Issues/Reports

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Via U.S. and Electronic Mail

Chairman Sammy Corbett
N.C. Marine Fisheries Commission
Division of Marine Fisheries
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Re: Petition for Rulemaking to Amend 15A Admin. Code 3L .0101, 3L .0103, 3M .0522, 3M .0523, 3N .0151, and 3R .0105 to Designate Special Secondary Nursery Areas and Reduce Bycatch Mortality in North Carolina Coastal Fishing Waters

Chairman Corbett:

On behalf of the North Carolina Wildlife Federation ("the Federation"), the undersigned files this Petition for Rulemaking ("Petition") pursuant to and in accordance with the North Carolina Administrative Procedure Act, N.C. Gen. Stat. § 150B-20, and 15A N.C. Admin. Code 3P .0301. These provisions allow any person wishing to adopt, amend, or repeal a rule of the North Carolina Marine Fisheries Commission ("MFC" or "the Commission") to submit a rulemaking petition to the Chairman of the Commission. In order to promote and ensure the viability and sustainability of North Carolina's valuable fisheries resources for all citizens, the Federation seeks amendments to the following sections of Title 15A of the North Carolina Administrative Code: 3R .0105, 3L .0101, 3L .0103, 3N .0151, and 3I .0101. In addition, the Federation urges the adoption of two new sections to Title 15A of the Code: 3M .0522 and 3M .0523 (collectively "proposed rules"). Taken together, the proposed rules will:

(1) Designate all coastal fishing waters not otherwise designated as nursery areas as special secondary nursery areas;

(2) Establish clear criteria for the opening of shrimp season; and

(3) Define the type of gear and how and when gear may be used in special secondary nursery areas during shrimp season.

In this Petition, "coastal fishing waters" include all inshore and ocean waters out to three miles that are currently under MFC jurisdiction.[1] The proposed rules are designed to protect, conserve, and restore North Carolina's valuable marine resources for all users by protecting important habitat areas for finfish and shellfish species in our sounds and estuaries and reducing bycatch of juvenile fish in nursery areas. This Petition advocates a data-driven, research-based approach to identifying existing nursery areas in North Carolina waters and in recommending management strategies most effective in protecting habitat and reducing bycatch.

The Petition proposes expanding special secondary nursery area designations to encompass areas that are essential to juvenile development for numerous recreationally and commercially valuable species in North Carolina waters, including but not limited to weakfish, spot, and Atlantic croaker. By expanding special secondary nursery area designations, more fish will survive the critical juvenile stage, reproduce, and thrive to stock recruitment.

Substantial fishing effort occurs in North Carolina's nursery areas. It is estimated that for every pound of shrimp harvested in North Carolina waters, over four pounds of non-target catch, including juvenile finfish, are discarded.[2] These juvenile finfish and other organisms constitute bycatch, which is defined as "the portion of a catch taken incidentally to the target catch because of non-selectivity of the fishing gear to either species or size differences."[3] In 2014, an estimated 15 million pounds of juvenile Atlantic croaker, spot, and weakfish were caught by trawl nets and thrown overboard.[4] Nearly all of the fish caught in trawl nets die in the net or shortly after culling on board.

The amount of finfish bycatch in the North Carolina shrimp trawl fishery is unsustainably high, and the negative impact of shrimp trawl bycatch is felt coast wide. North Carolina is the *only* state on the east coast to allow shrimp trawling in its sounds and estuaries. Rather than propose an outright ban on shrimp trawling in North Carolina waters, this Petition proposes a balanced approach of defining the type of gear and managing fishing in areas that are essential for juvenile finfish development. These efforts will protect important nursery areas, reduce bycatch of juvenile finfish, and preserve the commercial and recreational fishing industries, which drive North Carolina's coastal economy.

The Federation is a statewide, nonprofit conservation organization established in 1945 and dedicated to the sound, scientific management of North Carolina's fish, wildlife, and habitat

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[1] *See* 15A N.C. Admin. Code 3Q .0103 (2016) (defining "coastal fishing waters" and describing the scope of MFC jurisdiction over fishing waters); *see also* N.C. Gen. Stat. § 113-134.1 (2016) (stating the resources over which the MFC has jurisdiction).

[2] *Unintended Consequences*, N.C. WILDLIFE FED'N JOURNAL 2 (Spring 2014), http://www.ncwf.org/wp-content/uploads/ncwf-journal-spring-2014.pdf; *see also See* Kevin Brown, *Characterization of the commercial shrimp otter trawl fishery in the estuarine and ocean (0-3 miles) waters of North Carolina: Final Report to the National Fish and Wildlife Foundation and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service*, N.C. DEP'T OF ENV'TL QUALITY 14, 17 (Oct. 2015).

[3] Brown, *supra* note 2, at 2 (internal citations and quotations omitted).

[4] See Jack Travelstead & Louis Daniel, A Technical Review of a proposal submitted by the North Carolina Wildlife Federation to reduce mortality of juvenile fishes in North Carolina (Nov. 2016) (Exhibit B), at 11.

resources. The Federation is the state affiliate of the National Wildlife Federation and has offices in Charlotte and Raleigh, in addition to thirteen chapters, thirty eight affiliates, and thousands of members across the state. The Federation believes that North Carolina's marine resources are a public trust resource, and as such must be protected and sustained for use and enjoyment by all citizens. The Federation holds firmly to the position that North Carolina must change its approach to the protection, management, and conservation of its marine resources.

Pursuant to 15A N.C. Admin. Code 3P .0301, this Petition is addressed to the Chairman of the MFC. As required by MFC rules, fifteen (15) copies of this Petition will be submitted via U.S. Mail. The following sections of this Petition shall be organized by and shall provide the information that is required of rulemaking petitions set forth in 15A N.C. Admin. Code 3P .0301(b)(1)-(8).

I. TEXT OF THE PROPOSED RULES

The text of the proposed rules is attached hereto as Exhibit A.

II. THE STATUTORY AUTHORITY FOR THE COMMISSION TO PROMULGATE THE RULES

The Federation urges the adoption of amendments to the following sections of Title 15A of the North Carolina Administrative Code: 3R .0105, 3L .0101, 3L .0103, 3N .0151, and 3I .0101. In addition, the Federation urges the adoption of two new sections to Title 15A of the Code: 3M .0522 and 3M .0523.

The primary purpose of the MFC is to "[m]anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction."[5] The Commission has a mandatory duty to "adopt rules to be followed in the management, protection, preservation, and enhancement of the marine and estuarine resources within its jurisdiction."[6] The MFC has jurisdiction over the "conservation of marine and estuarine resources . . . and all activities connected with the conservation and regulation of marine and estuarine resources" in North Carolina.[7] Commission rulemaking authority includes regulation of the "[t]ime, place, character, or dimensions of any methods or equipment that may be employed in taking fish" and "[s]easons for taking fish."[8] The MFC must adopt rules to "provide a sound, constructive, comprehensive, continuing, and economical coastal fisheries program" for the State.[9] All regulation of commercial and recreational fishing must be "in the interest of the public,"[10] as the marine and estuarine resources of North Carolina "belong to the people of the State."[11]

[5] N.C. Gen. Stat. § 143B-289.51(b)(1) (2016).
[6] N.C. Gen. Stat. § 143B-289.52(a) (2016); *see also* N.C. Gen. Stat. § 113-182(a) (2016).
[7] N.C. Gen. Stat. § 113-132(a) (2016); *see also* N.C. Gen. Stat. § 143B-289.51(b)(1) (2016); N.C. Gen. Stat. § 113-134.1 (2016) (clarifying that the MFC has regulatory authority over the conservation of marine fisheries "in the Atlantic Ocean to the seaward extent of the State jurisdiction over the resources").
[8] N.C. Gen. Stat. § 143B-289.52(a)(1)(a)-(b) (2016); *see also* N.C. Gen. Stat. § 113-182(a) (2016).
[9] N.C. Gen. Stat. § 143B-289.51(b)(2) (2016).
[10] N.C. Gen. Stat. § 143B-289.52(a)(2) (2016).
[11] N.C. Gen. Stat. § 113-131(a) (2016).

The Commission defines nursery areas as "areas that for reasons such as food, cover, bottom type, salinity, temperature, and other factors, young finfish and crustaceans spend the major portion of their initial growing season."[12] Nursery areas fall into one of three categories: primary nursery areas ("PNAs"), secondary nursery areas ("SNAs"), and a subset of SNAs, special secondary nursery areas ("SSNAs").[13] PNAs are defined as "those areas in the estuarine system where initial post-larval development takes place . . [and] where populations are uniformly early juveniles."[14] SNAs are "areas in the estuarine system where later juvenile development takes place [and where] [p]opulations are composed of developing sub-adults of similar size that have migrated from an upstream primary nursery area to the secondary nursery area located in the middle portion of the estuarine system."[15] North Carolina rules do not distinguish between permanent SNAs and SSNAs. The rules prohibit the use of trawl nets, swipe nets, dredges, and other gear in PNAs.[16] The rules also prohibit the use of trawl nets in SNAs and SSNAs.[17] SSNAs, however, may be opened to trawling at the discretion of the Fisheries Director.[18] The designation of nursery areas, which triggers additional restrictions on effort and gear in these areas, is a critical component of the MFC's duty to protect and conserve the fisheries resources of the state.

The proposed rules expand the designation of SSNAs to include all inshore and near shore waters under MFC jurisdiction that are not currently protected as PNAs or permanent or special SNAs. In addition, the proposed rules provide guidance to the Fisheries Director regarding the appropriate time to open shrimp season. The proposed rules also limit trawl effort in sensitive and important habitat areas. Finally, the proposed rules establish size limits for Atlantic croaker and spot.

The proposed rules are consistent with—and further the objectives of—the Coastal Habitat Protection Plan ("CHPP"), which was mandated by the Fisheries Reform Act.[19] The MFC, together with the N.C. Coastal Resources Commission and the N.C. Environmental Management Commission, adopted the CHPP and must implement the recommendations contained therein.[20] The CHPP catalogues and describes the diversity of habitats and ecosystems on North Carolina's coast, identifies threats to important coastal habitats, and recommends management actions "to protect and restore habitats" vital to the State's fishery resources.[21] The CHPP repeatedly acknowledges the important role that nursery habitats play in maintaining

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[12] 15A N.C. Admin. Code 3I .0101(4)(f) (2016).
[13] *Id.*
[14] *Id.*
[15] *Id.*
[16] *See* 15A N.C. Admin. Code 3N .0104 (2016).
[17] *Id.* at .0105.
[18] *Id.*
[19] *See* N.C. Gen. Stat §§ 143B-289.52(a)(11), 143B-279.8 (2016). *See also North Carolina Coastal Habitat Protection Plan: Source Document*, N.C. DEP'T OF ENVT'L QUALITY 2 (2016), http://portal.ncdenr.org/c/document_library/get_file?uuid=5d02ccd2-3b9d-4979-88f2-ab2f9904ba61&groupId=38337 [hereinafter *CHPP*].
[20] N.C. Gen. Stat. § 143B-279.8(c) (2016).
[21] N.C. Gen. Stat. § 143B-279.8(a) (2016).

viable fisheries and a healthy coastal ecosystem.[22] Among the CHPP's many stated goals is that of enhancing and protecting habitats from adverse physical impacts. Expanding nursery area designations to accurately account for nursery habitat and affording these habitats additional protection furthers the goals of the CHPP.

Current North Carolina fisheries management policy does not include measures to ensure proper and necessary protection of marine fisheries resources. The proposed rules will ensure that essential habitat areas for commercially and recreationally valuable species are adequately protected by: (1) designating additional special secondary nursery areas in inshore and near shore waters, and (2) limiting effort and restricting gear within designated nursery areas. These measures are consistent with and fulfill MFC's statutory duties to manage, protect, preserve, and enhance the marine and estuarine resources of North Carolina. Moreover, the proposed rules will advance the objectives of the Fisheries Reform Act of 1997.

The MFC is statutorily authorized to enact the proposed rules. Designating nursery areas, regulating the opening and closing of seasons, establishing size limits, and managing the use of gear within designated nursery areas fall squarely within the MFC's authority to regulate the appropriate areas and methods for the taking of fish.[23] In addition, the MFC has explicit authority to establish seasons for the taking of fish.[24] Neither the Fisheries Reform Act nor any other legislation restricts when the Commission may take action on these important issues.[25]

III. A STATEMENT OF THE REASONS FOR ADOPTION OF THE PROPOSED RULES

The lack of adequate habitat protections and declining and depleted status of many of our coastal fish stocks suggests a failure of the MFC, through its existing regulations, to meet its duties to "conserve, protect, and regulate" marine and estuarine resources. While environmental factors and water pollution may affect the status of fish stocks, fishing practices also contribute to decline and depletion of several stocks. Bycatch of juvenile fish in the shrimp trawl fishery in estuarine and near shore waters, as allowed by existing Commission regulations, contributes to the current status of several commercially and recreationally valuable species, including but not limited to Atlantic croaker, spot, and weakfish.

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[22] *See, e.g.*, *CHPP*, *supra* note 19, at 27 (discussing the role of nursery areas for estuarine spawners).
[23] *See* N.C. Gen. Stat. § 143B-289.52(a)(1)(a) (2016).
[24] *Id.* at (a)(1)(b).
[25] The Fisheries Reform Act, N.C. Gen. Stat. § 113-181, *et. seq.*, requires the adoption of fishery management plans for "all commercially or recreationally significant species or fisheries that compromise State marine or estuarine resources." N.C. Gen. Stat. § 113-182.1(a) (2016). Fishery management plans may be species-specific, or may be based on gear or geographic areas. *Id*. at (b). With the exception of the size limits proposed for spot and Atlantic croaker, the proposed rules are not species-specific management measures. Instead, the proposed rules designate special secondary areas and provide for appropriate practices designed to protect these areas for numerous species. Size limits for several species not the subject of a state fishery management plan have been adopted by the MFC. *See, e.g.*, 15A N.C. Admin. Code 3M .0511 (2016) (imposing a per-day catch limit and a size limit for bluefish for recreational purposes). All of the proposed rules may be adopted by the MFC outside of the fishery management plan process outlined by the Fisheries Reform Act.

As discussed in further detail in the attached expert analyses:

(1) Existing primary, secondary, and special secondary nursery area designations fail to protect vital habitat areas within which later juvenile development takes place prior to a fish's first spawning;

(2) N.C. Division of Marine Fisheries ("DMF") data demonstrates that all coastal fishing waters that are not currently designated as nursery areas are, in fact, SSNAs for several finfish species;

(3) Additional gear restrictions and effort limits are necessary to provide adequate protection to juvenile fish that have yet to spawn in SSNAs at this sensitive life stage; and

(4) All coastal fishing waters not otherwise designated must be designated as SSNAs and afforded the protections of SSNA designation.

North Carolina's commercial and recreational fisheries are some of the most productive in the country. Estuarine-dependent species account for more than 90 percent of the State's commercial fisheries landings and over 60 percent of the recreational harvest.[26] The continued success and viability of these fisheries requires protection of important habitat areas on which these species rely for survival. North Carolina's existing nursery program provides important protections to larval and early juvenile populations that inhabit shallow, protected habitat areas. Later stage juveniles—those juveniles that have not yet reached adulthood and therefore have not spawned—however, lose habitat protection once they move into the sounds and ocean waters and are exposed to shrimp trawls and other fishing gear. It is no surprise that the highest levels of bycatch of juvenile species in North Carolina waters are found in the Pamlico Sound, which is a highly productive nursery area for several species of finfish.

The impact of bycatch mortality in North Carolina nursery areas extends to the mid- and south Atlantic coast.[27] Commercially and recreationally valuable species, including Atlantic croaker, spot, and weakfish, are in depleted or declining status, and fisheries managers have struggled to mitigate further decline in these stocks.[28] In fact, these three species also account for the vast majority of finfish bycatch in North Carolina waters.[29] As the experts note, bycatch mortality in North Carolina's shrimp trawl fishery contributes to declining status of these important populations.[30] Currently, tens of millions of juvenile fish fall victim to shrimp trawl bycatch each year, and therefore do not spawn, replace themselves, and contribute to the adult population. Increasing juvenile recruitment is essential to rebuilding the stock of these species.[31]

[26] *See CHPP*, *supra* note 19, at 11.
[27] *See* Travelstead & Daniel, *supra* note 4, at 20.
[28] *See id*. at 5, 7-9.
[29] *See id.* at 1, 5-9 (citing Brown 2015).
[30] *Id.* at 2.
[31] *Id.*

Critical ecosystem services are also lost as a result of sustained high bycatch levels.[32] Atlantic croaker, spot, and weakfish serve an important role in the trophic structure of the state's fisheries resources. Spot and Atlantic croaker, for example, transfer energy from benthic species (their primary diet component) to other economically valuable species, including spotted seatrout, red drum, and southern and summer flounder. [33] Removing significant levels of juvenile fish in shrimp trawls disadvantages higher-level species. The trawling activity itself compounds this effect, as bottom disturbing gear disrupts bottom habitat and bottom-dwelling benthic communities.[34]

The MFC's efforts to minimize bycatch of juvenile finfish have proven unsuccessful to date, as discussed below. The MFC limited the scope of Amendment 1 to the North Carolina Shrimp Fishery Management Plan ("FMP") to address the significant levels of bycatch in the state's shrimp trawl fishery. The MFC fell far short of taking meaningful action to protect important habitat areas and reduce bycatch of juvenile fish. Decades of inaction by the MFC have led to unsustainable levels of bycatch, and the time for action is now.

A. **Nursery Area Protection is Essential to Achieving Sustainable Fisheries.**

Nursery areas serve as vital habitat areas for the development of finfish and shellfish species from early larval to late juvenile life stages. As discussed in detail in the attached expert reports, nursery habitat supports high abundance levels and diversity of fish species, and the ecological processes that occur in nursery habitat support growth of individual fish. For decades, researchers have recognized the importance of nursery areas for juvenile life stage development. Estuarine nursery areas have been shown to contribute disproportionately to the production of individual fish that recruit into adult populations.[35] Nursery areas must be maintained in their natural state to promote and support species development.

Atlantic croaker, spot, and weakfish, among other estuarine-dependent species, spawn in coastal and near shore ocean waters and recruit as early juveniles in estuarine habitats like the Pamlico Sound.[36] The majority of the individuals found in the Pamlico Sound are juvenile fish that have yet to spawn or have not reached their full spawning potential.[37] As discussed in more detail below and in the attached expert reports, harvesting or otherwise subjecting these juveniles to high levels of fishing mortality before first spawning leads to recruitment overfishing and growth overfishing, and may ultimately impact fishery yields and long-term stock productivity.[38]

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[32] *See* Luiz Barbieri, *Technical Review: The Need to Reduce Fishing Mortality and Bycatch of Juvenile Fish in North Carolina's Estuaries* (Nov. 2016) (Exhibit E), at 9.
[33] *See* Travelstead & Daniel, *supra* note 4, at 12.
[34] *See id*. at 15; *see also* Barbieri, *supra* note 32, at 11.
[35] *See* Barbieri, *supra* note 32, at 5 (citing Able 2005, Beck, et. al., 2001, Heck and Crowder 1991).
[36] *See id.* at 9 (citing Lowerre-Berbieri et al. 1995, Barbieri et al. 1994a, Weinstein and Walters 1981, Chao and Musik 1977).
[37] *See id*.
[38] *See id.* at 11-12.

1. The Existing Nursery Area Program Fails to Protect Important Habitat Areas that are Essential for the Viability and Recovery of Fish Stocks.

The first steps in protecting nursery areas are to properly define "nursery area" under North Carolina rules and to designate important habitat areas as nursery areas. In 1988, approximately 3.9 percent of the state's estuarine waters were designated as PNAs; 1.7 percent were designated as SNAs; and 0.7 percent were designated as SSNAs.[39] In sum, approximately 129,000 acres, or 6.3 percent, of the state's estuarine waters were designated as nursery areas at that time.[40] Fast forward almost 30 years and little has changed, despite current and historical data demonstrating that additional areas serve as nursery habitat for several finfish species.[41] As a result, important habitat areas are left unprotected and few gear restrictions apply in these critical areas. Indeed, the CHPP acknowledges that "many shallow soft bottom areas are productive but *not* designated as primary or secondary nursery."[42] The existing nursery area designations fail to protect larger juvenile fish or very young adult fish and shellfish prior to spawning or reaching full spawning potential because existing designations do not account for large swaths of important habitat areas.[43] The MFC may obtain its goal of "balancing competing public trust uses with the goal of habitat protection" by expanding the areas designated as SSNAs and allowing commercial and recreational activities in SSNAs within certain limitations.[44]

DMF conducts several surveys to identify nursery area habitat in North Carolina waters, including the Program 120 ("P120") Survey and the P195 Pamlico Sound Survey. DMF conducted trawling and seine surveys in the 1970s to develop an inventory of the state's estuarine resources and to identify those areas of the state's estuaries that consistently support juvenile populations of shrimp, crab, and finfish.[45] The 1970s trawl surveys served as the initial survey to build DMF's inventory of coastal and estuarine resources and led to the first designation of PNAs, SNAs, and SSNAs. DMF surveys annually through the P120 survey, which provides updated data to identify nursery areas and builds a database of annual juvenile populations of economically beneficial species.[46] The P120 survey is concentrated in shallow, upper estuarine areas. The P195 Pamlico Sound Survey is conducted annually by DMF staff in June and September in the Pamlico Sound. The P195 survey has several objectives, including determining which species utilize the Sound and whether nursery habitats exist in the Sound for identified species.[47] Pamlico Sound Survey stations are located in the deeper parts of the

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[39] Elizabeth Noble and Robert Monroe, *Classification of Pamlico Sound Nursery Areas: Recommendations for Critical Habitat Criteria*, N.C. DEP'T OF ENV'T, HEALTH AND NAT. RES., 5 (1991).
[40] *Id.*
[41] *See* Travelstead & Daniel, *supra* note 4, 14-15 (citing Brown 2015, Casey and Zapf 2015).
[42] *CHPP*, *supra* note 19, at 169.
[43] *See* Travelstead & Daniel, *supra* note 4, at 2, 10-12 ; *see also* Barbieri, *supra* note 32, at 7.
[44] *Amendment 1 to the North Carolina Shrimp Fishery Management Plan*, N.C. DIV. MARINE FISHERIES, 170 (2015), http://portal.ncdenr.org/c/document_library/get_file?uuid=3d0d96c3-05bf-4cb6-84c3-fd119ad25d7e&groupId=38337 [hereinafter *Amendment 1*].
[45] *See id.* at 168; *see also North Carolina Division of Marine Fisheries Primary Nursery Area Designation Protocol*, N.C. DIV. MARINE FISHERIES, 1 (2002) [hereinafter *Protocol*].
[46] *See Amendment 1*, *supra* note 44, at 169.
[47] *See* Travelstead & Daniel, *supra* note 4, at 10 (citing Knight and Zapf 2015).

Pamlico Sound.[48] Generally, the Pamlico Sound Survey and P120 Survey stations do not overlap.

The following criteria are used to determine the presence of nursery areas: abundance, size composition, species diversity, bottom type, and depth.[49] The abundance analysis under the P120 survey, however, is limited to the following species: brown shrimp, blue crab, spot, Atlantic croaker, and southern flounder.[50] As the MFC has acknowledged, 90 percent of commercially and recreationally valuable species in North Carolina waters are dependent on nursery areas during an important life stage.[51] Those areas that "consistently support[] populations of juvenile shrimps, crab, and finfishes" and meet the criteria outlined by DMF should be designated as PNAs, SNAs, and SSNAs.[52]

2. North Carolina's Inshore Waters and Ocean (0-3 miles) Waters are Nursery Areas.

As explained in detail in the expert reports attached hereto as Exhibits B and E, current and historical DMF data clearly demonstrates that inshore and ocean (0-3 miles) waters serve as nursery areas for several species of finfish, including Atlantic croaker, spot, and weakfish. The MFC can no longer ignore its obligation to protect and conserve these areas for juvenile species, which are critical to recruitment and stock recovery.

The results of the annual Pamlico Sound Survey consistently indicate high levels of abundance of Atlantic croaker, spot, and weakfish in the Pamlico Sound.[53] Moreover, length frequency data suggests that the vast majority of the fish found in the Sound are juveniles that have not yet reached maturity.[54] These results are consistent with DMF characterization studies conducted in inshore waters south of the Pamlico Sound, including Bogue Sound and Core Sound, and in ocean waters.[55] In addition, physical habitat characteristics in these areas, including bottom type, salinity, and temperature, support the growth of juveniles into adulthood.[56]

The proposed rules designate all undesignated coastal fishing waters out to three miles offshore as SSNAs, recognizing the important role that these waters play in pre-spawn, late juvenile development. The proposed rules also amend the definition of "secondary nursery areas" to include "ocean waters" that serve as nursery habitat for food and forage species.

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[48] *See id*. at 10, 22 (Fig. 2).
[49] *See Protocol*, *supra* note 45, at 2-3.
[50] *See id*. at 2; *see also Amendment 1*, *supra* note 44, at 169.
[51] *Amendment 1*, *supra* note 44, at 168.
[52] *Protocol*, *supra* note 45, at 1.
[53] *See* Travelstead & Daniel, *supra* note 4, at 10-11 (citing Knight and Zapf 2015).
[54] *See id*. Abundance is the most important variable in determining the presence of nursery areas. *See Amendment 1*, *supra* note 44, at 169.
[55] *See* Travelstead & Daniel, *supra* note 4, at 11 (citing Brown 2015, Knight 2015, Knight and Zapf 2015, Brown 2009, Johnson 2006, Logothetis & McCuiston 2004, Johnson 2003, Diamond-Tissue 1999).
[56] *See id*. at 12.

B. **Gear Restrictions and Reduced Effort Are Necessary to Protect Habitat in Special Secondary Nursery Areas.**

Juvenile populations of Atlantic croaker, spot, and weakfish, among many other species, are subjected to intense fishing pressure in the shrimp trawl fishery in North Carolina waters. Ninety-two percent of shrimp landings in state waters are harvested with otter trawls.[57] Otter trawls catch essentially everything in their path, leading to extraordinarily high levels of bycatch. In addition, otter trawls disturb the sea or sound floor, which are fragile and productive ecosystems. A legislative panel pre-dating the Fisheries Reform Act found that bottom trawling gear, including shrimp trawls, had the greatest potential to impact bottom habitats in estuarine and coastal waters.[58] These impacts include physical disruption of habitat, changes in functional organization of species, increases in total suspended solids and turbidity, destruction of submerged aquatic habitat, and decreases in habitat complexity.[59] In North Carolina, designated PNAs, SNAs, and SSNAs are afforded protection; however, existing designations fail to account for all habitat areas that serve as nurseries. This is in spite of the fact that the MFC has recognized that "nursery areas need to be maintained . . . in their natural state, and the populations within them must be permitted to develop in a normal manner with as little interference from man as possible."[60]

In 2014 alone, approximately 15 million pounds of juvenile spot, Atlantic croaker, and weakfish were caught and discarded in North Carolina waters.[61] The vast majority of commercial shrimp landings from North Carolina are from inshore waters.[62] Substantial numbers of shrimp are also harvested in near shore ocean waters. High levels of juvenile abundance of valuable species have been found in these areas as well.[63] As discussed in detail above, these inshore and near shore areas serve as important habitat areas for an abundant and diverse population of juvenile fish. It is imperative to protect these nursery areas, as they provide "food, protection and proper environmental conditions (salinity and bottom type) for development and growth of young fish and crustaceans."[64]

North Carolina remains the only state on the east coast to allow trawling in inshore waters. A wholesale ban on trawling in inshore waters would substantially reduce bycatch in the commercial and recreational fisheries—but this extreme policy would have a detrimental impact on commercial fishermen, recreational fishermen, and North Carolina's coastal economy. The Federation proposes the following balanced, research-based approach to reduce bycatch mortality of juvenile species and to protect vital habitat areas in North Carolina's estuaries and ocean waters while allowing shrimp trawling to continue under new parameters. These management strategies are intended to apply to both the commercial and the recreational fishing

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[57] *See* Brown, *supra* note 2, at 1.
[58] *See CHPP*, *supra* note 19, at 163.
[59] *See id*. at 163-67.
[60] *See Amendment 1*, *supra* note 44, at 168; *see also* 15A N.C. Admin. Code 3N .0104-0105 (2016).
[61] *See* Travelstead & Daniel, *supra* note 4, at 11.
[62] *See* Brown, *supra* note 2, at 1 ("The majority of landings are from Pamlico Sound (56%), the Atlantic Ocean (24%) and Core Sound (6%), respectively.").
[63] *See* Travelstead & Daniel, *supra* note 4, at 11 (citing Brown 2015).
[64] *Amendment 1*, *supra* note 44, at 168; *see also* 15A N.C. Admin. Code 3I .0101(4)(f) (2016).

industries, including recreational fisherman operating under a recreational commercial gear license.

Taken together, the proposed rules will provide protection to essential habitat areas in which juvenile fish grow and thrive, reduce bycatch of juvenile fishes, and put North Carolina's fisheries on the path to recovery, which will benefit all North Carolinians—commercial and recreational fishermen alike. The Federation recommends that the proposed rules take effect in the shrimp season following their adoption. The following management measures are discussed in more detail in the attached expert reports.

1. Open Shrimp Season Under Established Guidelines.

Currently, the Fisheries Director must open each shrimp season by proclamation. Commission rules, however, provide no guidelines for the opening of the season. The Director should be guided by conservation principles in exercising proclamation authority under MFC rules. The Federation proposes opening shrimp season once the shrimp count in the Pamlico Sound reaches 60 shrimp per pound (heads on), as evaluated by DMF staff.[65]

2. Reduce Headrope Length.

Average headrope length in otter trawls has increased steadily over time, which in turn increased overall yield and higher levels of bycatch.[66] In 2012, average maximum headrope length on commercial otter trawls measured 94 feet.[67] By 2015, average maximum headrope length increased to 134 feet.[68] As discussed in detail in the attached expert reports, a headrope length restriction would reduce the total amount of bycatch by reducing the overall net size on all trawls in state waters.[69] Currently, combined headropes may be as long as 220 feet in some internal coastal waters, while headrope length is restricted to 90 feet in other internal coastal waters.[70]

Other states with significant commercial shrimping industries have established combined headrope length limits well below the current 220 feet maximum in North Carolina waters. For example, the maximum combined headrope length for shrimp trawls in Mississippi waters is 100 feet.[71] In Alabama, recreational shrimp trawl nets cannot exceed 16 feet (only one net per boat)

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[65] *See* Travelstead & Daniel, *supra* note 4, at 18-19.
[66] *See id.* at 17-18.
[67] *Id.* (citing Brown 2015). *See also Amendment 1*, *supra* note 44, at 312-313.
[68] Travelstead and Daniel, *supra* note 4, at 17 (citing Brown 2015).
[69] *See id. See also North Carolina Shrimp Fishery Management Plan*, N.C. DIV. OF MARINE FISHERIES 315 (2006), http://portal.ncdenr.org/c/document_library/get_file?uuid=7dc55c67-c6df-4a39-9ffc-32471c055c23&groupId=38337 (stating that limiting headrope sizes will lead to reduction in bycatch).
[70] Maximum headrope length cannot exceed 90 feet in certain Internal Coastal Waters. *See* 15A N.C. Admin. Code 3L .0103 (2016).
[71] *See* 21-1 MISS. CODE. R. § 15:05 (2014) (restricting individual trawl net sizes in different coastal areas to 12, 25, and 50 feet and placing limitations on the size of trawl doors).

and commercial trawl nets cannot exceed a combined 50 feet in length (limit of two nets per boat).[72]

The Federation proposes a maximum headrope length on all trawls in state waters not to exceed 90 feet. A consistent maximum headrope length not to exceed 90 feet will provide clarity and consistency for all fishermen and result in more efficient fishing practices in state waters.

3. Limit Tow Times.

Mortality of bycatch captured in trawl nets can vary widely based on tow times; longer tow times generally lead to higher bycatch mortality.[73] Conversely, shorter tow times would lead to a reduction in culling time and bycatch mortality.[74] Tow times vary widely in both the commercial and recreational fishery. Overall tow times have increased over the last several years. In 2012, average tow times in the shrimp trawl fishery during an observer study totaled 100 minutes in the Pamlico Sound.[75] By 2015, tow times under the same study increased more than 75 percent and averaged 181 minutes.[76] Maximum tow times likewise increased over the study period from 240 minutes in 2012 to 360 minutes in 2015.[77]

A reduction in tow times is unlikely to have an impact on overall harvest or income for commercial fishermen.[78] Bycatch mortality, however, is expected to decrease, giving juvenile fish caught in nets a higher likelihood of survival. The Federation proposes limiting tow times to 45 minutes in SSNAs.

4. Limit Fishing Days to Three Days per Week During Daylight Hours.

Reducing the number of fishing days each week and limiting trawling to daytime hours will reduce overall effort and, thus, bycatch of juvenile species in state waters. Under existing rules, shrimp trawling is prohibited in inshore waters between 9:00 pm on Friday until 5:00 pm on Sunday evenings.[79] An additional two day closure would reduce overall bycatch, provide fish species the opportunity to move out of trawling areas, and allow fish to recover from encounters with shrimp trawls during fishing days.[80] Shrimp landings are highest immediately after the opening of trawling for the week, suggesting that an additional two days of closure could

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[72] *See* ALA. ADMIN CODE R. 220-3-.01(8) (2014).
[73] *See, e.g.*, *Amendment 1*, *supra* note 44, at 304 ("Reduced tow times would likely reduce bycatch mortality.").
[74] *See id.*; *see also* Travelstead & Daniel, *supra* note 4, at 18.
[75] Travelstead & Daniel, *supra* note 4, at 18 (citing Brown 2015).
[76] *Id*.
[77] *Id*.
[78] *See Amendment 1*, *supra* note 44, at 306 (noting that implementing a tow time would not likely have an impact on harvest or income and that the Advisory Committees did not consider this management option when developing Amendment 1).
[79] 15A N.C. Admin. Code 3L .0102 (2016).
[80] *See* Travelstead & Daniel, *supra* note 4, at 18; *see also Amendment 1*, *supra* note 44, at 302 (discussing Ingraham's (2003) evaluation of nighttime closure off the coast of Brunswick County and noting that finfish bycatch was higher during nighttime trawling).

improve overall efficiency in the fishery.[81] Limiting trawling to daytime hours further limits effort in the fishery, without sacrificing catch.[82] Monitoring the shrimp trawling fishery is more effective during daylight hours because the trawlers can be more readily seen by DMF officers.

The Federation, therefore, proposes limiting the number of days for trawling in designated SSNAs to three days each week during daylight hours only.

5. Require the Use of Two DMF-certified Bycatch Reduction Devices.

No current North Carolina statute, regulation, or proposed regulation requires the use of a BRD by shrimp trawlers in state waters, other than a turtle excluder device.[83] The Fisheries Director may, but is not required to, issue a proclamation mandating the use of BRDs to reduce the number of finfish caught by shrimp trawl nets.[84] The use of one BRD has been required by proclamation since the 2012 shrimp season.[85] After the adoption of Amendment 1 to the Shrimp FMP, the Fisheries Director issued Proclamation SH-2-2015, which requires the use of two DMF-authorized BRDs on all otter and skimmer trawls in coastal fishing waters.[86] Amendment 1 also provided for the convening of a stakeholder group to initiate industry testing of several BRDs, with the target of reducing bycatch by 40 percent and minimizing shrimp loss.[87] DMF, with the support and involvement of the commercial industry stakeholders, has tested several promising BRDs over the last two shrimp seasons that significantly reduce bycatch levels while minimizing shrimp loss. The results of this study support the implementation of this management strategy.

Proclamations are binding on all fishermen fishing in North Carolina waters;[88] however, a proclamation may be rescinded at any time by the Fisheries Director. A rule requiring the use of two BRDs would put in place a permanent and consistent requirement and signal to fishermen MFC's commitment to reducing bycatch in the state's shrimp trawl fishery.

The Federation proposes a rule that requires all fishermen to use two DMF-certified BRDs when trawling in any state waters, which is consistent with Proclamation SH-2-2015.

6. Establish Size Limits for the Possession of Spot and Atlantic Croaker.

A size limit will supplement efforts in the commercial fishery to reduce bycatch, preserve habitat, and protect sensitive juvenile finfish populations. Currently, no size limits exist for the

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[81] *See Amendment 1*, *supra* note 44, at 301 (citing Johnson 2006); *see also* Travelstead & Daniel, *supra* note 4, at 18.
[82] *See* Travelstead & Daniel, *supra* note 4, at 18.
[83] 15A N.C. Admin. Code 03L .0103(g) (2016).
[84] 15 N.C. Admin. Code 3J .0104(d) (2016).
[85] *See* Proclamation SH-3-2012 Re: Shrimp Trawling, N.C. Div. of Marine Fisheries (May 22, 2012), *available at* http://portal.ncdenr.org/web/mf/proclamation-sh-03-2012.
[86] *See* Proclamations SH-2-2015 Re: Shrimp Trawl BRD Requirements, N.C. Div. of Marine Fisheries (May 12, 2015), http://portal.ncdenr.org/web/mf/proclamation-sh-02-2015.
[87] Amendment 1, *supra* note 44, at 356.
[88] 15 N.C. Admin. Code 3H .0103(a) (2016).

possession of Atlantic croaker or spot in North Carolina waters.[89] To allow these species to grow to full maturity and spawn at least once, the Federation recommends establishing size limits for spot and Atlantic croaker for the recreational fishery. Specifically, the Federation proposes an 8 inch size limit for the harvest of spot and a 10 inch size limit for the harvest of Atlantic croaker.

IV. A STATEMENT OF THE EFFECT ON EXISTING RULES

The proposed rules will amend the following sections of 15A of the North Carolina Administrative Code: 3R .0105, 3L .0101, 3L .0103, and 3N .0151. The proposed rules also add two additional sections to Chapter 3, Subchapter M of Title 15A of the North Carolina Administrative Code. The proposed rules are not expected to affect any other existing rules.

V. COPIES OF ANY DOCUMENTS AND DATA SUPPORTING THE PROPOSED RULES

Copies of documents supporting the proposed rules are attached hereto as Exhibits B through F. Exhibit B is a technical review provided by Jack Travelstead and Dr. Louis Daniel, and details the important role of nursery areas in juvenile fish development, the stock status of several commercially and recreationally important species, and the contribution of bycatch mortality in nursery areas to overall stock status. In addition, Mr. Travelstead and Dr. Daniel recommend several management strategies that the MFC must adopt to provide adequate protection to nursery areas and mitigate bycatch levels in North Carolina waters. Exhibit E is a technical review provided by Dr. Luiz Barbieri, which outlines the need to reduce fishing and bycatch mortality of juvenile fish in North Carolina's estuaries. Exhibits C, D, and F include the curriculum vitae of supporting experts.

VI. A STATEMENT OF THE EFFECT OF THE PROPOSED RULE ON EXISTING PRACTICES IN THE AREA INVOLVED, INCLUDING AN ESTIMATE OF COST FACTORS FOR PERSONS AFFECTED BY THE PROPOSED RULES

The proposed rule is designed to minimally affect the commercial and recreational fishing industries. Commercial and recreational fishermen would be expected to see increases in the availability of fishes for harvest under the proposed rules. Commercial shrimp trawl fishermen with smaller boats and nets shorter than 45 feet will be minimally affected. Those fishermen who already employ the use of a second BRD will minimally affected by the proposed rules. Fishermen with large boats and nets exceeding the total headrope maximum may be required to discontinue the use of one or two nets while in state waters. In addition, fish dealers may be impacted if the availability, quantity, or price of harvested shrimp is positively or negatively affected by the proposed rules.

[89] The MFC prohibits the possession of weakfish below 12 inches in the commercial and recreational fishery and limits the catch of weakfish to 1 bag per day in the recreational fishery. *See N.C. Recreational Coastal Waters Guide for Sports Fishermen*, N.C. DIV. OF MARINE FISHERIES, http://portal.ncdenr.org/web/mf/recreational-fishing-size-and-bag-limits (last updated Oct. 13, 2016).

Efficiencies in terms of reduced effort and associated costs would be measureable. As pointed out in the attached expert reports, limiting shrimping during the day and the earlier part of the week results in minimal shrimp loss. Anecdotal evidence suggests that several of the management strategies required by the proposed rules will increase the size, and therefore the value, of shrimp harvested in North Carolina waters, which would benefit the commercial fishing industry. Moreover, all commercial and recreational fisheries will benefit if fish stocks currently in depleted or declining status rebound as a result of the proposed rule. Without an economic analysis that considers the specific proposals contained in this Petition, any prediction of cost is purely speculative.

Cost factors associated with the proposed rule include, but are not limited to, the following: (1) cost of new gear, including a headrope meeting the proposed rule requirements and a second bycatch reduction device, and installation of new gear, if necessary; (2) cost of delaying the shrimp season by a short time to allow shrimp count to reach 60 shrimp per pound (heads on) as determined by the Fisheries Director; (3) cost of reducing tow time to 45 minute tows and trawl effort to three days per week during nighttime hours, if these reductions affect overall effort; and (4) the cost of implementing a size limit on spot and Atlantic croaker.

VII. A DESCRIPTION OF THOSE MOST LIKELY TO BE AFFECTED BY THE PROPOSED RULES

As described above, the proposed rules will affect individuals who participate in the commercial and recreational fishing industries, as well as the general public. The general public will derive substantial benefits from the adoption of the proposed rule changes. Economically valuable North Carolina and coast-wide fish stocks have struggled to rebound after several years, and in some cases decades, of decline. Bycatch mortality in the absence of adequate habitat protection has contributed to declining and depleted stock statuses. By protecting valuable habitats and reducing bycatch levels, the proposed rules will protect marine and estuarine resources for all citizens of the State.

VIII. THE NAME AND ADDRESS OF THE PETITIONER

Tim Gestwicki, Chief Executive Officer
North Carolina Wildlife Federation
1346 Saint Julien Street
Charlotte, NC 28205

IX. CONCLUSION

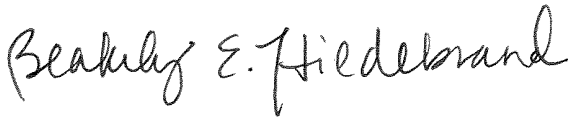
The Commission has a duty to adopt rules “in the public interest” for the “protection, preservation, and enhancement” of fish stocks adversely affected by bycatch in the shrimp trawl fishery. The Federation has proposed rules that would allow the continuation of a shrimp trawl fishery while protecting habitat, reducing bycatch, and contributing to the restoration of declining and depleted fish stocks. The proposed regulations are within the authority of the Commission and in the public interest, and will enable the Commission to meet its duties under the law to conserve, preserve, protect, and enhance marine and estuarine resources.

For the reasons stated above, the Federation requests that the MFC adopt the proposed rules. Pursuant to 15A N.C. Admin. Code 3P .0303(b), the MFC has 120 days to make a final determination regarding the Petition. The Federation appreciates the opportunity to informally discuss this Petition with the Commission on November 17, 2016.

The Federation welcomes questions from the Commission, and appreciates the Commission's consideration of the Petition. Please direct any questions regarding the Petition to Blakely Hildebrand at bhildebrand@selcnc.org or (919) 967-1450.

Sincerely,

Tim Gestwicki
Chief Executive Officer
North Carolina Wildlife Federation



Blakely E. Hildebrand
Associate Attorney
Southern Environmental Law Center

Enclosures (6)

CC (w/encl.):
Vice Chairman, Commissioner Joe Shute, N.C. Marine Fisheries Commission
Commissioner Rick Smith, N.C. Marine Fisheries Commission
Commissioner Janet Rose, N.C. Marine Fisheries Commission
Commissioner Mike Wicker, N.C. Marine Fisheries Commission
Commissioner Alison Willis, N.C. Marine Fisheries Commission
Commissioner Mark Gorges, N.C. Marine Fisheries Commission
Commissioner Chuck Laughridge, N.C. Marine Fisheries Commission
Braxton Davis, Director, N.C. Division of Marine Fisheries

EXHIBIT A

TEXT OF PROPOSED RULES

The added text is denoted by underline and deleted text is denoted ~~by strike-through~~ below.

15A N.C. Admin. Code 3R .0105: Special Secondary Nursery Areas

The special secondary nursery areas referenced in 15A NCAC 3N .0105(b) are designated in the following coastal water areas:

(1) Roanoke Sound:

(a) Outer Shallowbag Bay--west of a line beginning on Baum Point at a point 35° 55.1461' N--75° 39.5618' W; running southeasterly to Ballast Point to a point 35° 54.6250' N--75° 38.8656' W; including the canal on the southeast shore of Shallowbag Bay; and
(b) Kitty Hawk Bay/Buzzard Bay--within the area designated by a line beginning at a point on the east shore of Collington Creek at a point 36° 2.4360' N--75° 42.3189' W; running westerly to a point 36° 2.6630' N--75° 41.4102' W; running along the shoreline to a point 36° 2.3264' N--75° 42.3889' W; running southwesterly to a point 36° 2.1483' N--75° 42.4329' W; running along the shoreline to a point 36° 1.6736' N--75° 42.5313' W; running southwesterly to a point 36° 1.5704' N--75° 42.5899' W; running along the shoreline to a point 36° 0.9162' N--75° 42.2035' W; running southeasterly to a point 36° 0.8253' N--75° 42.0886' W; running along the shoreline to a point 35° 59.9886' N--75° 41.7284' W; running southwesterly to a point 35° 59.9597' N--75° 41.7682' W; running along the shoreline to the mouth of Buzzard Bay to a point 35° 59.6480' N--75° 32.9906' W; running easterly to Mann Point to a point 35° 59.4171' N--75° 32.7361' W; running northerly along the shoreline to the point of beginning;

(2) In the Pamlico and Pungo rivers Area:

(a) Pungo Creek--west of a line beginning on Persimmon Tree Point at a point 35° 30.7633' N--76° 38.2831' W; running southwesterly to Windmill Point to a point 35° 31.1546' N--76° 37.7590' W;
(b) Scranton Creek--south and east of a line beginning on the west shore at a point 35° 30.6810' N--76° 28.3435' W; running easterly to the east shore to a point 35° 30.7075' N--76° 28.6766' W;
(c) Slade Creek--east of a line beginning on the west shore at a point 35° 27.8879' N--76° 32.9906' W; running southeasterly to the east shore to a point 35° 27.6510' N--76° 32.7361' W;
(d) South Creek--west of a line beginning on Hickory Point at a point 35° 21.7385' N--76° 41.5907' W; running southerly to Fork Point to a point 35° 20.7534' N--76° 41.7870' W; and
(e) Bond Creek/Muddy Creek--south of a line beginning on Fork Point 35° 20.7534' N--76° 41.7870' W; running southeasterly to Gum Point to a point 35° 20.5632' N--76° 41.4645' W;

(3) In the West Bay Area:

(a) West Thorofare Bay--south of a line beginning on the west shore at a point 34° 57.2199' N--76° 24.0947' W; running easterly to the east shore to a point 34° 57.4871' N--76° 23.0737' W;
(b) Long Bay-Ditch Bay--west of a line beginning on the north shore of Ditch Bay at a point 34° 57.9388' N--76° 27.0781' W; running southwesterly to the south shore of Ditch Bay to a point 34° 57.2120' N--76° 27.2185' W; then south of a line running southeasterly to the east shore of Long Bay to a point 34° 56.7633' N--76° 26.3927' W; and
(c) Turnagain Bay--south of a line beginning on the west shore at a point 34° 59.4065' N--76° 30.1906' W; running easterly to the east shore to a point 34° 59.5668' N--76° 29.3557' W;

(4) In the Core Sound Area:

(a) Cedar Island Bay--northwest of a line beginning near the gun club dock at a point 34° 58.7203' N--76° 15.9645' W; running northeasterly to the south shore to a point 34° 57.7690' N--76° 16.8781' W;
(b) Thorofare Bay-Barry Bay--northwest of a line beginning on Rumley Hammock at a point 34° 55.4853' N--76° 18.2487' W; running northeasterly to Hall Point to a point 34° 54.4227' N--76° 19.1908' W;
(c) Nelson Bay--northwest of a line beginning on the west shore of Nelson Bay at a point 34° 51.1353' N--76° 24.5866' W; running northeasterly to Drum Point to a point 34° 51.6417' N--76° 23.7620' W;
(d) Brett Bay--north of a line beginning on the west shore at a point 34° 49.4019' N--76° 26.0227' W; running easterly to Piney Point to a point 34° 49.5799' N--76° 25.0534' W; and
(e) Jarrett Bay--north of a line beginning on the west shore near Old Chimney at a point 34° 45.5743' N--76° 30.0076' W; running easterly to a point east of Davis Island 34° 45.8325' N--76° 28.7955' W;

(5) In the North River Area:

(a) North River--north of a line beginning on the west shore at a point 34° 46.0383' N--76° 37.0633' W; running easterly to a point on the east shore 34° 46.2667' N--76° 35.4933' W; and
(b) Ward Creek--east of a line beginning on the north shore at a point 34° 46.2667' N--76° 35.4933' W; running southerly to the south shore to a point 34° 45.4517' N--76° 35.1767' W;

(6) Newport River--west of a line beginning near Penn Point on the south shore at a point 34° 45.6960' N--76° 43.5180' W; running northeasterly to the north shore to a point 34° 46.8490' N--76° 43.3296' W;

(7) New River--all waters upstream of a line beginning on the north side of the N.C. Highway 172 Bridge at a point 34° 34.7680' N--77° 23.9940' W; running southerly to the south side of the bridge at a point 34° 34.6000' N--77° 23.9710' W;

(8) Chadwick Bay--all waters west of a line beginning on the northeast side of Chadwick Bay at a point 34° 32.5630' N--77° 21.6280' W; running southeasterly to a point near Marker "6" at 34° 32.4180' N--77° 21.6080' W; running westerly to Roses Point at a point 34° 32.2240' N--77° 22.2880' W; following the shoreline in Fullard Creek to a point 34° 32.0340' N--77° 22.7160' W; running northwesterly to a point 34° 32.2210' N--77° 22.8080' W; following the shoreline to the west point of Bump's Creek at a point 34° 32.3430' N--77° 22.4570' W; running northeasterly to the east shore to a point 34° 32.4400' N--77° 22.3830' W; following the shoreline of Chadwick Bay back to the point of origin;

(9) Intracoastal Waterway--all waters in the IWW maintained channel from a point near Marker "17" north of Alligator Bay 34° 30.7930' N--77° 23.1290' W; to a point near Marker "49" at Morris Landing at a point 34° 28.0820' N--77° 30.4710' W; and all waters in the IWW maintained channel and 100 feet on either side from Marker "49" to the N.C. Highway 50-210 Bridge at Surf City;

(10) Cape Fear River--all waters bounded by a line beginning on the south side of the Spoil Island at the intersection of the IWW and the Cape Fear River ship channel at a point 34° 1.5780' N--77° 56.0010' W; running easterly to the east shore of the Cape Fear River to a point 34° 1.7230' N--77° 55.1010' W; running southerly and bounded by the shoreline to the Ferry Slip at Federal Point at a point 33° 57.8080' N--77° 56.4120' W; running northerly to Bird Island to a point 33° 58.3870' N--77° 56.5780' W; running northerly along the west shoreline of Bird Island and the Cape Fear River spoil islands back to point of origin;

(11) Lockwood Folly River--all waters north of a line beginning on Howells Point at a point 33° 55.3680' N--78° 12.7930' W and running in a westerly direction along the IWW near IWW Marker "46" to a point 33° 55.3650' N--78° 13.8500' W; and

(12) Saucepan Creek--all waters north of a line beginning on the west shore at a point 33° 54.6290' N--78° 22.9170' W; running northeasterly to the east shore to a point 33° 54.6550' N--78° 22.8670' W.

(13) All Coastal Fishing Waters under the jurisdiction of the Marine Fisheries Commission, pursuant to N.C. Gen. Stat. § 113-132(a), not otherwise designated as primary, secondary, or special secondary nursery areas under .0103, .0104, or above, respectively.

15A N.C. Admin. Code 3L .0101: Shrimp Harvest Restrictions

(a) It is unlawful to take shrimp until the Fisheries Director, by proclamation, opens the season.

(b) The Fisheries Director may not open the season until the shrimp count reaches 60 shrimp per pound, heads on, in the Pamlico Sound.

~~(b)~~ (c) The Fisheries Director may, by proclamation, impose any or all of the following restrictions on the taking of shrimp:

(1) specify time;
(2) specify area;
(3) specify means and methods;
(4) specify season;
(5) specify size; and
(6) specify quantity.

15A N.C. Admin. Code 3L .0103: Prohibited Nets, Mesh Lengths and Areas

(a) It is unlawful to take shrimp with nets with mesh lengths less than the following:

(1) Trawl net--one and one-half inches;
(2) Fixed nets, channel nets, float nets, butterfly nets, and hand seines--one and one-fourth inches; and
(3) Cast net--no restriction.

(b) It is unlawful to take shrimp with a net constructed in such a manner as to contain an inner or outer liner of any mesh length. Net material used as chafing gear shall be no less than four inches mesh length, except that chafing gear with smaller mesh may be used only on the bottom one-half of the tailbag. Such chafing gear shall not be tied in a manner that forms an additional tailbag.

~~(c) It is unlawful to take shrimp with trawls that have a combined headrope of greater than 90 feet in Internal Coastal Waters in the following areas~~:

~~(1) North of the 35| 46.3000' N latitude line;~~
~~(2) Core Sound south of a line beginning at a point 34| 59.7942' N--76| 14.6514' W on Camp Point; running easterly to a point 34| 58.7853' N--76| 9.8922' W on Core Banks; to the South Carolina State Line;~~
~~(3) Pamlico River upstream of a line from a point 35| 18.5882' N--76| 28.9625' W at Pamlico Point; running northerly to a point 35| 22.3741' N--76| 28.6905' W at Willow Point; and~~
~~(4) Neuse River southwest of a line from a point 34| 58.2000' N--76| 40.5167' W at Winthrop Point on the eastern shore of the entrance to Adams Creek; running northerly to a point 35| 1.0744' N--76| 42.1550' W at Windmill Point at the entrance of Greens Creek at Oriental.~~

~~(d)~~ (c) Effective January 1, 201~~7~~8 it is unlawful to take shrimp with trawls that have a combined headrope of greater than 90 feet in Coastal Fishing Waters. ~~220 feet in Internal Coastal Waters in the following areas:~~

~~(1) Pamlico Sound south of the 35| 46.3000' N latitude line and north of a line beginning at a point 34| 59.7942' N--76| 14.6514' W on Camp Point; running easterly to a point 34| 58.7853' N--76| 9.8922' W on Core Banks;~~

~~(2) Pamlico River downstream of a line from a point 35| 18.5882' N--76| 28.9625' W at Pamlico Point; running northerly to a point 35| 22.3741' N--76| 28.6905' W at Willow Point; and~~

~~(3) Neuse River northeast of a line from a point 34| 58.2000' N--76| 40.5167' W at Winthrop Point on the eastern shore of the entrance to Adams Creek; running northerly to a point 35| 1.0744' N--76| 42.1550' W at Windmill Point at the entrance of Greens Creek at Oriental.~~

~~(e)~~ (d) It is unlawful to use a shrimp trawl in the areas described in 15A NCAC 3R .0114.

~~(f)~~ (e) It is unlawful to use channel nets except as provided in 15A NCAC 3J .0106.

~~(g)~~ (f) It is unlawful to use shrimp pots except as provided in 15A NCAC 3J .0301.

~~(h)~~ (g) It is unlawful to use a shrimp trawl that does not conform with the federal rule requirements for Turtle Excluder Devices (TED) as specified in 50 CFR Part 222.102 Definitions, 50 CFR Part 223.205 (a) and Part 223.206 (d) Gear Requirements for Trawlers, and 50 CFR Part 223.207 Approved TEDs. These federal rules are incorporated by reference including subsequent amendments and editions. Copies of these rules are available via the Code of Federal Regulations posted on the Internet at http://www.gpoaccess.gov/cfr/index.html and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost.

~~(i)~~ (h) It is unlawful to use a shrimp trawl without two (2) authorized North Carolina Division of Marine Fisheries bycatch reduction devices properly installed and operational in the cod end of each net in Coastal Fishing Waters.

15A N.C. Admin. Code 3N .0105: Prohibited Gear, Secondary Nursery Areas

(a) It is unlawful to use trawl nets for any purpose in any of the permanent secondary nursery areas designated in 15A NCAC 3R .0104.

(b) It is unlawful to use trawl nets for any purpose in any of the special secondary nursery areas designated in 15A NCAC 3R .0105(1)-(12), except that the Fisheries Director, may, by proclamation, open any or all of the special secondary nursery areas listed in 15A NCAC 3R .0105(1)-(12), or any portion thereof, ~~listed in 15A NCAC 3R .0105~~ to shrimp or crab trawling from August 16 through May 14 subject to the provisions of 15A NCAC 3L .0100 and .0200.

(c) It is unlawful to use trawl nets for any purpose in any of the special secondary nursery areas designated in 15A NCAC 3R .0105(13), except that the Fisheries Director, may, by proclamation, open any special secondary nursery areas listed in 15A NCAC 3R .0105(13), or any portion thereof, to shrimp or crab trawling, subject to the provisions of 15A NCAC 3L. 0100 and .0200 and the restrictions described below:

(1) Trawling may only occur during shrimp season;
(2) Trawling is restricted to a total of three days per week;
(3) Trawling is prohibited between sunset and sunrise; and
(4) Tow time may not exceed 45 minutes. Tow time begins when the doors of the trawl enter the water and ends when the doors exit the water.

15A N.C. Admin. Code 3I .0101: Definitions

All definitions set out in G.S. 113, Subchapter IV and the following additional terms apply to this Chapter:

(1) Enforcement and management terms:

(a) Commercial Quota. Total quantity of fish allocated for harvest by commercial fishing operations.

(b) Educational Institution. A college, university, or community college accredited by an accrediting agency recognized by the U.S. Department of Education; an Environmental Education Center certified by the N.C. Department of Environment and Natural Resources Office of Environmental Education and Public Affairs; or a zoo or aquarium certified by the Association of Zoos and Aquariums.

(c) Internal Coastal Waters or Internal Waters. All Coastal Fishing Waters except the Atlantic Ocean.

(d) Length of finfish.

i. Curved fork length. A length determined by measuring along a line tracing the contour of the body from the tip of the upper jaw to the middle of the fork in the caudal (tail) fin.
ii. Fork length. A length determined by measuring along a straight line the distance from the tip of the snout with the mouth closed to the middle of the fork in the caudal (tail) fin, except that fork length for billfish is measured from the tip of the lower jaw to the middle of the fork of the caudal (tail) fin.
iii. Pectoral fin curved fork length. A length of a beheaded fish from the dorsal insertion of the pectoral fin to the fork of the tail measured along the contour of the body in a line that runs along the top of the pectoral fin and the top of the caudal keel.
iv. Total length. A length determined by measuring along a straight line the distance from the tip of the snout with the mouth closed to the tip of the compressed caudal (tail) fin.

(e) Recreational Possession Limit. Restrictions on size, quantity, season, time period, area, means, and methods where take or possession is for a recreational purpose.

(f) Recreational Quota. Total quantity of fish allocated for harvest for a recreational purpose.

(g) Regular Closed Oyster Season. March 31 through October 15, unless amended by the Fisheries Director through proclamation authority.

(h) Scientific Institution. One of the following entities:

(i) An educational institution as defined in this Item;

i. A state or federal agency charged with the management of marine or estuarine resources; or
ii. A professional organization or secondary school working under the direction of, or in compliance with mandates from, the entities listed in Subitems (h)(i) and (ii) of this Item.
iii. Seed Oyster Management Area. An open harvest area that, by reason of poor growth characteristics, predation rates, overcrowding or other factors, experiences poor utilization of oyster populations for direct harvest and sale to licensed dealers and is designated by the Marine Fisheries Commission as a source of seed for public and private oyster culture.

(2) Fishing Activities:

(a) Aquaculture operation. An operation that produces artificially propagated stocks of marine or estuarine resources or obtains such stocks from permitted sources for the purpose of rearing in a controlled environment. A controlled environment provides and maintains throughout the rearing process one or more of the following:

i. food;
ii. predator protection;
iii. salinity
iv. temperature controls; or
v. water circulating, utilizing technology not found in the natural environment.

(b) Attended. Being in a vessel, in the water or on the shore, and immediately available to work the gear and be within 100 yards of any gear in use by that person at all times. Attended does not include being in a building or structure.

(c) Blue Crab Shedding. The process whereby a blue crab emerges soft from its former hard exoskeleton. A shedding operation is any operation that holds peeler crabs in a controlled environment. A controlled environment provides and maintains throughout the shedding process one or more of the following:

i. food;
ii. predator protection;
iii. salinity;

iv. temperature controls; or
v. water circulation, utilizing technology not found in the natural environment. A shedding operation does not include transporting pink or red-line peeler crabs to a permitted shedding operation.

(d) Depuration. Purification or the removal of adulteration from live oysters, clams, or mussels by any natural or artificially controlled means.

(e) Long Haul Operations. Fishing a seine towed between two vessels.

(f) Peeler Crab. A blue crab that has a soft shell developing under a hard shell and having a white, pink, or red-line or rim on the outer edge of the back fin or flipper.

(g) Possess. Any actual or constructive holding whether under claim of ownership or not.

(h) Recreational Purpose. A fishing activity that is not a commercial fishing operation as defined in G.S. 113-168.

(i) Shellfish marketing from leases and franchises. The harvest of oysters, clams, scallops, or mussels from privately held shellfish bottoms and lawful sale of those shellfish to the public at large or to a licensed shellfish dealer.

(j) Shellfish planting effort on leases and franchises. The process of obtaining authorized cultch materials, seed shellfish, and polluted shellfish stocks and the placement of those materials on privately held shellfish bottoms for increased shellfish production.

(k) Shellfish production on leases and franchises:

i. The culture of oysters, clams, scallops, or mussels on shellfish leases and franchises from a sublegal harvest size to a marketable size.
ii. The transplanting (relay) of oysters, clams, scallops, or mussels from areas closed due to pollution to shellfish leases and franchises in open waters and the natural cleansing of those shellfish.

(l) Swipe Net Operations. Fishing a seine towed by one vessel.

(m) Transport. Ship, carry, or cause to be carried or moved by public or private carrier by land, sea, or air.

(n) Use. Employ, set, operate, or permit to be operated or employed.

(3) Gear:

(a) Bunt Net. The last encircling net of a long haul or swipe net operation constructed of small mesh webbing. The bunt net is used to form a pen or pound from which the catch is dipped or bailed.

(b) Channel Net. A net used to take shrimp that is anchored or attached to the bottom at both ends or with one end anchored or attached to the bottom and the other end attached to a vessel.

(c) Commercial Fishing Equipment or Gear. All fishing equipment used in Coastal Fishing Waters except:

i. Cast nets;
ii. Collapsible crab traps, a trap used for taking crabs with the largest open dimension no larger than 18 inches and that by design is collapsed at all times when in the water, except when it is being retrieved from or lowered to the bottom;
iii. Dip nets or scoops having a handle not more than eight feet in length and a hoop or frame to which the net is attached not exceeding 60 inches along the perimeter;
iv. Gigs or other pointed implements that are propelled by hand, whether or not the implement remains in the hand;
v. Hand operated rakes no more than 12 inches wide and weighing no more than six pounds and hand operated tongs;
vi. Hook-and-line and bait-and-line equipment other than multiple-hook or multiple-bait trotline;
vii. Landing nets used to assist in taking fish when the initial and primary method of taking is by the use of hook and line;
viii. Minnow traps when no more than two are in use;
ix. Seines less than 30 feet in length;
x. Spears, Hawaiian slings, or similar devices that propel pointed implements by mechanical means, including elastic tubing or bands, pressurized gas, or similar means.

(d) Corkline. The support structure a net is attached to that is nearest to the water surface when in use. Corkline length is measured from the outer most mesh knot at one end of the corkline following along the line to the outer most mesh knot at the opposite end of the corkline.

(e) Dredge. A device towed by engine power consisting of a frame, tooth bar or smooth bar, and catchbag used in the harvest of oysters, clams, crabs, scallops, or conchs.

(f) Fixed or stationary net. A net anchored or staked to the bottom, or some structure attached to the bottom, at both ends of the net.

(g) Fyke Net. An entrapment net supported by a series of internal or external hoops or frames, with one or more lead or leaders that guide fish to the net mouth. The net has one or more internal funnel-shaped openings with tapered ends directed inward from the mouth, through which fish enter the enclosure. The portion of the net designed to hold or

trap fish is completely enclosed in mesh or webbing, except for the openings for fish passage into or out of the net (funnel area).

(h) Gill Net. A net set vertically in the water to capture fish by entanglement of the gills in its mesh as a result of net design, construction, mesh length, webbing diameter, or method in which it is used.

(i) Headrope. The support structure for the mesh or webbing of a trawl that is nearest to the water surface when in use. Headrope length is measured from the outer most mesh knot at one end of the headrope following along the line to the outer most mesh knot at the opposite end of the headrope.

(j) Hoop Net. An entrapment net supported by a series of internal or external hoops or frames. The net has one or more internal funnel-shaped openings with tapered ends directed inward from the mouth, through which fish enter the enclosure. The portion of the net designed to hold or trap the fish is completely enclosed in mesh or webbing, except for the openings for fish passage into or out of the net (funnel area).

(k) Lead. A mesh or webbing structure consisting of nylon, monofilament, plastic, wire, or similar material set vertically in the water and held in place by stakes or anchors to guide fish into an enclosure. Lead length is measured from the outer most end of the lead along the top or bottom line, whichever is longer, to the opposite end of the lead.

(l) Mechanical methods for clamming. Dredges, hydraulic clam dredges, stick rakes, and other rakes when towed by engine power, patent tongs, kicking with propellers or deflector plates with or without trawls, and any other method that utilizes mechanical means to harvest clams.

(m) Mechanical methods for oystering. Dredges, patent tongs, stick rakes, and other rakes when towed by engine power, and any other method that utilizes mechanical means to harvest oysters.

(n) Mesh Length. The distance from the inside of one knot to the outside of the opposite knot, when the net is stretched hand-tight in a manner that closes the mesh opening.

(o) Pound Net Set. A fish trap consisting of a holding pen, one or more enclosures, lead or leaders, and stakes or anchors used to support the trap. The holding pen, enclosures, and lead(s) are not conical, nor are they supported by hoops or frames.

(p) Purse Gill Nets. Any gill net used to encircle fish when the net is closed by the use of a purse line through rings located along the top or bottom line or elsewhere on such net.

(q) Seine. A net set vertically in the water and pulled by hand or power to capture fish by encirclement and confining fish within itself or against another net, the shore or bank as a result of net design, construction, mesh length, webbing diameter, or method in which it is used.

(4) Fish habitat areas. The estuarine and marine areas that support juvenile and adult populations of fish species, as well as forage species utilized in the food chain. Fish habitats as used in this definition, are vital for portions of the entire life cycle, including the early growth and development of fish species. Fish habitats in all Coastal Fishing Waters, as determined through marine and estuarine survey sampling, include:

(a) Anadromous fish nursery areas. Those areas in the riverine and estuarine systems utilized by post-larval and later juvenile anadromous fish.

(b) Anadromous fish spawning areas. Those areas where evidence of spawning of anadromous fish has been documented in Division sampling records through direct observation of spawning, capture of running ripe females, or capture of eggs or early larvae.

(c) Coral:

i. Fire corals and hydrocorals (Class Hydrozoa);
ii. Stony corals and black corals (Class Anthozoa, Subclass Scleractinia); or
iii. Octocorals; Gorgonian corals (Class Anthozoa, Subclass Octocorallia), which include sea fans (Gorgonia sp.), sea whips (Leptogorgia sp. and Lophogorgia sp.), and sea pansies (Renilla sp.).

(d) Intertidal Oyster Bed. A formation, regardless of size or shape, formed of shell and live oysters of varying density.

(e) Live rock. Living marine organisms or an assemblage thereof attached to a hard substrate, excluding mollusk shells, but including dead coral or rock. Living marine organisms associated with hard bottoms, banks, reefs, and live rock include:

i. Coralline algae (Division Rhodophyta);
ii. Acetabularia sp., mermaid's fan and cups (Udotea sp.), watercress (Halimeda sp.), green feather, green grape algae (Caulerpa sp.) (Division Chlorophyta);
iii. Sargassum sp., Dictyopteris sp., Zonaria sp. (Division Phaeophyta);
iv. Sponges (Phylum Porifera);
v. Hard and soft corals, sea anemones (Phylum Cnidaria), including fire corals (Class Hydrozoa), and Gorgonians, whip corals, sea pansies, anemones, Solengastrea (Class Anthozoa);
vi. Bryozoans (Phylum Bryozoa);
vii. Tube worms (Phylum Annelida), fan worms (Sabellidae), feather duster and Christmas treeworms (Serpulidae), and sand castle worms (Sabellaridae);
viii. Mussel banks (Phylum Mollusca: Gastropoda); and
ix. Acorn barnacles (Arthropoda: Crustacea: Semibalanus sp.).

(f) Nursery areas. Areas that for reasons such as food, cover, bottom type, salinity, temperature, and other factors, young finfish and crustaceans spend the major portion of their initial growing season. Primary nursery areas are those areas in the estuarine system where initial post-larval development takes place. These are areas where populations are uniformly early juveniles. Secondary nursery areas are those areas in the ocean and estuarine system where later juvenile development takes place. Populations are composed of developing sub-adults of similar size that have migrated from an upstream primary nursery area to the secondary nursery area located in the middle portion of the estuarine system.

(g) Shellfish producing habitats. Historic or existing areas that shellfish, such as clams, oysters, scallops, mussels, and whelks use to reproduce and survive because of such favorable conditions as bottom type, salinity, currents, cover, and cultch. Included are those shellfish producing areas closed to shellfish harvest due to pollution.

(h) Strategic Habitat Areas. Locations of individual fish habitats or systems of habitats that provide exceptional habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity.

(i) Submerged aquatic vegetation (SAV) habitat. Submerged lands that:

i. are vegetated with one or more species of submerged aquatic vegetation including bushy pondweed or southern naiad (Najas guadalupensis), coontail (Ceratophyllum demersum), eelgrass (Zostera marina), horned pondweed (Zannichellia palustris), naiads (Najas spp.), redhead grass (Potamogeton perfoliatus), sago pondweed (Stuckenia pectinata, formerly Potamogeton pectinatus), shoalgrass (Halodule wrightii), slender pondweed (Potamogeton pusillus), water stargrass (Heteranthera dubia), water starwort (Callitriche heterophylla), waterweeds (Elodea spp.), widgeongrass (Ruppia maritima), and wild celery (Vallisneria americana). These areas may be identified by the presence of above-ground leaves, below-ground rhizomes, or reproductive structures associated with one or more SAV species and include the sediment within these areas; or
ii. have been vegetated by one or more of the species identified in Sub-item (4)(i)(i) of this Rule within the past 10 annual growing seasons and that meet the average physical requirements of water depth (six feet or less), average light availability (secchi depth of one foot or more), and limited wave exposure that characterize the environment suitable for growth of SAV. The past presence of SAV may be demonstrated by aerial photography, SAV survey, map, or other documentation. An extension of the past 10 annual growing seasons criteria may be considered when average environmental conditions are altered by drought, rainfall, or storm force winds.

This habitat occurs in both subtidal and intertidal zones and may occur in isolated patches or cover extensive areas. In defining SAV habitat, the

Marine Fisheries Commission recognizes the Aquatic Weed Control Act of 1991 (G.S. 113A-220 et. seq.) and does not intend the submerged aquatic vegetation definition, or this Rule or Rules 3K .0304 and .0404, to apply to or conflict with the non-development control activities authorized by that Act.

(5) Licenses, permits, leases and franchises, and record keeping:

(a) Assignment. Temporary transferal to another person of privileges under a license for which assignment is permitted. The person assigning the license delegates the privileges permitted under the license to be exercised by the assignee, but retains the power to revoke the assignment at any time, and is still the responsible party for the license.

(b) Designee. Any person who is under the direct control of the permittee or who is employed by or under contract to the permittee for the purposes authorized by the permit.

(c) For Hire Vessel. As defined by G.S. 113-174, when the vessel is fishing in state waters or when the vessel originates from or returns to a North Carolina port.

(d) Holder. A person who has been lawfully issued in his or her name a license, permit, franchise, lease, or assignment.

(e) Land:

i. For commercial fishing operations, when fish reach the shore or a structure connected to the shore.
ii. For purposes of trip tickets, when fish reach a licensed seafood dealer, or where the fisherman is the dealer, when fish reach the shore or a structure connected to the shore.
iii. For recreational fishing operations, when fish are retained in possession by the fisherman.

(f) Licensee. Any person holding a valid license from the Department to take or deal in marine fisheries resources.

(g) Logbook. Paper forms provided by the Division and electronic data files generated from software provided by the Division for the reporting of fisheries statistics by persons engaged in commercial or recreational fishing or for-hire operators.

(h) Master. Captain of a vessel or one who commands and has control, authority, or power over a vessel.

(i) New fish dealer. Any fish dealer making application for a fish dealer license who did not possess a valid dealer license for the previous license year in that name. For purposes of license issuance, adding new categories to an existing fish dealers license does not constitute a new dealer.

(j) Office of the Division. Physical locations of the Division conducting license and permit transactions in Wilmington, Washington, Morehead City, Roanoke Island, and Elizabeth City, North Carolina. Other businesses or entities designated by the Secretary to issue Recreational Commercial Gear Licenses or Coastal Recreational Fishing Licenses are not considered Offices of the Division.

(k) Responsible party. Person who coordinates, supervises, or otherwise directs operations of a business entity, such as a corporate officer or executive level supervisor of business operations, and the person responsible for use of the issued license in compliance with applicable statutes and rules.

(l) Tournament Organizer. The person who coordinates, supervises, or otherwise directs a recreational fishing tournament and is the holder of the Recreational Fishing Tournament License.

(m) Transaction. Act of doing business such that fish are sold, offered for sale, exchanged, bartered, distributed, or landed.

(n) Transfer. Permanent transferal to another person of privileges under a license for which transfer is permitted. The person transferring the license retains no rights or interest under the license transferred.

(o) Trip Ticket. Paper forms provided by the Division and electronic data files generated from software provided by the Division for the reporting of fisheries statistics by licensed fish dealers.

15A N.C. Administrative Code 3M .0522: Spot (new section)

It is unlawful to possess spot less than 8 inches in total length.

15A N.C. Administrative Code 3M .0523: Atlantic croaker (new section)

It is unlawful to possess Atlantic croaker less than 10 inches in total length.

EXHIBIT B

A TECHNICAL REVIEW OF A PROPOSAL SUBMITTED BY THE NORTH CAROLINA WILDLIFE FEDERATION TO REDUCE MORTALITY OF JUVENILE FISHES IN NORTH CAROLINA

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I. INTRODUCTION

The level of bycatch and discard mortality of juvenile marine fishes in shrimp trawls in the coastal and estuarine waters of North Carolina is extraordinary. Though other fisheries contribute to juvenile bycatch, shrimp trawls are the largest source of bycatch mortality, and proper management would have a significant and measureable impact in restoring overfished and declining stocks.

North Carolina is the only state on the east coast of the United States that still allows shrimp trawls to operate in estuarine nursery areas, and its trawling regulations are the most lax nationwide. Despite efforts to reduce the documented bycatch that occurs in this fishery through the use of bycatch reduction devices ("BRDs"), closed seasons, and restricted areas, hundreds of millions of juvenile fish continue to die each year from shrimp trawls, which contributes to declining stocks. The critical importance of all these species to the recreational and commercial fisheries of North Carolina, as well as their ecosystems function as forage and energy transfer, cannot be overstated.

Viable fish populations depend on the recruitment of juvenile fish into the adult population so that they can spawn and replace themselves before being harvested or dying. This is the essential tenet behind the "sustainable harvest" objective of North Carolina's Fisheries Reform Act of 1997. Juvenile fishes first enter the estuary at the larval or early juvenile stage and move into shallow protected habitats inside North Carolina's expansive estuarine system. In defined Primary and Secondary Nursery Areas, these fishes are partially protected from recognized, destructive fishing practices such as shrimp trawling. Natural mortality during these early life stages is extremely high. Fishes that survive the high natural mortality rates during these stages move out of the confines of North Carolina's limited nursery area system and into the open rivers and sounds where fish receive far less regulatory protection. Though natural mortality declines during this time, mortality in the form of discard mortality from shrimp trawls progressively increases, thus depressing recruitment of juvenile fish into the adult population.

Many of the adult populations of fish stocks subjected to shrimp trawl bycatch have declined significantly, which means that increased juvenile recruitment to rebuild those populations is more important today than ever. Specifically, spot, Atlantic croaker, and weakfish were critical components of North Carolina's estuarine commercial and recreational fisheries prior to their dramatic declines in the late 1980s. In 1981, the commercial landings of these three species were 37.6 million pounds. In 2015 that number dropped to 2.3 million pounds, a 95 percent decline. The recreational fishery shows a similar trend: in 1981 recreational landings were 5.3 million pounds compared to 1.6 million pounds in 2015, a 70 percent decline. This precipitous decrease comes despite increases in angler effort in terms of numbers of fishermen. Primarily, the high juvenile mortality from bycatch, along with overfishing of adult stocks in directed fisheries, confound efforts to rebuild these populations. Declining spawning stock biomass and continued high discards must be addressed immediately to restore the viability of these important fisheries to North Carolina and the east coast.

The purpose of this paper is to provide a review of the management history, concerns, and impacts of the shrimp trawl fishery on important stocks. In addition, this paper proposes

solutions to existing issues that should be considered and addressed to restore severely depleted fish stocks in the estuarine waters of North Carolina.

II. BACKGROUND

The Atlantic Coastal Fisheries Cooperative Management Act (1993) and the North Carolina Fisheries Reform Act (1997) were passed 20 years ago. The intent of these legislative mandates was to restore overfished fish stocks and provide ongoing protections to facilitate responsible and sustainable fishing. The general concept is simple: coordinated management of fish stocks would yield healthy fishery resources that benefitted all users as well as the ecosystem. A review of the stock status of many of the fisheries managed under these laws indicates these goals have not been achieved. Today, many stocks remain in an overfished or overfishing status or fall into a category of concern as population measurements either languish at low levels or are in decline.

Government agencies and stakeholders involved in the early development and passage of this legislation expected more tangible results than what has been achieved. Whether the issue is uncertainty in stock assessments, continued overharvest, failure to adequately characterize and address substantive bycatch issues, or the inter- and intra-state concerns over allocation, many south and mid-Atlantic fish stocks are no better off, and are likely in worse condition, than they were 20 years ago. Most nearshore, state waters fisheries of importance to North Carolina and the mid- and south Atlantic states have declined to either concern, depleted, or unknown status. The common thread for these fish stocks is that virtually all are subjected to intense juvenile mortality and many lack any protective size limits.

Alverson et al. (1996) indicate that the global impacts of trawl bycatch are enormous. Shrimp trawls generate more bycatch than any other gear leading to declining fish stocks on a global scale. It is undisputed that discarded finfish species rarely survive their encounter with a shrimp trawl. Moreover, the research consistently indicates that discards from fisheries that impact large quantities of juvenile fish can generate significant population effects. The combined effects of overfishing, discard mortality on natural species assemblages, altered predator/prey dynamics, and modified structure and function of benthic communities contribute to population declines. Even 20 years ago, it was believed that Atlantic croaker in the Gulf of Mexico declined by more than 40 percent as a result of shrimp trawl bycatch. Estimated bycatch during the 1980s was 7.9 billion fish per year. In addition, the Gulf of Mexico Fishery Management Council recognized that shrimp trawl bycatch was the primary source of mortality for red snapper in 1990 (Alverson et al. 1996). Despite the implementation of BRDs since the 1990s, the evidence presented in Alverson et al. (1996) indicates that many of the ecological impacts of shrimp trawl bycatch and other bycatch fisheries have yet to be studied but likely have negative consequences on stock dynamics. Researchers suggest that “[t]he single action that will provide the greatest improvement to the bycatch and discard problem will be the reduction in these efforts levels. Without such control, other solutions to the bycatch and discard problem will be less effective and real success in our efforts to better manage the ocean’s resources much more difficult” (Alverson et al. 1996). Bycatch and discard mortality continue to negatively impact fish stocks along the east coast, especially in North Carolina waters.

North Carolina is unique along the east coast in that it allows significant fishing effort in its estuaries, which results in excessive fish mortalities, especially among juvenile fish. In fact, North Carolina is the *only* state on the east coast that permits trawling in inshore waters. Despite efforts to mitigate those impacts by fisheries managers, North Carolina shrimp trawling is the leading contributor to bycatch mortality (Brown 2015, ASMFC Fishery Management Plans for spot, Atlantic croaker, weakfish). However, it is worth noting that other fisheries also contribute to high levels of bycatch. For example, hook and line, large and small mesh gill nets, long haul seines, and unlimited crab pot efforts contribute to bycatch mortality. Though some of these fish are sold, many others are discarded. Many of these fisheries are either prohibited or significantly limited in other states.

Many of the stocks deemed overfished, overfishing, or of concern in the North Carolina Stock Status Report are impacted by shrimp trawl bycatch, including spot, Atlantic croaker, weakfish, summer flounder, and southern flounder. The hundreds of millions of juvenile fishes discarded from fishing activities prior to reaching adulthood and having the opportunity to contribute to the spawning stock biomass are a significant threat to the health and productivity of these important fish populations.

III. METHODS

We relied heavily on published reports, stock assessments, journal articles, and data sets from the North Carolina Division of Marine Fisheries ("NC DMF") and the Atlantic States Marine Fisheries Commission ("ASMFC") to conduct this review. The ASMFC is a compact of the east coast states that manage fisheries that migrate up and down the coast. The ASMFC's mission is to ensure healthy, self-sustaining fisheries. All data sources are readily available to the public and most, if not all, have undergone peer-review or ASMFC approval. In several cases, we used our experience and expertise in managing east coast fisheries to make suggestions or point out issues that are unavailable in the literature we reviewed.

IV. DATA REVIEW

What follows is an examination of the status of the three finfish species—Atlantic croaker, spot, and weakfish—that are most impacted by shrimp trawl bycatch in North Carolina.

A. Atlantic croaker

The life history of most members of the drum family (*Sciaenidae*), including Atlantic croaker, is characterized by cyclical abundance: it is natural for these fish populations to fluctuate over time. However, periods of low abundance have lasted longer than normal in recent years. While landings may be naturally cyclical as a result of environmental conditions and population abundance, fishing effort also plays a role. At periods of high abundance, effort increases and Atlantic croaker are harvested in large amounts with no constraints. Catches can exceed 100,000 pounds in a single trip. The most recent landings peak in 2001 (43 million pounds) has been followed by a persistent decline through 2014 (10 million pounds). The ASMFC (2015) recently raised concern over declining trends in fishery-independent indices and commercial and recreational landings of Atlantic croaker.

a. Stock Status of Atlantic croaker

North Carolina and Virginia account for approximately 90 percent of the commercial landings of Atlantic croaker along the east coast (ASMFC 2015). Trawling is prohibited in Virginia state waters, while neither state has any size or possession limits. From the mid-1960s until the early 1990s, North Carolina dominated landings with a single year high of 21.1 million pounds in 1980. By 2015, however, that number had fallen to 1.8 million pounds. Today, Virginia ranks number one in Atlantic croaker commercial landings while landings in the south Atlantic, including North Carolina, South Carolina, Georgia, and Florida, have significantly declined.

The recreational fishery for Atlantic croaker in North Carolina and the south Atlantic has also declined. In 1990, North Carolina accounted for 22 percent of the recreational Atlantic croaker harvest, while all the south Atlantic states accounted for 48 percent of recreational landings. By the last year of the benchmark stock assessment, North Carolina recreational harvest had fallen to 4 percent, and the recreational harvest in the south Atlantic to just 12 percent of the coast wide harvest (ASMFC 2010a).

Ideally, one would see a distribution of all sizes and ages in a healthy fishery. However, the 2010 ASMFC stock assessment's (ASMFC 2010a) summary of information on reproductive ecology based on fish collected in North Carolina and Virginia shows that state fisheries are increasingly relying on juvenile fishes. The midpoint of the published estimates of L100%[1] for Atlantic croaker is approximately 270 mm TL. In 2004, Atlantic croaker taken below L100% in the North Carolina recreational fishery comprised 68 percent of the harvest. In 2015, 90 percent of the Atlantic croaker harvest had yet to reach L100%. This increasing reliance on juvenile fish in the catch is indicative of a stock in decline.

To address concerns with declining landings, the ASMFC developed and approved Addendum II to the Atlantic croaker Fishery Management Plan ("FMP") in 2014. Addendum II takes a precautionary approach in managing the Atlantic croaker in light of the current and persistent decline in the stock. The addendum tracks trends in abundance, life history characteristics, and responses to fishing pressure. Based on the 2015 stock status review (ASMFC 2015b) all characteristics are trending down with some above the threshold for management action. While further action may be forthcoming from the ASMFC, it will likely not address the biggest source of mortality in the fishery—shrimp trawl—because those concerns rest primarily within the jurisdiction of North Carolina.

b. Impact of bycatch on Atlantic croaker stock

The estimated bycatch of Atlantic croaker in the south Atlantic peaked in 1995 at approximately 46.3 million pounds. Since 1950, estimates of Atlantic coast bycatch in all fisheries has exceeded harvest (ASMFC 2010a). Atlantic croaker are extremely resilient and can be very productive when environmental conditions are favorable, hence the boom and bust fisheries we have observed. By reducing the level of discards, especially for those fish that have yet to contribute to the population through at least one spawning event, the busts become more

[1] L100% is the length at which 100 percent of the sampled fish were mature as evidenced by developing, developed, or spent gonads.

infrequent and the fishery becomes more stable. More spawning fish impact not only the ecological value of Atlantic croaker but generally produce higher average recruitment. Higher recruitment means more yield for the benefit of the fishery and the ecosystem.

Atlantic croaker are the dominant bycatch species by number and weight in the North Carolina shrimp trawl fishery. In fact, Brown et al. (2015) found that Atlantic croaker dominated the shrimp trawl catches during virtually every season from 2012 to 2015 in their estuarine and coastal ocean bycatch characterization study, regularly exceeding the harvest of shrimp. During the four-year study period (August 2012 toAugust 2015), observers covered 1.2 percent of all commercial estuarine and ocean (0-3 miles) trips (n = 388, including 227 estuarine and 161 ocean trips). The total number of commercial trips reported to the North Carolina trip ticket program during the study period was 32,388. The total weight of all Atlantic croaker taken from observed trips during the study period was 322,883 pounds, which amounts to approximately 5.1 million fish. All of these fish were discarded as unmarketable and ranged in size from 70 to 200 mm TL, and were primarily juvenile fish (Brown 2015).

Brown et al. (2015) estimated that the average at-net mortality of Atlantic croaker was 23.4 percent. These estimates, including those for spot and weakfish, should be viewed with caution as extremely low. By contrast, the 2010 benchmark stock assessment for Atlantic croaker by the ASMFC uses a discard mortality rate of 100 percent for fish discarded from both gill nets and trawls (ASMFC 2010a). Brown (2015) characterized fish on deck as alive or dead immediately upon dumping the nets. However, as Brown (2015) correctly points out, “delayed mortality associated with discarded bycatch in the commercial shrimp otter trawl fishery will likely be much higher than at-net mortality due to factors including sorting time of catch, physical injury associated with capture, and indirect predation from birds, sharks, and dolphins.” Culling time, delayed mortality from injuries, and increased predation once discarded likely result in these estimates being unreasonably optimistic.

The magnitude of unmarketable Atlantic croaker discards in the North Carolina estuarine and ocean shrimp trawl fishery greatly exceeds the directed harvest. Assuming that observer data are representative of the fishery, summary tables in Brown (2015) indicate that 322,883 pounds of Atlantic croaker representing approximately 5,141,487 individuals were observed in the shrimp trawl during the study period. Expanding the observed trips to approximate total fishery-wide bycatch based on average catch per trip (322,883 pounds per 388 trips = 832 pounds per trip) and total trips reported during the four-year study period (n = 32,388), indicates that nearly 27 million pounds of Atlantic croaker were taken in the shrimp trawl fishery during the study period. The average weight of Atlantic croaker varied by year and season (0.05-0.11 lbs.) and averaged .076 lbs. (Brown 2015). Larger juveniles were taken in the ocean fishery. Employing a range of estimates (10-20 fish/pound) provides a total estimated bycatch of Atlantic croaker during the study period from 270 to 540 million fish. Using discard mortality rates ranging from 23.4 percent (Brown 2015) to the more defensible 100 percent estimated for trawls in the benchmark stock assessment (ASMFC 2010a), Atlantic croaker mortality in the North Carolina shrimp trawl fishery during the study period ranges from 63 to 540 million dead fish.

B. Spot

Spot have been a very popular and culturally important fish along the east coast for decades. The North Carolina Spot Festival occurs in Hampstead, North Carolina each September to celebrate the arrival and significance of this little fish. Many of the coastal ocean fishing piers were constructed, in part, so that anglers could intercept their fall runs. Like Atlantic croaker and weakfish, spot appeal to a huge demographic in the fishery because they are easy to catch and inexpensive to pursue when they are abundant.

a. Stock Status of Spot

A coast-wide stock assessment is underway for spot and results are expected in late 2016. Current data indicate concerns related to declines in the juvenile abundance index for spot from 1990 until the mid-2000s, with improvements noted in 2011 and 2012. While the ASMFC technical committee report for spot indicates that triggers were not tripped for management action in 2014, analysis shows concerning declining trends in abundance indices and harvest (ASMFC 2015).

The most recent status review for spot continues to show that spot harvest varies in terms of quantity landed and fishing sector. In some years, the recreational harvest dominates and, in other years, the commercial fishery catches the larger amount. North Carolina currently accounts for just 14 percent of the current commercial landings of spot on the east coast, down from 50 percent in the 1980s. North Carolina landings have steadily declined from 3.0 million pounds in 2001 to 0.76 million pounds in 2014. As with Atlantic croaker, North Carolina dominated commercial landings up until the early 1990s when Virginia took over the top spot (ASMFC 2015a).

Recreational landings data show a similar, but less pronounced, declining trend since data was first recorded in 1981. The recreational contribution of North Carolina to coast-wide spot landings in 1985 was 52 percent (3.1 million pounds), compared to 24 percent (704,445 pounds) in 2014. Coast-wide recreational landings have declined by 50 percent since 1985, however, the decline in the south Atlantic is the most pronounced. In 1985, the south Atlantic states accounted for 64 percent of the coast-wide recreational catch, compared to 34 percent in 2014 (ASMFC 2015a).

Spot mature at sizes between 184 and 292 mm TL for both sexes. Males mature at slightly smaller sizes, and full maturity (the L100%) for both sexes is 220 mm TL or greater (ASMFC 2010b). Length-frequency information on the commercial gill net fishery for spot in North Carolina indicates an average size of 213 mm TL, with 65 percent of the harvest less than the L100%. Because there is no size limit in North Carolina, unmarketable spot and Atlantic croaker can be included as bait and are typically sold to participants in both the crab pot and recreational fisheries. Sizes of spot taken in the recreational fishery range from 120 to 410 mm TL. In 2005, 2 percent of the spot harvested were greater than 300 mm TL, compared to 0.04 percent in 2015. Recreational landings statistics from 2015 in North Carolina indicate that 69 percent of the spot harvested were less than its L100% value (NC DMF Marine Recreational Information Program

("MRIP") data request), compared to 58 percent in 2005. It should be noted that in a healthy population, a significant percentage of the population should be larger than the L100%. The fact that so few mature fish have occurred in the population for over a decade raises concern about maintaining a healthy, spawning stock biomass.

b. Impact of bycatch on spot stock

While juvenile spot are known to be a bycatch component of many fisheries, "the largest bycatch component for spot comes from the south Atlantic shrimp trawl fishery" (ASMFC 2015). Spot are second only to Atlantic croaker in abundance among bycatch species in the North Carolina shrimp trawl observer program (Brown 2015). During the study period, researchers observed 110,113 pounds of spot as unmarketable discards in the observed trips (284 lbs./trip). Sizes generally ranged from 70 to 200 mm TL, and mean weight for all years and seasons was 0.065 pounds (ranging from 10 to 25 fish per pound). Researchers observed a total of 2 million spot. The at-net mortality of spot was much higher than for Atlantic croaker at 66 percent, without factoring in delayed mortality as described above for Atlantic croaker. Using the same method as above for Atlantic croaker, the number of spot observed in the North Carolina shrimp trawl fishery (32,388 trips) during the four-year study period ranged from 92 to 230 million fish.

C. Weakfish

The management history of weakfish is complex. The states took significant actions to reduce the directed and by-catch mortality of weakfish in the mid-1990s with Amendment 3 to the Interstate FMP for Weakfish (ASMFC 1996). Many felt certain that increased size limits, reduced bag limits, bycatch reduction in the south Atlantic shrimp trawl fishery, and the closure south of Cape Hatteras to flynets would result in recovery. While monitoring of the fishery showed positive early signs, the stock had lost all gains by the mid-2000s and was again declared depleted. Years of technical analysis indicated something had changed in terms of natural mortality as fishing mortality was estimated to be very low. Addendum IV to the Weakfish FMP closed the fishery to all but a minimal bycatch allowance, which is where it has remained since (ASMFC 2009).

a. Stock status of Weakfish

North Carolina and Virginia have historically dominated the commercial fishery for weakfish. Throughout the 1980s and 1990s, North Carolina accounted for 60 to 70 percent of the coast wide commercial harvest. The percentage declined to 19 percent in 2007. Since 2010, commercial fisheries have been limited to a 100 pound bycatch allowance likely resulting in an increase in discards in many fisheries that go unreported (ASMFC 1996, 2009).

The commercial fishery in North Carolina operates under a 12 inch TL minimum size limit, except the estuarine long haul seine and pound net fisheries, which are held to a 10 inch TL size limit. The recreational fishery operates under a 12 inch TL limit and a one fish bag limit. These size limits, unique among the three fishes reviewed, prevent directed harvest of juvenile fish, however, undersized and regulatory discards still consist of juvenile fish (ASMFC 1996; 2009).

Age frequency distribution of weakfish in the North Carolina recreational fishery is truncated. The current size distribution taken in the North Carolina recreational fishery range from 310 to 480 mm TL. Weakfish can live well into their teens, however, current catch levels reveal less than 5 percent of the catch is greater than 430 mm TL (age IV) (NC DMF MRIP data request). Analysis of the coast wide recreational fishery likewise shows a truncation in the age structure with 0.01 percent of weakfish harvested recreationally at age V+ compared to 46 percent in 1998 (ASMFC 2016). Similar to Atlantic croaker and spot, the weakfish harvest is increasingly reliant on smaller fish, many of which are juveniles or the least fecund.

Though weakfish grow rapidly and often mature and spawn at age I, their fecundity greatly increases with age. The 2016 peer review report on weakfish (ASMFC 2016) cited Nye et al. (2008) and noted that "despite maturing early, first spawn weakfish at age I spawned less frequently, arrived later to the estuarine spawning grounds, and had lower batch fecundity than older fish, likely resulting in an overly optimistic assumption about the contribution of age I fish to the overall reproductive success of the stock. This is currently amplified by the fact that larger, older fish comprise a small proportion of the overall population." Lowerre-Barbieri et al. (1996) found that 90 percent of weakfish were mature at age I and that the eggs to female ratio significantly increased with both total length and weight. Specifically, batch fecundity (the number of eggs per spawning event) estimates ranged from 75,289 to 517,845 eggs per female. Lowerre-Barbieri noted that the fecundity increased significantly with both total length and weight. Consequently, while weakfish are afforded more protection to spawn at least once in the directed fisheries, the reproductive capacity of these young fish is slight compared to the larger and older fish.

b. Impacts of bycatch on weakfish

There is significant bycatch of weakfish associated with the south Atlantic shrimp trawl fishery. Brown (2015) reported 29,688 pounds of weakfish in the North Carolina shrimp trawl characterization study (77 lbs. per trip) over four years. Additionally, the at-net mortality for weakfish was the highest of the three species examined in their analysis at 87 percent. Like Atlantic croaker, the less conservative ASMFC benchmark assessment employs a 100 percent mortality rate for trawls. The weakfish taken in the Brown (2015) study were all characterized as regulatory discards with sizes ranging from approximately 70 to 280 mm TL, with most falling between 110 and 180 mm TL size classes (age 0). Weakfish averaged 7 to14 fish per pound during the study period, yielding an estimated number of weakfish observed from 17 to 34 million fish over the four-year study period. Based on the most conservative estimates, weakfish mortality due to trawling during Brown's study period totaled over 15 million fish, most of them age 0 and juvenile. However, it is worth noting that, while less common, higher fecundity weakfish age I and age II are also subjected to shrimp trawl mortality (Brown 2015).

D. Importance of Nursery Areas to Juvenile Fish

The abundance and distribution of juvenile fishes reported by Brown (2015) are supported by the data collected during the time series of the NC DMF Pamlico Sound Survey that has occurred for decades (e.g., Knight 2015, Knight and Zapf 2015). Numerous Pamlico Sound Survey reports are available and consistently provide evidence that the majority of the species

encountered in the Pamlico Sound are juvenile finfishes. The Brown (2015) study occurred over a four-year period in the primary shrimping grounds of the state (Figures 3 and 4), including the Pamlico Sound and waters south. Another characterization study was conducted from Carteret County to Brunswick County in North Carolina (Brown 2009), which found results similar to the more recent study (Brown 2015). In the 2009 study, Spanish mackerel and flounders were taken in higher numbers in the southern estuaries and catches were dominated by juvenile fishes, primarily Atlantic croaker and spot. Multiple surveys and characterization studies referenced in Brown (2015) and NCDMF (2006, 2015) have also occurred in these same general locations. NCDMF (2015) points out that blue crab, weakfish, Atlantic croaker, and spot have accounted for the majority of all shrimp trawl bycatch since studies began in the 1950s and that situation continues today. All available data reviewed provide solid evidence that all regions and locations surveyed using trawls are dominated by the presence of juvenile fishes.

The Pamlico Sound Survey occurs in June and September each year within Pamlico Sound and has the following objectives:

> (1) To determine and monitor the distribution, relative size abundance, and size composition of fish, shrimp, and crab in the survey area and how they vary temporally and spatially.
>
> (2) To provide data to ascertain fishery-independent estimates of mortality and population size to compare to commercial fishery samples and landings data.
>
> (3) *To determine which species utilize (and to what extent) the sound during their early life development and identify nursery areas for those species (i.e.* Cynoscion sp., Paralichthys sp. *etc.).*
>
> (4) To determine if catch rates of various species are correlated with indices of juvenile abundance derived from the juvenile trawl survey.
>
> (5) To determine if species distributions are correlated with each other or with some other measured parameter(s).
>
> (6) To monitor the movement of organisms out of the nursery area and into the open waters of Pamlico Sound where they are available for commercial and recreational exploitation.

(Knight and Zapf 2015). The survey is conducted within Pamlico Sound and extends up into the Neuse, Pamlico, and Pungo Rivers. Stations are sampled during each cruise period from an established survey grid (Figure 2). As an example, during a single nine day cruise in September 2014, 54 randomly selected stations were sampled with two 30-foot mongoose nets outfitted with small mesh (approximately 1 inch) for 20 minutes. The estimated area of the sound floor swept by each net was estimated at 97,500 square feet. Forty-seven species of finfish were observed, and the most abundant species observed are considered economically important and include: spot, Atlantic croaker, blue crab, weakfish, brown shrimp, summer flounder, southern flounder, bluefish, southern kingfish, white shrimp, and pink shrimp. Spot were present in all strata, and were the most abundant species collected. Atlantic croaker were also present in all strata, and

were the second most abundant species collected. Weakfish were present in all but the Neuse River stratum, and were the sixth most abundant species collected and fourth most abundant amongst the economically important species. Length frequency data for the species listed above indicate that all specimens were juvenile fish taken within the Pamlico Sound during shrimp season (e.g., Casey and Zapf 2015).

The Pamlico Sound Survey data (e.g., Knight 2015, Knight and Zapf 2015), combined with the shrimp trawl characterization studies of Brown (2009, 2015), and numerous other studies and surveys provide substantial evidence that all estuarine and nearshore ocean waters of North Carolina function as important nursery habitat for hundreds of species of finfish and crustaceans. Many of these species (e.g., spot, Atlantic croaker, weakfish, flounders, blue crab) are valuable components of the commercial and recreational fisheries of North Carolina and are all in decline. The persistent loss of these fishes at juvenile life stages as discard mortality greatly affects fishing success and yield.

The studies of Brown (2009, 2010, 2015), Diamond-Tissue (1999), Johnson (2003, 2006), and Logothetis and McCuiston (2004) all corroborate our concerns that shrimp trawl bycatch in waters south of the Pamlico sound, in addition to the Pamlico Sound and nearshore coastal ocean, is comprised of primarily juvenile fishes. The bycatch levels found in these studies are extraordinary and exceed the directed harvest for many species impacted, particularly spot, Atlantic croaker, and weakfish. From the Intracoastal Waterway in Brunswick County to the upper reaches of the Pamlico Sound and various water bodies in between, the problem is systemic and must be addressed if the affected stocks are to show meaningful recovery.

While we understand the difficulties in quantitatively assessing the impacts of juvenile bycatch in shrimp trawls and other fisheries in stock assessments, the issue is a matter of scale. Diamond (2003) suggests that bycatch estimates are meaningless without an estimate of population abundance. However, when the bycatch of juvenile fishes approaches or exceeds the annual, directed removals, particularly for stocks in decline or depressed, the likelihood of negative impacts is great. Additionally, when a large percentage of the fishes harvested are also juvenile fishes, the problem is magnified. We believe it unwise to ignore this major component of fishing mortality any longer, based on simulated modeling exercises that fail to provide a direct link to the magnitude of this problem or require an unattainable population abundance estimate in order to act. If even a fraction of the 15 million pounds of spot, Atlantic croaker, and weakfish taken as shrimp trawl bycatch in 2014 had been afforded the protection to grow to maturity and spawn, it is hard to imagine a scenario in which the stocks would not respond favorably.

Nursery areas in North Carolina are currently defined (15A NCAC 03I.0101) as

> "areas that for reasons such as food, cover, bottom type, salinity, temperature, and other factors, young finfish and crustaceans spend the major portion of their initial growing season. Primary nursery areas are those areas where in the estuarine system where initial post-larval development takes place. These are areas where populations are uniformly early juveniles. Secondary nursery areas are those areas in the

estuarine system where later juvenile development takes place. Populations are comprised of developing sub-adults of similar size that have migrated from an upstream primary nursery area to the secondary nursery area located in the middle portion of the estuarine system."

Based on our analysis, it is evident that all estuarine and nearshore ocean waters of North Carolina meet these criteria and function as secondary nursery areas. All of North Carolina's estuarine and nearshore waters provide the necessary physical conditions in terms of salinity and temperature required for development of several commercially and recreationally valuable species. Further, the soft organic sediments, along with shell bottom, oyster reefs, live bottom, and other structures present in inshore and nearshore areas provide essential habitat for feeding and cover. The currently designated secondary nursery area contain but a small fraction of those important habitats. Consequently, growth, development, and maturity of these sensitive life history stages are severely compromised by the lack of protection afforded to these nursery areas, limiting the ability of these fisheries to measurably improve. In addition, the failure to protect these juvenile fishes by significantly reducing the anthropomorphic sources of mortality compromises the ecosystems effects of these life stages by their premature loss and inability to either provide energy exchange to higher trophic levels or contribute to the spawning stock.

We believe that further protection of these vital nursery habitats from harm is critical. Moreover, additional protection of nursery areas is consistent with the recommendations of the North Carolina Coastal Habitat Protection Plan (NC DEQ 2015) and the ASMFC.[2] Specifically, the ASMFC designates all estuaries as Habitat Areas of Particular Concern for spot and Atlantic croaker and advises that any fishing gear determined by management agencies to have a negative impact on the habitat for these species should be prohibited. The ASMFC states that "in addition to losses of abundance as target and bycatch some fishing gears, particularly dredges and trawls, can impact sciaenid habitats. These gears remove epifauna, alter bathymetry, re-distribute substrates, and change organism assemblages. Habitat loss by fishing gears can take months to years to recover."

E. Ecosystems impacts of shrimp trawl bycatch

The value of the hundreds of millions of juvenile finfish and crustaceans to the ecosystem as forage is high. The Food and Agriculture Organization of the United Nations ("FAO") Technical Guidelines for Responsible Fisheries adopted an ecosystem approach to fisheries management and suggested that where there are threats of serious and irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent degradation (FAO 2003).

The ecosystems approach to fisheries management recognizes that fisheries should be managed to limit their impact on the ecosystem and that management strategies should be

[2] *See* Atlantic Sciaenid Habitats: A review of utilization, threats, and recommendations for conservation, management, and research (2016). This document is available in the meeting materials contained on the ASMFC website for the Annual Meeting in 2016, but has not yet been published. Proceedings of the 2016 ASMFC Annual Meeting may be accessed at the following link: http://www.asmfc.org/home/2016-annual-meeting.

precautionary because our knowledge of the ecosystem is incomplete. The impacts of shrimp trawls on bottom habitat, particularly structural components such as live bottom and shell bottom habitats, is well established.

Numerous studies have been conducted that demonstrate that juvenile spot and Atlantic croaker are important components in the diet of many fishes of importance to commercial and recreational fisheries (Mercer, 1987). Specifically, juvenile spot and Atlantic croaker are important ecosystem components for energy transfer because their early diets consist mostly of benthic invertebrates that they convert into fish flesh for higher trophic level predators. In a study of juvenile red drum and spotted seatrout, Daniel (1988) found that spot was the second most important prey item to the diet of young-of-the-year red drum, second only to grass shrimp in the tidal creeks of coastal South Carolina. Spot were also documented as an important prey item to juvenile spotted seatrout. In a broader study, Wenner et al. (1990) found spot to be the most important component of the diet of southern flounder by frequency, volume and number, while spot also contributed to the diet of summer flounder. Fish and crustaceans dominate the diet of spotted seatrout. Grass shrimp were the dominant crustacean and spot were the dominant finfish species observed. The diet of red drum is more varied than the other species in this study. Various species of shrimp and crabs dominated the red drum diet. Fishes (Atlantic menhaden and spot) were second in importance to larger red drum. Additional diet studies, mostly lacking in North Carolina, would further show the importance of many shrimp trawl bycatch components to the diets of most estuarine and nearshore predators so important to east coast fisheries (*see* Mercer 1987 for review).

In summary, more conservative management of important forage based fishes (e.g., spot, Atlantic croaker, weakfish), to provide for maximum abundance rather than maximum yield, is necessary to allow them to achieve their important role in the trophic balance of the ecosystem, as well as provide the necessary surplus production to support valuable fisheries in North Carolina and elsewhere.

V. ANALYSIS

All states in the mid-Atlantic and south Atlantic regions have taken different approaches to fisheries management. North Carolina stands alone as the only state on the east coast that allows trawling in estuarine waters. The specific impacts of this fishery on several species are provided above. Virtually all east coast states have some type of juvenile survey in estuarine waters to document the abundance and diversity of fishes that occur there. These surveys provide solid evidence that estuarine waters are critical nursery habitat. Other states have acted on these data by protecting those important areas. For example, the Virginia Institute of Marine Science trawl survey has occurred since 1955. The species composition and relative abundance of fishes in Virginia waters are similar to those found in trawl research conducted in North Carolina. Atlantic croaker, weakfish, and spot were exceeded in abundance only by bay anchovy, hogchoker, and white perch during their survey periods. Trawling has been prohibited in the Chesapeake Bay for decades.

The bycatch associated with shrimp trawling confounds fisheries managers in North Carolina and impacts fisheries along much of the east coast that rely on spillover from the

important nursery that is North Carolina's sounds. The persistent harvest and mortality of juvenile fishes in North Carolina upsets the natural migration of inter-jurisdictional fishes that move to feeding and spawning areas outside of North Carolina waters. In many instances, these fish would normally return to North Carolina as larger fish. North Carolina also receives recruits from sister states to its south and north, which have provided far greater protection for its juvenile fish resources in the past.

The data is clear that substantive rule changes to minimize mortality, particularly juvenile mortality, in the North Carolina shrimp trawl fishery are necessary in order to build on the management programs already in place at the interstate level. The amount of effort and the bycatch that continues in the commercial fisheries is extraordinary and especially concerning for stocks in decline or at low levels of abundance. Likewise, the discard mortality in the growing recreational fishery and lack of controls such as size and bag limits, particularly on the larger juveniles, is a concern. Though progress has been made— turtle excluder devices and BRDs are required in shrimp trawls, the long haul seine fishery has declined in participants, and gill nets have been much reduced in some areas as a result of Incidental Take Permits for Atlantic sturgeon and sea turtles—efforts to control substantive bycatch issues to date, particularly in the shrimp trawl fishery, are inadequate.

North Carolina's important, but rudimentary, nursery area program, illustrated in Figure 1, fails to consider and protect those areas in the estuarine and nearshore coastal waters where juveniles are abundant and need protection in order to develop into adults, and where habitat conditions are ideal for juvenile life stage development. Outside of the designated nursery areas of North Carolina, fish populations in Pamlico Sound and other estuarine areas are clearly comprised of larger juveniles that will soon put energy into reproductive growth for their first spawn (e.g., Casey and Zapf 2015). These largest juveniles have migrated out of the designated Primary and Secondary Nursery Areas located in the more upper and middle portion of the estuarine system to the middle and lower portions of the estuarine system and waters. Juveniles of species important to commercial and recreational fishermen dominate commercial and fishery-independent trawl catches. Fishes generally remain in these areas until they spawn or move to overwintering nursery areas offshore. The fact that extensive commercial and recreational fisheries are allowed in these critical areas compromises the ability of numerous fish stocks and forage species to rebuild.

It is counterproductive to protect the smallest juveniles that already face high natural mortality rates in the current nursery area and not continue that protection until these individuals actually contribute to the health of the population by spawning. The only difference between the limited areas currently defined as nursery habitat in North Carolina and the rest of North Carolina's estuarine and nearshore coastal ocean waters is the size of the juveniles encountered. Multiple sampling efforts in North Carolina, which include extensive trawl and gill net surveys, along with samples of recreational and commercial catches show a very large and variable preponderance of juvenile fishes throughout North Carolina waters. The survey grid for the Pamlico Sound Survey (Figure 2) is expansive and catches are almost exclusively juvenile fishes, in much the same area as the commercial shrimp trawl fishery operates (Figures 3 and 4). As juvenile fishes, "protected" in the current and geographically limited nursery areas grow in North

Carolina, their natural tendency is to move to the more open, higher salinity waters of larger sounds and bays. It is at this time that these fishes, fit enough to survive, are subjected to intense anthropomorphic sources of mortality in the form of shrimp trawls. In some circumstances, fishes with healthy abundance levels can withstand high levels of mortality and still produce a surplus. Such is not the case for most species of concern in North Carolina's estuaries. Consequently, all North Carolina inshore and nearshore waters are indeed nursery areas and should be afforded maximum protection. Doing so would allow the vulnerable species currently subjected to shrimp trawls the opportunity to spawn at least once.

Some might suggest that fishing mortality of juvenile fishes has a negligible impact on population viability and that those fishes would have likely died anyway. During various opportunities for public comment others suggest that bycatch provides a service to the ecosystem by providing needed food to the members of the system. However, diet studies of most predatory fishes indicate that these fishes are visually-oriented, opportunistic predators that focus on the weakest of the particular prey items for their meal, e.g., the survival of the fittest (*see* Mercer 1987 and Wenner et al. 1990 for review). With bycatch and discards the fittest are no more fit than the weakest, throwing the ecosystem off balance. Species that reportedly benefit from this "free lunch" do not appear to be benefiting as one might expect. For example, the North Carolina Marine Fisheries Commission recently revised their FMP schedule to update the blue crab FMP sooner than expected as a result of the fishery decline and concerns over the health of the stock. One might expect that if blue crab were a beneficiary of the significant bycatch in North Carolina fisheries, the stock would be viable. We are unaware of any positive link between bycatch in shrimp trawls and stock status.

Because absolute estimates of age-specific discard mortality are highly variable and difficult to quantify, some argue that the absence of this data in quantitative stock assessments lessens its importance or cautions against management actions. This conclusion is erroneous and dangerous, particularly when one reviews the stock status and landings history of many of the species that are particularly vulnerable to significant bycatch and discard mortality. Spot, Atlantic croaker, and weakfish all suffer from low trends in biomass and harvest (*see* ASMFC FMP citations above). During the shrimp trawl characterization study alone, during a time when all three of these key species were at low and declining abundance, the estimated number of discards from the shrimp trawl fishery was conservatively estimated at approaching ½ billion fish. This is despite the fact that shrimp trawl nets were outfitted with turtle excluder devices and BRDs (Brown 2015). The Atlantic croaker, spot, and weakfish stocks are highly productive and could provide tremendous access, opportunity, economic value, and ecosystem function if further protected.

This analysis focused on spot, Atlantic croaker, and weakfish, however, concern is not limited to those three species. The impacts on numerous other components of the ecosystem that succumb to pre-spawn mortality are likely in the same position, not to mention the disruption to the bottom structure and critical benthic communities resulting from fishing efforts. Other species of recreational and commercial importance taken in the North Carolina shrimp trawl fishery include kingfishes, pigfish, southern and summer flounder, and king and Spanish mackerel (Brown 2009, 2015).

The concept that first spawn fishes that may naturally spawn over a decade or more can somehow rebuild populations is outdated. The reproductive capacity of first spawn fishes is but a fraction of their true capacity (Lowerre-Barbieri et al. 1995, Nye et al. 2003). The fecundity, fitness, and survivability of the eggs of a virgin spawner simply cannot compare to the fecundity of their larger counterparts in the population. The more fecund, and presumably valuable, older fishes in the population are mostly absent from these populations today (see ASMFC annual reports on spot, Atlantic croaker, and weakfish for review, NC DMF MRIP data request 2016). Proper management should be implemented that allows for an expansion in the age structure of these populations, and thereby spawning stock biomass, by utilizing measures that allow these fishes to spawn at least once, and preferably twice, before any allowable harvest.

In summary, bycatch and discard mortality, along with the directed harvest, of juvenile and pre-spawn adult fishes in North Carolina is alarming. Current trawling practices lead to the discard of billions of juvenile fish each decade, decimating populations and seriously impacting local, fishery dependent economies and communities. Using only the data from 2014 in Brown (2015), when observer coverage was greatest and covered all seasons, the estimated discards of spot, Atlantic croaker, and weakfish from shrimp trawls was 15 million pounds of nearly all juvenile fish. For comparison, the commercial and recreational harvest of these three species in North Carolina in 2014 was 4.6 million pounds and greater than 50 percent were juvenile fishes. The coast wide commercial and recreational harvest of these three species, all designated as depleted or depressed, was 18.7 million pounds. The potential yield of these small fishes, if they were afforded the protection to grow to adulthood, is staggering: the benefits of protecting juvenile fish far outweigh the costs in terms of fishery yield and success for commercial and recreational fisheries alike. Furthermore, an expansion of the range of these fishes into other jurisdictions, which will come with further regulation of bycatch, is entirely consistent with the basic tenants of inter-jurisdictional fisheries management.

The commercial fishery in the estuarine waters of North Carolina has limited restrictions on extraordinary amounts of commercial gear. The health of both species that exclusively call North Carolina home and many inter-jurisdictional fisheries depends on the concerted conservation efforts of all.

VI. MANAGEMENT RECOMMENDATIONS

The need to substantially reduce discards in North Carolina fisheries cannot be overstated. While measures to date have helped, they have fallen short of meaningful changes in bycatch rates. Based on this review, the following recommendations are offered to measurably address this systemic problem in North Carolina. The recommendations are based on what is best for the long-term economic viability of these fish stocks. Closing the shrimp trawl fishery in North Carolina inshore and nearshore waters, as other states on the east coast have done, would be the most effective single strategy to protect important nursery areas and juvenile fishes. This solution, however, is unreasonable; thousands of North Carolinians rely on the commercial shrimp industry for their livelihood. These measures balance conservation goals with current fishing practices to mitigate the effects of bycatch mortality while still providing for a productive commercial and recreational fishery.

A. Designate all inshore and ocean (0-3 miles) waters as nursery habitat

Because these areas function as important nursery habitats, bycatch and mortality issues from the shrimp trawl fishery in estuarine waters is unique to North Carolina in the south Atlantic. Data collected by NC DMF regarding the occurrence of juvenile fishes in inside waters is adequate, appropriate, and clear to support nursery area designation for all inshore, estuarine and ocean waters (0-3 miles offshore). The preponderance of data regarding juvenile life stages of fishes in these programs illustrate that all inside waters serve as important locations where juvenile fishes feed and grow to maturity. Juvenile fish are defined here as fishes that have yet to spawn at least once. While some fishes may be harvested and possess mature gonads, if they are harvested prior to spawning, their contribution to the population is zero, threatening population stability and population growth. In fact, there is no evidence that any areas within the estuarine system of North Carolina do *not* function as a nursery area. These data, along with the Pamlico Sound survey and the decline of Atlantic croaker and spot in the south Atlantic, provide unequivocal support to the argument that the area functions as critical nursery habitat.

B. Implement strategies to reduce shrimp trawl bycatch of juvenile fishes in all designated nursery areas

Shrimp trawl bycatch, particularly in nursery areas, confound efforts to protect important inter-jurisdictional fishes. Although limited data are available to unequivocally prove the effectiveness of various strategies to reduce bycatch, the critical importance of such reductions is logical, particularly for species of concern. The only estuarine shrimp trawl fishery on the east coast exists in North Carolina; however, concerns related to its impact on fish stocks are enormous.

While no shrimp trawling in newly designated nursery areas would yield the best result biologically, if it is to continue, effort needs to be significantly reduced by employing the following suite of management strategies.

a. Reduce maximum headrope length in shrimp trawl fishery

First, reduce the maximum combined headrope length from 220 feet to 90 feet for all nets combined. Headrope length is a measure of the size of the shrimp trawl, with larger vessels tending to use larger nets to catch more shrimp. While improved efficiency and overall yield are the primary objectives, bycatch also increases. A reduction in the allowable headrope length is necessary to reduce effort, and subsequent bycatch in this fishery.

During the development of the original North Carolina Shrimp FMP (NC DMF 2006), the recognition of specific problems related to juvenile southern flounder bycatch resulted in rules to limit sensitive areas to trawling by closing some areas and limiting others to a 90 foot headrope maximum. The NC DMF points out in their plan (NC DMF 2006, p. 315) that headrope restrictions reduce bycatch and the fishing power of larger vessels. Further, no other south Atlantic or Gulf Coast state allows shrimp trawls over 60 feet in their jurisdictional waters. During the Brown (2015) study, maximum headrope lengths ranged from 220 to 240 feet. The average headrope length increased from 94 feet in 2012 to 134 feet in 2015. While this increase in headrope size may not be completely reflective of all fleet activities, the study reports these

trips as representative of the fishery. These data also suggest that many vessels in the fleet already employ nets less than 90 feet, thereby mitigating the impacts of the proposed reduction. A 90 foot maximum headrope for all nets combined in all estuarine and nearshore ocean waters is recommended to reduce the bycatch of *all* fishes impacted by shrimp trawls.

b. Require the use of two bycatch reduction devices ("BRDs") on all shrimp trawls

Second, require the mandatory use of a second, federally certified BRD or device tested by DMF and certified to further reduce bycatch by at least 25 percent. Recent studies by NC DMF, pursuant to Amendment 1 to the N.C. Shrimp FMP (NC DMF 2015), indicate that a second Florida Fish Eye BRD placed next to the currently required single BRD shows great promise in further reducing bycatch in the brown shrimp fishery while limiting shrimp loss. The N.C. Marine Fisheries Commission ("MFC") contemplated the requirement of a second BRD in Amendment 1. The MFC should require the use of a second BRD with documented, additional bycatch reduction.

c. Limit tow times to 45 minutes

Third, limit tow times to 45 minutes. Reducing tow times to a maximum of 45 minutes would reduce bycatch, culling time, and discard mortality. Logothetis and McCuiston (2006) reported that survivability of bycatch increased with reduced culling time. Shorter tow times generally mean less catch and shorter culling time. This regulation is especially important in light of rapidly increasing tow times in recent years: Brown (2015) reported an increase in average tow times over his study period from 100 minutes in 2012, 142 minutes in 2013, 187 minutes in 2014, and 181 minutes in 2015. Maximum tow times likewise increased from 240 minutes in 2012 to 360 minutes in 2015.

d. Limit shrimp trawl effort to three days per week, during daylight hours only

Fourth, limit all shrimp trawl effort to three days per week during daylight hours only. Fishermen are known to fish harder in the wake of restrictions to make up for lost opportunities due to measures such as tow times and reduced net size. A limit of three days per week of trawling during daylight hours would significantly reduce attempts at fishing harder and allow some fishes to move out of trawling areas or recover from encounters during open days. Lay days may also serve to limit the number of out of state vessels that may travel to North Carolina in order to participate in this unique estuarine fishery.

This time restriction would both reduce bycatch and improve the efficiency of the shrimp trawl industry. Finfish bycatch is significantly higher at night while shrimp catches are higher during the day (Ingraham 2003). Additionally, Johnson (2003) reported that far more shrimp are taken early in a fishing week than later (cited in NC DMF 2015).

Brunswick County provides a template for success: it is currently unlawful to shrimp during nighttime hours in the ocean off Brunswick County. This rule was implemented to reduce bycatch (NC DMF 2015). The current restrictions off of Brunswick County should be expanded to all estuarine and coastal waters of North Carolina.

e. Delay the opening of shrimp season

Seasonal openings should be based on a shrimp count size. Delaying the harvest season until shrimp are larger provides not only a more valuable product to the industry, but reduces the length of the season when gear is in the water, thereby reducing bycatch. While determining count size for all North Carolina waters is impractical, delaying harvest in Pamlico Sound until shrimp count reaches 60 shrimp per pound (heads on) is prudent and reduces concerns from fishermen and dealers that shrimp are either too small or that bycatch is too high when the fishery traditionally opens in early to mid-May.

These five actions must be implemented together in order to achieve the desired effect of meaningful bycatch reduction in the shrimp trawl fishery. While it is beyond our ability to determine, or even speculate, on the absolute reductions that would be realized by taking this course of action, it is a step in the right direction and would measurably reduce bycatch in our judgment.

f. Establish size limits and bag limits for spot and Atlantic croaker

In the event North Carolina makes these important changes in the shrimp trawl fishery, the abundance and subsequent encounters with juvenile fishes in other fisheries should dramatically increase. Hilborn and Walters (1992) point out the need to allow fish to grow to a reasonable size before they are harvested. Size limits developed to delay harvest to allow juvenile fish to spawn at least once has been a common sense management approach used for decades. The fishery management plans of the ASMFC, federal Councils, and North Carolina are replete with examples of the impacts, not only on increasing spawning stock biomass, but yield per recruit as well. We recommend strategies to reduce this potential increase in the bycatch of juvenile and pre-spawn adult fishes in all fisheries. Many of the species of concern in North Carolina and coast wide either have no size limits or size limits have proven to be ineffective. This is certainly the case for Atlantic croaker and spot. An 8 inch size limit for spot and a 10 inch size limit for Atlantic croaker in all North Carolina fisheries are slightly below the L100% for these two species and would allow nearly all fish to reach maturity and spawn at least once. An alternative to size limits in the higher volume commercial fisheries could be changes to mesh sizes in primary gears such as gill nets and trawls to minimize interactions altogether in those fisheries. The positive impacts in terms of increased spawning stock biomass and yield to the fishery would be enormous and go a long way towards sustainable fishing in the future.

VII. CONCLUSION

The only difference between the limited areas currently defined as nursery habitat in North Carolina and the rest of North Carolina's estuarine and nearshore coastal ocean waters is the size of the juveniles encountered. The majority of fishes in the unprotected areas of North Carolina's estuarine and nearshore waters are juveniles, have not yet reached maturity, and therefore have not yet reproduced and contributed to the population. It makes no sense to protect the smallest juveniles that already face high natural mortality rates in the current nursery area and not continue that protection until they actually contribute to the health of the population by spawning at least once.

Spot, Atlantic croaker, and weakfish were critical components of North Carolina's estuarine commercial and recreational fisheries prior to their dramatic decline in the fisheries late 1980s.

The combined landings of these three species in the commercial fishery in 1981 were 37.6 million pounds. In 2015, commercial landings were 2.3 million pounds, a 95 percent decline. A similar trend is observed in the recreational fishery when, in 1981, recreational landings were 5.3 million pounds compared to 1.6 million pounds in 2015, a 70 percent decline.

During the 2014 season, 149 of the 8,670 (1.72 percent) reported shrimping days in the estuary and ocean waters were observed. Spot, Atlantic croaker, and weakfish accounted for 268,116 pounds of the 415,283 total pounds, or 65 percent, of catch observed, including shrimp. Expansion of these observed numbers to the total estimated catch of the shrimp trawl fishery in 2014 yields 15.6 million pounds of spot, Atlantic croaker, and weakfish, primarily juveniles, discarded as bycatch by shrimp trawlers. This level of bycatch is four times the combined commercial and recreational harvest in North Carolina (3.9 million pounds) and nearing the coast wide harvest of all three species in 2014 (18.7 million pounds).

This goal of sustainable and healthy fisheries is severely compromised by the magnitude of juvenile mortality that occurs in North Carolina fisheries. The fact that North Carolina remains the lone state to allow shrimp trawl activity in coastal and estuarine nursery areas provides a common denominator that may explain the dramatic shift in landings from the south Atlantic to the mid-Atlantic region. The current boom or bust cycle in our fisheries will persist with longer gaps between boom years unless measures are taken to reduce juvenile mortality and improve spawning stock biomass.

Sound science points to shrimp trawl bycatch, despite efforts to reduce it, as the primary factor that is impacting North Carolina's fisheries. Measures taken to date to reduce shrimp trawl bycatch in North Carolina have skirted around the edges of a complex problem. The data provided in the North Carolina Shrimp FMP and Amendment I clearly indicate that the magnitude of shrimp trawl bycatch is significant and impacts to fish populations are concerning. The North Carolina Shrimp FMP (NC DMF 2015) states that it is commonly known that harvesting a fish before it matures and spawns can lead to recruitment overfishing and impair the stock's ability to sustain itself. Further, harvesting a fish before it reaches some optimal size leads to growth overfishing and reduced overall yield from the fishery. Measureable improvements in North Carolina fisheries and the fragile ecosystems they rely on for food, protection, growth, and reproduction will languish until shrimp trawl bycatch is properly addressed.

Figure 1. Nursery area map, with locations of the various nursery area locations for estuarine waters of North Carolina. The N.C. Marine Fisheries Commission prohibits trawling in primary nursery areas, however, the mesh sizes and size constraints of these areas preclude significant activity or potential juvenile fish mortality. Further, the fishes utilizing these areas are typically far too small to be retained in traditional shrimping gear. Consequently, we argue that the nursery area protections are far more habitat-related than fisheries-resources related.

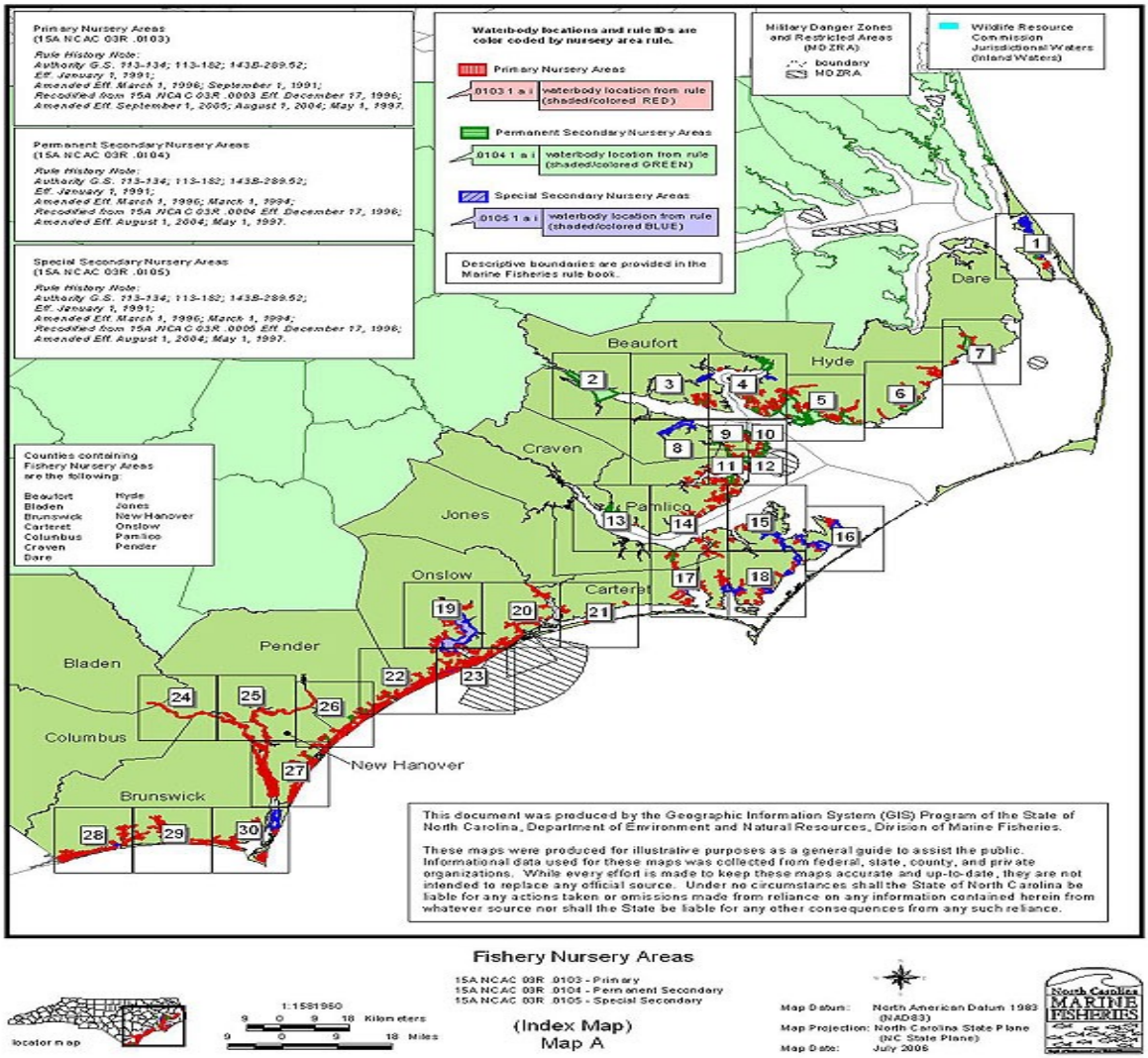


Figure 2. Randomized sample locations of the Pamlico Sound survey are obtained from areas outside of any of the designated nursery areas. With few exceptions, these areas are subjected to intense fishing pressure by all sectors of the fishery, including trawls, long haul seines, gill nets, and hook and line, all of which harvest and/or discard substantial quantities of juveniles fishes.

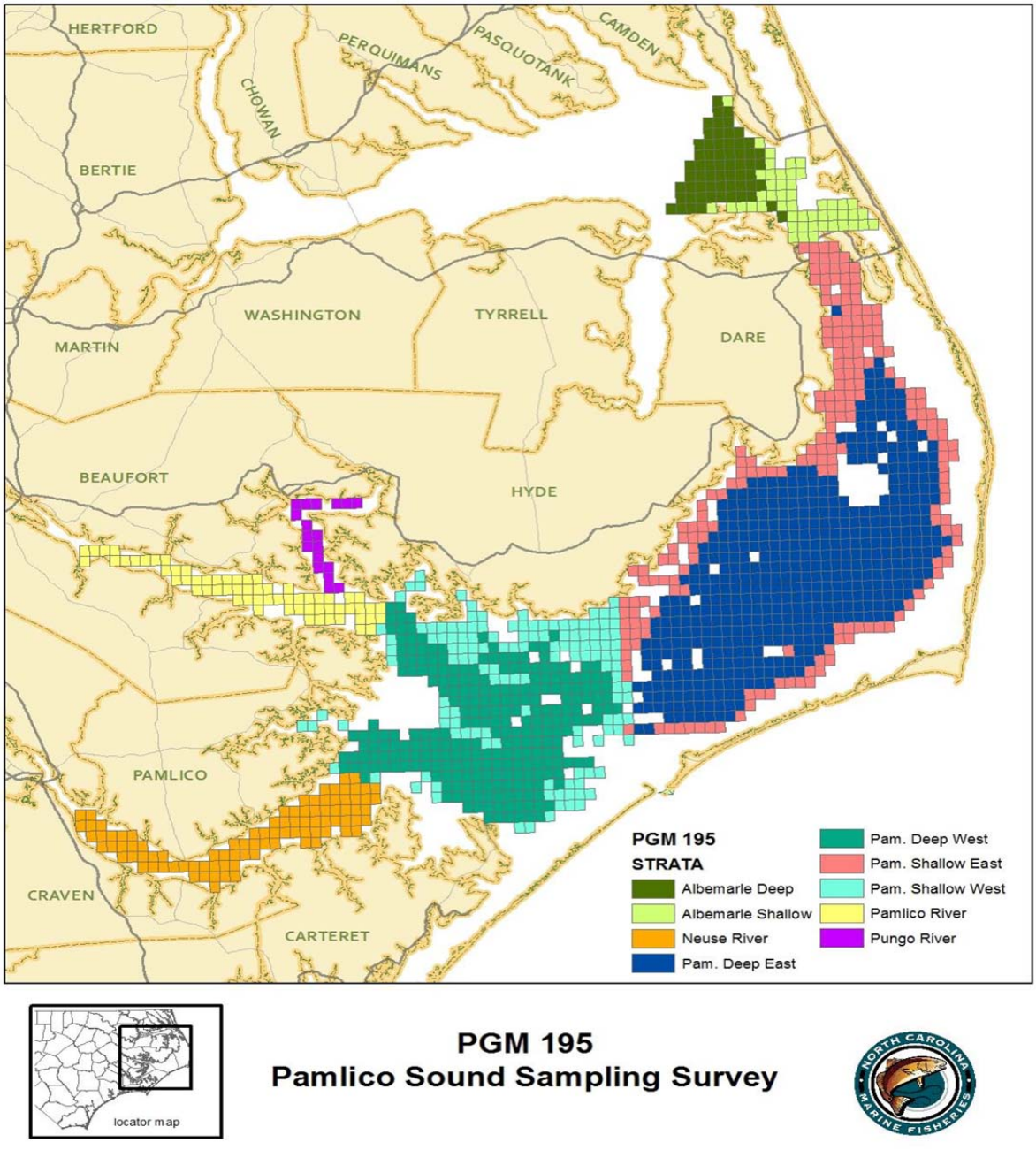


Figure 3. Location of commercial shrimp trawl observations made in northern North Carolina, January–December 2014 (Brown 2015).

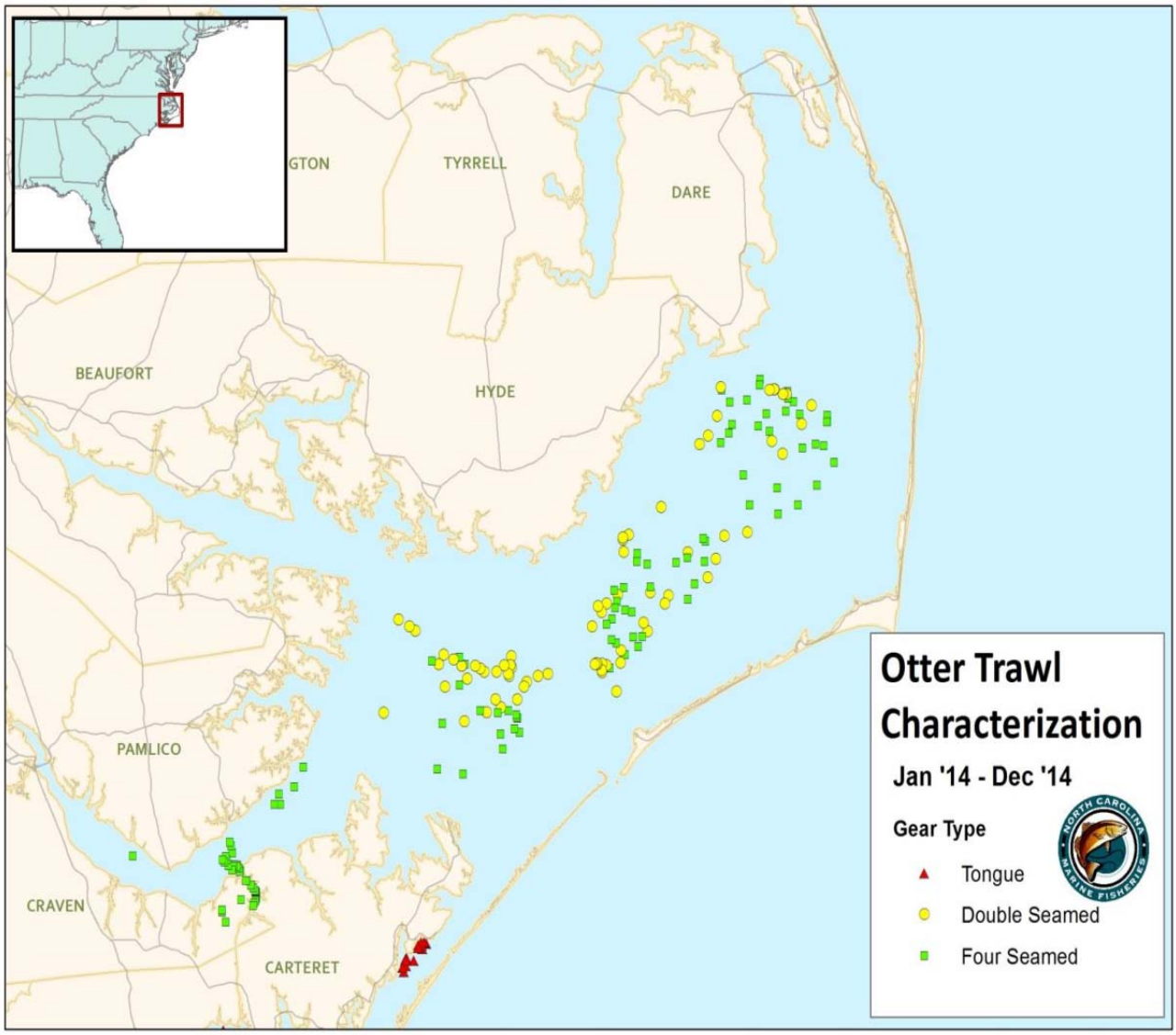
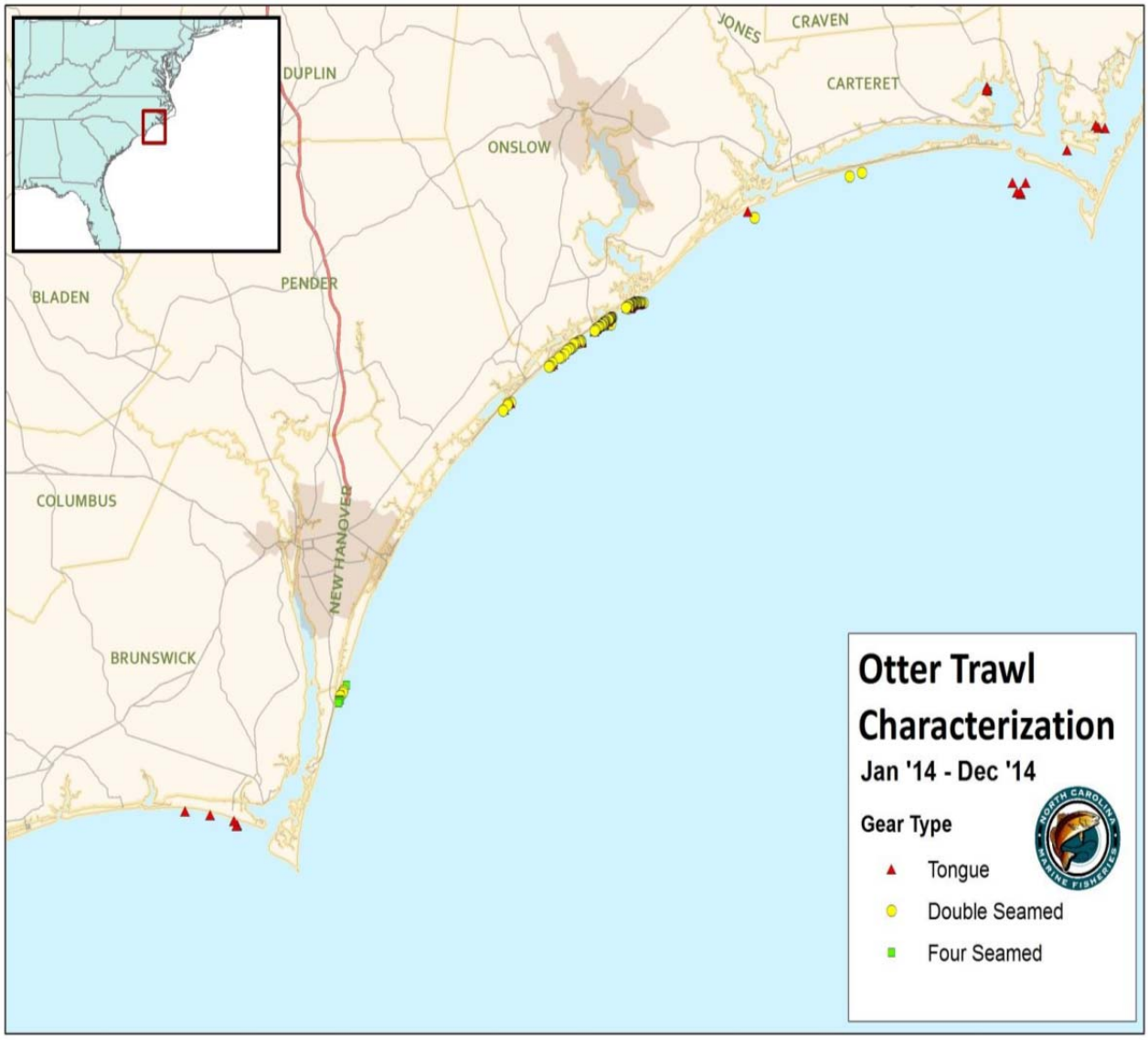


Figure 4. Location of commercial shrimp trawl observations made in southern North Carolina, January–December 2014 (Brown 2015).



Literature Cited

Alverson, D.L., M.H. Freeburg, S.A. Murawski, and J.G. Pope. 1996. A global assessment of fisheries bycatch and discards. FAO Fisheries Technical Paper. No. 339. Rome, FAO. 1994. 233 pp.

Atlantic States Marine Fisheries Commission. 1996. Amendment 3 to the interstate fishery management plan for weakfish. Washington DC: ASMFC Weakfish Plan Development Team. Fishery Management Report No. 27. 66 p.

Atlantic States Marine Fisheries Commission. 2009. Addendum IV to Amendment 4 to tthe weakfish fishery management plan. 18p

Atlantic States Marine Fisheries Commission. 2010a. Atlantic croaker 2010 benchmark stock assessment. Washington, D.C. 366 p.

Atlantic States Marine Fisheries Commission. 2010b. Spot life history report. Report to the ASMFC South Atlantic State/Federal Fisheries Management Board. 46 pp.

Atlantic States Marine Fisheries Commission. 2011. Addendum I to Amendment I to the Atlantic croaker fishery management plan. Washington DC: ASMFC Atlantic croaker Plan Development Team. 7 pp.

Atlantic States Marine Fisheries Commission. 2014a. Addendum I to the omnibus amendment to the interstate fishery management plan for Spanish mackerel, spot, and spotted seatrout. Management of the spot fishery using the traffic light approach. 7 pp

Atlantic States Marine Fisheries Commission. 2014b. Addendum I to Amendment I to the interstate fishery management plan for Atlantic croaker. Management of the Atlantic croaker fishery using the traffic light approach. 7 p. Atlantic States Marine Fisheries Commission. 2016. Weakfish stock assessment peer review. NOAA Award No. NA15NMF4740069. 12 pp.

Atlantic States Marine Fisheries Commission. 2015a. 2015 review of the ASMFC fishery management plan for spot. 2014 Fishing Year. Spot plan review team. Report to the ASMFC South Atlantic State/Federal Fisheries Management Board. 18 pp.

Atlantic States Marine Fisheries Commission. 2015b. 2015 review of the ASMFC fishery management plan for Atlantic croaker. 2014 Fishing Year. Atlantic croaker plan review team. Report to the ASMFC South Atlantic State/Federal Fisheries Management Board. 20 pp.

Atlantic States Marine Fisheries Commission. 2016. Weakfish benchmark stock assessment. NOAA Award No. NA15NMF4740069. 263 pp.

Brown, K. 2009. Characterization of the near-shore commercial shrimp trawl fishery from Carteret County to Brunswick County, North Carolina. North Carolina completion report for NOAA award no. NA05NMF4741003. NC Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC. 29 pp

Brown, K. 2015. Characterization of the commercial shrimp otter trawl fishery in the estuarine and ocean (0-3 miles) waters of North Carolina. Final Report to the National Fish and Wildlife Foundation and the National Marine Fisheries Service for the study period August 2012 – August 2015. NC Department of Environmental Quality, Division of Marine Fisheries, Morehead City, NC. 177 pp.

FAO Technical Guidelines for Responsible Fisheries. 2003. The ecosystems approach to fisheries. No. 4, supplement 2. Rome.

Knight, C. 2015. Pamlico Sound Survey. September 2015 cruise report. Department of Environmental Quality, Division of Marine Fisheries, Morehead City, NC. 42 pp.

Daniel, L.D, III. 1988. Aspects of the biology of juvenile red drum, *Sciaenops ocellatus*, and spotted seatrout, *Cynoscion nebulosus*, in South Carolina. Master's Thesis, College of Charleston. June 23, 1988. 58 pp.

Hilborn, R. and C.J. Walters. 1992. Quantitative Fisheries Stock Assessment: Choice, Dynamics, and Uncertainty. Chapman and Hall. 580 pp.

Ingraham, B. 2003. Night vs. Day bycatch comparison for shrimp trawling in the southern district of North Carolina. North Carolina Fisheries Resource Grant. FRG-98-FEG-46.

Johnson, G.A. 2003. The role of trawl discards in sustaining blue crab populations. North Carolina Fisheries Resource Grant. FRG-99-EP-07

Knight, C. 2015. Pamlico Sound Survey. June 2015 cruise report. Department of Environmental Quality, Division of Marine Fisheries, Morehead City, NC. 38 pp.

Knight, C, and D. Zapf. 2015. Pamlico sound survey, September 2014 Cruise Report. North Carolina Department of Environmental Quality. Division of Marine Fisheries, Morehead City, NC. 47 pp.

Logothetis, E. and D. McCuiston. 2006. An assessment of the bycatch generated in the inside commercial shrimp fishery in southeastern North Carolina, 2004 & 2005. North Carolina Sea Grant Fisheries Resource Grant Program. Project #05-EP-04. 87 pp.

Lowerre-Barbieri, S.K. Chittenden, M., and Barbieri, L.R. 1995. Age and growth of weakfish, *Cynoscion regalis*, in the Chesapeake Bay region with a discussion of historical changes in maximum size. Fish Bull. 93: 643-656.

Lowerre-Barbieri, S.K. Chittenden, M., and Barbieri L.R. 1996. The multiple spawning pattern of weakfish, *Cynoscion regalis*, in the Chesapeake Bay and Middle Atlantic Bight. Can J Fish Aquat Sci. 55: 2244-2254.

Lowerre-Barbieri, S.K. Chittenden, M., and Barbieri, L.R. 1996. Variable spawning activity and annual fecundity of weakfish in Chesapeake Bay. Trans Am Fish Soc 125:532-545.

Mercer, L.P. 1987. Fishery management plan for spot (*Leiostomus xanthurus*). Special Scientific Report No. 49. North Carolina Department of Natural Resources and Community Development. Division of Marine Fisheries, Morehead City, NC. 90 pp.

North Carolina Department of Environmental Quality. 2016. North Carolina coastal Habitat Protection Plan. Barrett, T.J., A.S. Deaton, E.F. Hain and J. Johnson (eds.). Division of Marine Fisheries. Morehead City, NC.

North Carolina Division of Marine Fisheries. 2006. North Carolina Fishery Management Plan for Shrimp. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC. 390 pp.

North Carolina Division of Marine Fisheries. 2015. North Carolina Fishery Management Plan Amendment 1 for Shrimp. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC. 519 pp.

Nye, J.A., Targett, T.E., and Helser, T.E. 2008. Reproductive characteristics of weakfish in Delaware Bay: implications for management. N Am J Fish Manage, 27:1-11.

Wenner, C.A., W.A. Roumillat, J.E. Moran, M.B. Maddox, L.B. Daniel, III, and J.W. Smith. Investigations on the life history and population dynamics of marine recreational fishes in South Carolina; Part 1. Final Report to Federal Aid in Fish Restoration Act Project F-37. Marine Resources Research Institute, South Carolina Wildlife and Marine Resources Department, Charleston, SC. 200 pp.

EXHIBIT C

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EDUCATION:

B.S. Biology, Old Dominion University, 1976. Summa Cum Laude.

M.A. Marine Science, College of William and Mary, Virginia Institute of Marine Science, 1980.

Virginia Executive Institute, 1989.

EMPLOYMENT HISTORY:

2014-2016	Consultant to the Coastal Conservation Commission and other organizations. Monitor activities of the Atlantic States Marine Fisheries Commission.
2012-2014	Commissioner, Virginia Marine Resources Commission. Served as Agency Head and Chairman of the Agency's dual regulatory board. Directed the work of four Divisions, consisting of 160 employees: Fisheries Management, Habitat Management, Law Enforcement (Virginia Marine Police), and Administration and Finance. Responsible for an annual agency budget of $23 million.
2006-2012	Chief Deputy Commissioner, Virginia Marine Resources Commission. Served as second in command of the agency. Advised the Commissioner and Regulatory Board on agency policies and programs. Provided policy guidance to the Division Chiefs.
1984-2012	Chief, Fisheries Management Division, Virginia Marine Resources Commission. Directed the Fisheries Management Division of the Agency. Provided fishery management guidance to the Regulatory Board. Directed the collection and analysis of scientific, biological, economic and sociological information pertaining to Virginia fisheries. Supervised departments pertaining to fishery planning and statistics, fishery management plan development, shellfish conservation and replenishment, artificial reef construction

	and the promotion of recreational fisheries. Served as the agency's representative to the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery management Council.
1982-1984	Fisheries Manager, Head of the Department of Fisheries Plans and Statistics, Virginia Marine Resources Commission. Investigated and reported on the conditions of Virginia's commercial and recreational fisheries. Recommended regulatory options for the conservation and management of Virginia's fisheries to the agency regulatory board. Served as the agency alternate to the ASMFC and MAFMC.
1981-1982	Fisheries Liaison Officer, Virginia Marine Resources Commission. Served as agency alternate to the MAFMC. Investigated and reported to the Commissioner on special fishery issues.

AWARDS AND COMMENDATIONS

2003, Captain David H. Hart Award of the Atlantic States Marine Fisheries Commission, for outstanding leadership and contributions to the management of Atlantic coastal fisheries.

2009, Commander's Award for Public Service, Department of the Army. For outstanding effort and dedication while serving on the Management Team for the production of the Chesapeake Bay Oyster Programmatic Environmental Impact Statement.

2011, Conservation Award, Tidewater Chapter, American Fisheries Society.

2012, Ricks E. Savage Award of the Mid-Atlantic Fishery Management Council, for positive influence and contributions to the conservation and management of mid-Atlantic fisheries.

EXHIBIT D

CURRICULUM VITAE

LOUIS BROADDUS DANIEL, III

Birth date: February 14, 1963

Current Address: 109 Barringer Drive, Newport, North Carolina 28570

Telephone: 252-808-8147 *Fax: 252-726-0254*

Email: *sciaenops1@gmail.com*

Education:

College of William and Mary, School of Marine Science, Virginia Institute of Marine Science, Gloucester Point, Virginia, Ph.D., Marine Science, Graduated 1995.

College of Charleston, Charleston Higher Education Consortium, Charleston, South Carolina, M.S., Marine Biology, Graduated 1988.

Wake Forest University, Winston-Salem, North Carolina, B.A., Biology, Graduated 1985.

Employment History:

June 2016 to present
- Position: Environmental/Fisheries consultant
- Description: Administer various grants and contracts.
- Supervisor: Self
- Employer: Self

January 2016 to present
- Position: Adjunct Professor
- Description: Developed a marine resources policy and management curriculum for the sea semester at the NC State Center for Marine Sciences and Technology.
- Supervisor: Dave Eggleston
- Employer: North Carolina State University

March 2016 to June 2016
- Position: Assistant Section Chief, Shellfish Sanitation
- Description: Transitioned out of Director role, assisting section in day to day operations and sampling programs. Developed good understanding of general program requirements.
- Supervisor: Shannon Jenkins
- Employer: North Carolina Division of Marine Fisheries

February 2007 to March 2016
- Position: Director of the North Carolina Division of Marine Fisheries
- Description: Represent North Carolina on the ASMFC that oversees the management of fisheries resources along the Atlantic coast. Implement the North Carolina Fisheries Reform Act, Coastal Recreational Fishing License, Waterfront Access and Marine Industry Fund. Coordinate the development of Fishery Management Plans and Coastal Habitat Protection Plan. Responsible for management of Marine Fisheries headquarters and 5 field office with nearly 300 staff in 8 sections including Marine Patrol and a $30+ million budget.
- Supervisor: Secretary Donald van deer Vaart

Employer: North Carolina Division of Marine Fisheries

February 1998 to 2007

Position: Executive Assistant for Councils

Description: Represent North Carolina on the South Atlantic Fishery Management Council that oversees the management of fisheries resources in the south Atlantic EEZ. Assist the Fisheries Director in implementation of the North Carolina Fisheries Reform Act and serve as a technical advisor to the North Carolina Marine Fisheries Commission (NCMFC). Coordinate the development of Fishery Management Plans. Write and present numerous technical issue papers for action by the NCMFC and Joint Legislative Committee on Seafood and Aquaculture. Serve as the North Carolina representative on several ASMFC management boards.

Supervisor: Preston P. Pate, Jr.

Employer: North Carolina Division of Marine Fisheries

April 1995 to February 1998

Position: Marine Fisheries Biologist Supervisor

Description: Supervise 5 biologists and 5 technicians in various studies on North Carolina finfish and shellfish fisheries (i.e., long haul seine, otter trawl, gill net, pound net), bycatch reduction, and the population dynamics of important commercial and recreational fish species. Serve as the North Carolina representative on numerous ASMFC and SAFMC technical committees, stock assessment subcommittees, and plan development teams. Serve as the Chairman of the North Carolina Division of Marine Fisheries Biological Review Team, whose purpose is to review all biological activities performed by the Division.

Supervisor: David L. Taylor

Employer: North Carolina Division of Marine Fisheries

Selected Presentations, Reports, and Publications*:*

Since 2002, prepared, edited, and reviewed approximately 40 fishery management plans, amendments, and supplements for public hearings and recommendations to the Marine Fisheries Commission.

Since 2002 have given numerous presentations to academic, public, and legislative gatherings related to the management of marine fisheries.

Daniel, L.B., III. 2002. North Carolina Interjurisdictional Fisheries Management Plan. North Carolina Division of Marine Fisheries, Morehead City, NC 28557.

Daniel, L.B., III and Lee Parramore (with Plan Development Team). 2001. North Carolina Red Drum Fisheries Management Plan. North Carolina Division of Marine Fisheries, Morehead City, NC 28557.

Daniel, L.B., III and J.L. Armstrong. 2000. Reproductive ecology of selected marine recreational fishes in North Carolina: weakfish, *Cynoscion regalis.* Completion Report Grant F-60. North Carolina Division of Marine Fisheries, Morehead City, NC 28557.

Vaughan, D.S., L.B. Daniel, and R.W. Gregory. 1998. Assessing Weakfish Using Biased Historical ageing Data. 1998 Annual Meeting of the American Fisheries Society, Hartford Connecticut.

Daniel, L.B. 1997. Moderator and speaker for a symposium on the North Carolina weakfish fishery and its management. Tidewater Chapter, American Fisheries Society, Beaufort, North Carolina.

Daniel, L.B., III. 1995. Spawning and Ecology of early life stages of black drum, *Pogonias cromis*, in lower Chesapeake Bay. Ph.D. Dissertation, College of William and Mary, Williamsburg, VA., 167p.

Daniel, L.B.,III and J.E. Graves. 1994. Morphometric and genetic identification of eggs of spring spawning sciaenids in lower Chesapeake Bay. Fish. Bull. U.S. 92(2): 254-261.

Daniel, L.B. 1992. Reproductive ecology and the fate of the spawning products of black drum, Pogonias cromis, in lower Chesapeake Bay. 72nd Annual Meeting, ASIH, Champaign-Urbanna, Illinois

Olney, J.E. and L.B. Daniel, III. 1992. Spawning and recruitment of black drum, Pogonias cromis, in lower Chesapeake Bay. Final Report. Va. Mar. Res. Co., U.S. Fish and Wildlife F-95-R.

Wenner, C.A., W.A. Roumillat, J.E. Moran, Jr., M.B. Maddox, L.B. Daniel,III and J.W. Smith. 1990. Investigations on the life history and population dynamics of marine recreational fishes in South Carolina: part 1. Mar. Resources Res. Inst., Charleston, S.C.

Daniel, L.B. 1990. Aspects of the early life history of red drum, Sciaenops ocellatus, in South Carolina. 14th Larval Fish Conference, Early Life History Section, American Fisheries Society, Beaufort, North Carolina.

Daniel, L.B., III. 1988. Aspects of the biology of juvenile red drum, Sciaenops ocellatus, and spotted seatrout, Cynoscion nebulosus (Pisces: Sciaenidae) in South Carolina. M.S. Thesis, College of Charleston, Charleston, S.C., 58p.

Daniel, L.B. 1987. Aspects of the early life history of the spotted seatrout, Cynoscion nebulosus, in South Carolina. 67th Annual Meeting, ASIH, Albany, New York.

Field Experience:

March 1998 to June 2016

Participated in various aspects of division operations as needed and available. Lead or participated in various field trip exercises for legislative members and staff.

April 1995 to February 1998

Supervise and assist in sampling programs including a juvenile trawl survey, seine survey for juvenile red drum, fishery dependent port and on-water surveys, gear development, shrimp sampling, by-catch reduction, and tagging studies.

1989 to 1991

Chief scientist on 20 cruises aboard the R/V Bay Eagle to sample ichthyoplankton using an in situ silhouette photography system.

1986 to 1988

Participated in weekly rotenone, stop net, trammel net and gill net collections for juvenile and adult inshore recreational fishes in South Carolina. Extensive small (<25 ft.) boat use.

Selected Awards and Professional Offices:

2011-2015

Chairman and vice-Chairman of Atlantic States Marine Fisheries Commission

2002-2006

Chairman and vice-Chairman of the South Atlantic Fishery Management Council

1998 to 2007

North Carolina representative on South Atlantic Fishery Management Council.

1998 to 2016

North Carolina representative on Atlantic States Marine Fisheries Commission

Management Boards (Weakfish (Chairman 2003-2006), Coastal Sharks, Horseshoe Crabs, South Atlantic Board (Chairman 1999-2002)).

2002 to 2007
North Carolina representative on the National Marine Fisheries Service Highly Migratory Species Advisory Panel.

2000
DENR Distinguished Service Award

1995
USFWS Outstanding Service Award

1997 to Present
Adjunct Assistant Professor with the University of North Carolina at Chapel Hill, Institute of Marine Science.

2003 to Present
Adjunct Assistant Professor with North Carolina State University. Developed and taught Marine Resources Management and Policy (ES 295-2) during spring 2016.

1998 to 2007
Chairman of the North Carolina DMF Management Review Team

1995 to 1998
North Carolina Division of Marine Fisheries (NCDMF) representative on the ASMFC weakfish technical (Chairman) and stock assessment committees, bluefish technical and stock assessment committees and alternate for Science and Statistics Committee. Member of SAFMC Science and Statistics Committee, Bycatch Reduction Subcommittee, and Red Drum Assessment Committee.

1995 to 1998
Chairman of the North Carolina Division of Marine Fisheries Biological Review Team.

1998 to 2003
South Atlantic Representative on MARFIN Panel

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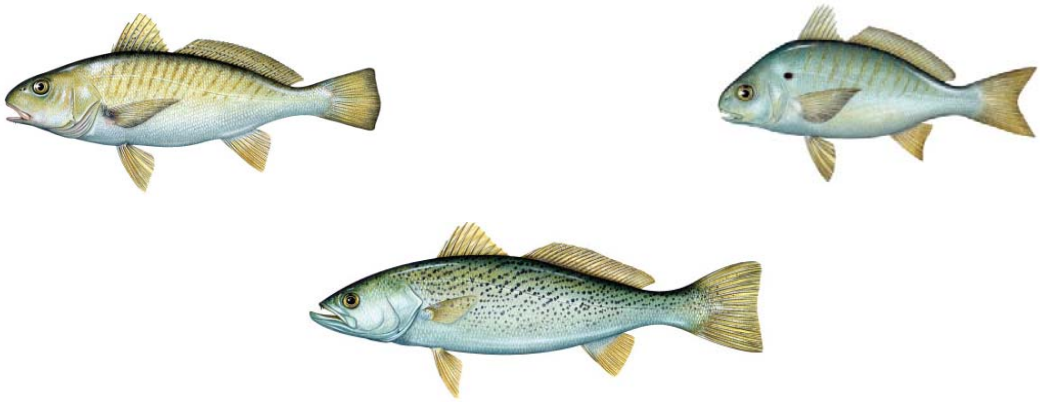
EXHIBIT E

TECHNICAL REVIEW: THE NEED TO REDUCE FISHING MORTALITY AND BYCATCH OF JUVENILE FISH IN NORTH CAROLINA'S ESTUARIES



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I. INTRODUCTION

The recreational and commercial fisheries in the state of North Carolina play an important role in the state's economy and culture, supporting a multi-million-dollar industry. Unfortunately, these fisheries have been facing increasing stressors caused by habitat alteration, juvenile bycatch, high levels of discards, and the effects of climate change. Given the recurrent concerns regarding population status and decreased fisheries landings for economically important species such as Atlantic croaker, spot, and weakfish (ASMFC 2010, 2015, 2016), a critical review of the factors contributing to long-term fisheries sustainability and population health is warranted. However, the problems caused by high levels of juvenile bycatch and nursery habitat alteration go beyond just these species. Even species that are not directly impacted by these stressors are likely affected by the removal of a substantial proportion of their prey biomass and the emergence of other ecosystem-level impacts (Hall 1999).

In North Carolina, the lack of sufficient nursery habitat protection and the need for a more rigorous and scientifically-informed process for protection of habitats not only for very early life stages (e.g., eggs, larvae, and post-settlement early juveniles) but also for juveniles, sub-adults, and first-time spawners is clear. From a fisheries management perspective, the problem of juvenile bycatch is a major impediment to sound practice, primarily because the magnitude of discards is not usually recorded and, therefore, not properly incorporated in fisheries stock assessments. Since most fisheries assessment methods rely on catch data for their operation, the uncertainty associated with unknown levels of bycatch can be enormous. Indeed, the problems are so great that some assessment scientists feel that without proper integration of bycatch mortality, the data used to conduct assessments is of questionable utility (Hall 1999, Walters and Martell 2004). From a practical perspective, this means that the true condition of croaker, spot, and weakfish stocks is likely to be even worse than we know because a significant source of mortality is not properly accounted for.

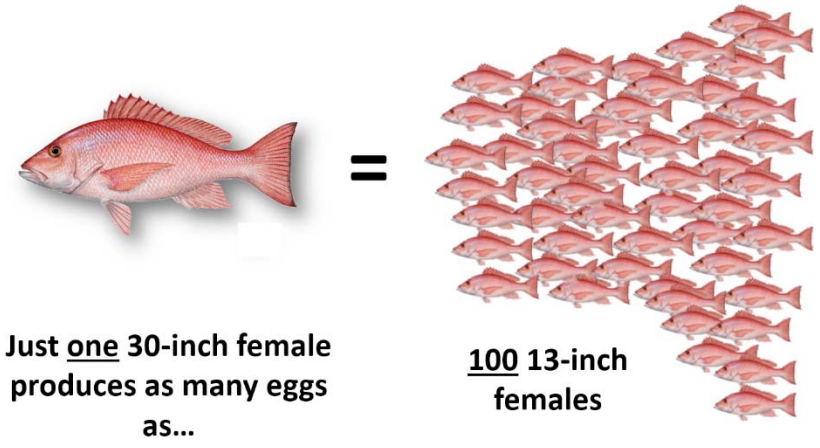
On many grounds, therefore, finding solutions to the high discard and bycatch problem is highly desirable by many sectors of the fisheries that depend on the long-term sustainability of fisheries resources. This paper provides a summary technical review of *how* and *why* a more comprehensive and inclusive designation of nursery habitat in North Carolina estuarine waters would greatly benefit not just the greater Pamlico Sound ecosystem but the many fisheries that depend on its productivity and health.

II. SCIENTIFIC DEFINITION OF "JUVENILE" AND "ADULT" FISH

In the scientific literature that deals with fisheries biology, the term "juvenile" is used to designate the young and relatively small individuals in the population that have not yet reached sexual maturity and therefore are not capable of spawning—i.e., they have not yet developed active reproductive organs such as ovaries and testes. It follows from this that individuals in the population reach "adulthood" (i.e., turn into adults) when they become sexually mature and are capable of reproducing (Lowerre-Barbieri 2009, Brown-Peterson et al. 2011).

Some species reach sexual maturity relatively early in life (e.g., in weeks, months, or one year), while others can take from a few years to decades to become sexually active (Stearns 1992, Lowerre-Barbieri, 2009). The specific reproductive strategy utilized by each individual species results from evolutionary processes and selective pressures that take place over millions of years (Stearns 1992, Lowerre-Barbieri 2009, Brown-Peterson et al. 2011, Lowerre-Barbieri et al. 2011, Lowerre-Barbieri et al. 2016). For example, common species found in North Carolina estuaries such as Atlantic croaker, weakfish, and spot mature relatively early in life. About 50 percent of individuals are sexually mature at age 1, and 80 to 90 percent are mature by age 2 (Barbieri et al. 1994a, Lowerre-Barbieri et al. 1996). However, first time spawners—females just reaching sexual maturity and spawning for the first time—have significantly lower fecundity and, therefore, much lower reproductive value than larger, older females (Stearns 1992, Lowerre-Barbieri 2009, Lowerre-Barbieri et al. 1998, Lowerre-Barbieri et al. 2016). Here the term "reproductive value" is used to denote higher reproductive capacity, usually measured by higher fecundity, higher egg quality, and the production of better fit larvae that have a higher probability of survival (Stearns 1992, Berkeley et al. 2004, Lowerre-Barbieri et al. 2016). The consequence is that by killing large numbers of juvenile, sexually immature, or even first time spawners, bycatch and discard mortality in North Carolina estuaries is likely to be severely impacting the egg production and reproductive capacity of these stocks. How does this work?

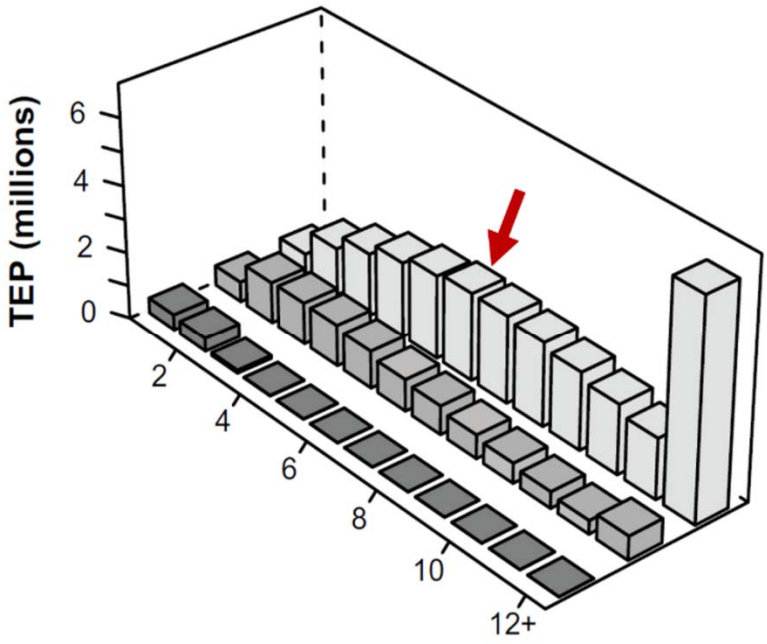
The example in the graphic below illustrates the concept of "size, age, and reproductive value" for red snapper, another important commercial and recreational fisheries species in the southeastern United States. Since body weight increases as a power function of fish length, the egg production of larger, older females is disproportionally larger than that of smaller, younger females (Berkeley et la. 2004, Hixon et al. 2014). The results are astonishing. Just one 30-inch female red snapper can produce as many eggs as 100 13-inch females (Porch *et al*. 2015).



Further, the idea of relying on first time spawners to maintain a population's egg production and reproductive capacity is completely flawed and without scientific support (Cooper et al. 2013, Hixon et al. 2014, Lowerre-Barbieri et al. 2015). As seen in the red snapper example

above, the reproductive capacity of first time spawners is exponentially lower than that of older females. A growing body of fisheries research shows that big, old, fat, fertile female fish—what scientists call BOFFFF's—are critically important to sustainable management of marine fisheries because their reproductive capacity is so large (Hixon et al. 2014). BOFFFF's are so vital because they produce a higher quantity of larger eggs that have a better chance of developing into larvae that can withstand environmental impacts and other threats (Berkeley et al. 2004, Hixon et al. 2014). BOFFFF's also tend to have longer spawning sessions, may spawn in a wider range of locations than smaller fish, and are more likely to survive bad years, reproducing feverishly when conditions improve (Cooper et al. 2013, Hixon et al. 2014). Since smaller females are also more susceptible to predation they are usually more restricted to safer habitats and thus different food supplies (Hixon et al. 2014). Smaller, younger females must also devote more energy to growth than larger females, which can devote more energy to reproduction (Stearns 1992, Cooper et al. 2013, Hixon et al. 2014, Lowerre-Barbieri et al. 2015, 2016).

Another example of the importance of letting enough fish mature, grow, and age to achieve their maximum reproductive potential can be found in the spotted seatrout (speckled trout), a close cousin to the weakfish or gray trout. A recently published study (Cooper et al. 2013) looked at the effect of age truncation and size-dependent timing on the spawning potential of spotted seatrout. In the fisheries biology scientific literature, the term "age truncation" means the removal of older age classes, leaving the population "juvenesced," or lacking the larger, older fish that produce the most eggs. Size-dependent timing of spawning means that females of different sizes (and presumably different ages) spawn at different time intervals during the



spawning season. The results of the Cooper et al. (2013) study are consistent with the pattern shown by red snapper: larger, older females were reported to have disproportionally larger total egg production (TEP) than their smaller, younger counterparts (Lowerre-Barbieri et al. 2015, Porch et al. 2015). The graph above shows the estimated TEP of spotted seatrout by age for different fishing mortality regimes: the light gray bars indicate stocks under no fishing pressure; the middle, a bit darker gray bars show results under a moderate level of fishing mortality; and the darker gray bars represent stocks under a relatively high level of fishing mortality. First, it is clearly noticeable that fish under no fishing pressure reach maximum TEP between the ages of five and seven years (red arrow) (Cooper et al. 2013). As seatrout stocks are subject to higher fishing mortality, fewer of the older fish survive and the population's egg production becomes progressively more dependent on younger females that, as shown above, have much lower reproductive capacity.

III. THE IMPORTANCE OF HABITAT PROTECTION FOR JUVENILE FISH

The nursery-role concept was first applied nearly a century ago to motile invertebrates and fishes with complex life cycles, in which larvae are transported to estuaries, metamorphose, grow to sub-adult stages, and then move to adult habitats offshore (Heck and Crowder, 1991). Some scientists trace this idea to work done between the early to mid-1900s on blue crabs, shrimp, and several finfish species (Beck et al. 2001). The concept became so pervasive that from a fisheries ecology perspective it has been termed a "law." For example, Deegan (1993) states that "estuarine fish faunas around the world are dominated in numbers and abundance by species which move into the estuary as larvae, accumulate biomass, and then move offshore."

Nearshore estuarine ecosystems—e.g., seagrass meadows, marshes, and mangrove forests—serve many important functions in coastal waters. Most notably, they have extremely high primary and secondary productivity and support a great abundance and diversity of fish and invertebrates. Because of their effects on the diversity and productivity of macrofauna, these estuarine and marine ecosystems are often referred to as nurseries in numerous papers, textbooks, and government-sponsored reports (Beck et al. 2001, Able 2005). The underlying premise of most studies that examine nursery-role concepts is that some nearshore, juvenile habitats contribute disproportionally to the production of individuals that recruit to adult populations (Heck and Crowder 1991, Beck et al. 2001, Able 2005). Therefore, the ecological processes operating in nursery habitats, as compared with other habitats, support greater contributions to adult recruitment (Beck et al. 2001). Indeed, the role of these nearshore ecosystems as nurseries is an established ecological concept accepted by scientists, conservation groups, managers, and the public, and is cited as justification for the protection and conservation of these areas (Able 2005).

IV. REVIEW OF NORTH CAROLINA'S NURSERY AREA PROGRAM

North Carolina regulations define "nursery areas" as "those areas in which for reasons such as food, cover, bottom type, salinity, temperature and other factors, young finfish and crustaceans spend the major portion of their initial growing season." 15A N.C. Admin. Code 3I.0101. Nursery areas in North Carolina are categorized based on various stages of juvenile

development and life history strategy. The map below (Fig. 1) provides the locations of the various nursery areas mapped for estuarine waters of North Carolina, which includes a very small fraction of the vast estuarine habitats of the state. For fisheries management purposes these areas are designated as:

(1) Primary Nursery Areas (PNAs), which are those areas of the estuarine system where initial post-larval development takes place. These areas are located in the uppermost sections of a system where populations are uniformly very early juveniles. 15A N.C. Admin. Code 3I.0101. Since 1978, PNAs have been designated by the N.C. Marine Fisheries Commission to protect areas where initial post-larval development takes place. The PNA designation is intended to maintain these habitats, as much as possible, in their natural state to allow juvenile populations to develop in a normal manner with as little interference from man as possible. Approximately 80,000 acres have been designated as PNAs in North Carolina.

(2) Secondary Nursery Areas (SNAs) are those areas of the estuarine system where later juvenile development takes place. Populations are usually composed of developing sub-adults of similar size which have migrated from upstream primary nursery areas to the secondary nursery areas located in the middle portion of the estuarine system. 15A N.C. Admin. Code 3I.0101.

(3) Special Secondary Nursery Areas (SSNAs) are areas adjacent to secondary nurseries. It is unclear how SSNAs are distinguishable from SNAs. North Carolina rules do not define SSNAs.

The logical conclusion after examination of the definitions above is that North Carolina regulations does not include habitat designations to protect larger juveniles (i.e., sub-adults in pre-spawning condition) or the very young fish and shellfish that have perhaps spawned once but have not yet reached even a fraction of their reproductive potential (Barbieri et al. 1994a, Lowerre-Barbieri et al. 1995, Lowerre-Barbieri et al. 1998). This raises a major fisheries management concern because it is these sub-adults and first time spawners that will eventually recruit into the main spawning stock to maintain the egg production and juvenile recruitment needed for sustainable fisheries (Lowerre-Barbieri et al. 1998, Lowerre-Barbieri 2009, Cooper et al. 2013).

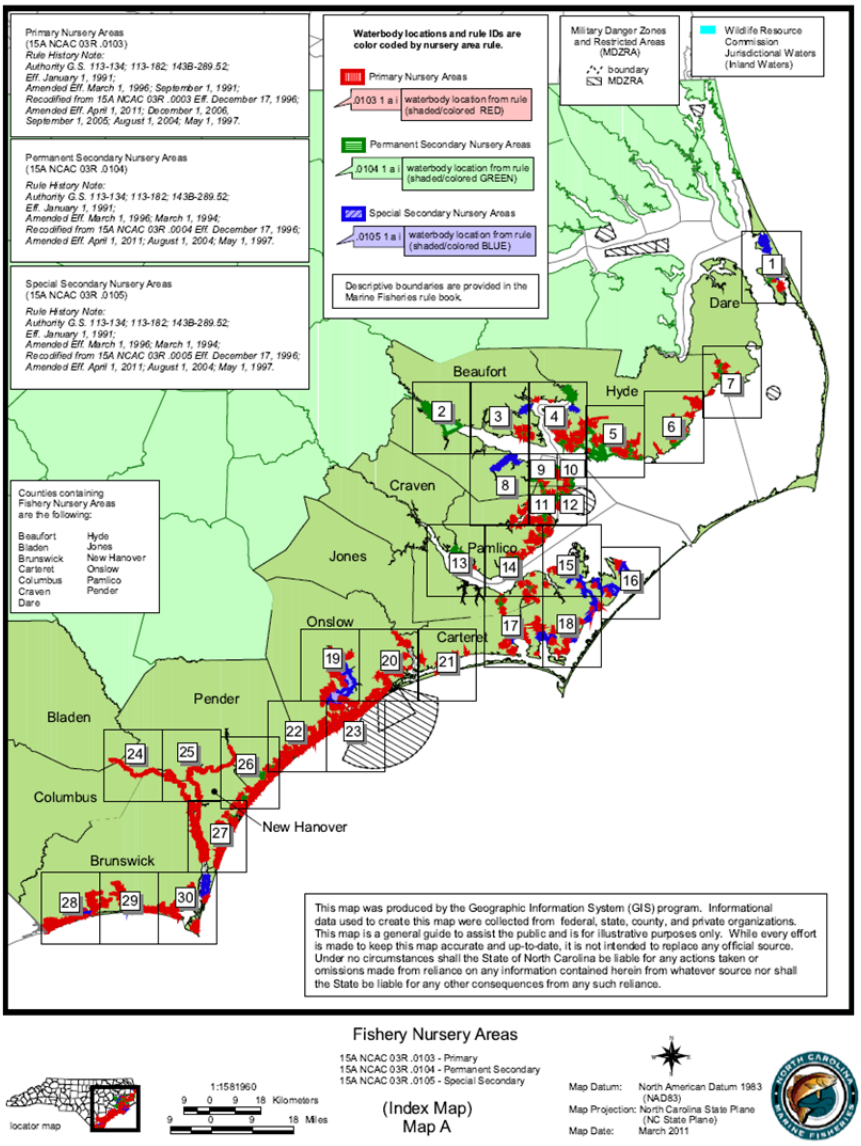


Fig. 1 – Locations of the various nursery areas for estuarine waters of North Carolina

Even a cursory review of the main fisheries that operate in North Carolina estuaries unequivocally indicate that the current nursery habitat designations do not provide adequate protection to the early life history stages of finfish and crustaceans that use these systems as nursery habitats (Broome et al 2011). Specifically, the North Carolina Division of Marine Fisheries Primary Nursery Area Designation Protocol, (also known as the P120 protocol) issued in 2002 mentions that of the approximately 2.1 million acres of open water and 200,000 acres of wetlands in coastal North Carolina, only 162,265 acres (or approximately 8 percent of the total estuarine waters) have been designated as nursery areas. Designations of estuarine areas that consistently support populations of juvenile shrimps, crab, and finfish—and, therefore, provide the basis for nursery area designation—is based on surveys conducted in the early 1970s (NCDMF 2002) and have not been substantially updated since.

People from other states are usually surprised by these facts. Most states prohibit trawling inside bays or other inshore areas deemed as estuarine nursery habitats. In North Carolina, with few exceptions, estuarine nursery areas are subject to intense fishing pressure by all sectors of the fishery (trawls, long-haul seines, gill nets, and hook and line), all of which harvest and/or discard substantial quantities of juvenile fish species such as Atlantic croaker, spot, weakfish, summer flounder, and blue crabs (Murray et al. 1992, Broome et al. 2011). Technically, trawling in North Carolina is prohibited in designated nursery areas. However, the problem is that Pamlico Sound and other estuarine areas providing nursery habitat have not been designated as nursery areas. Data derived through the N.C. Division of Marine Fisheries Pamlico Sound Survey are obtained from areas outside of any of the designated nursery areas (Fig. 2). In other words, although DMF conducts surveys in the Pamlico Sound, scientific sampling to properly designate the location, geographic extent, and ecological function of estuarine nursery areas in the Sound is lacking.

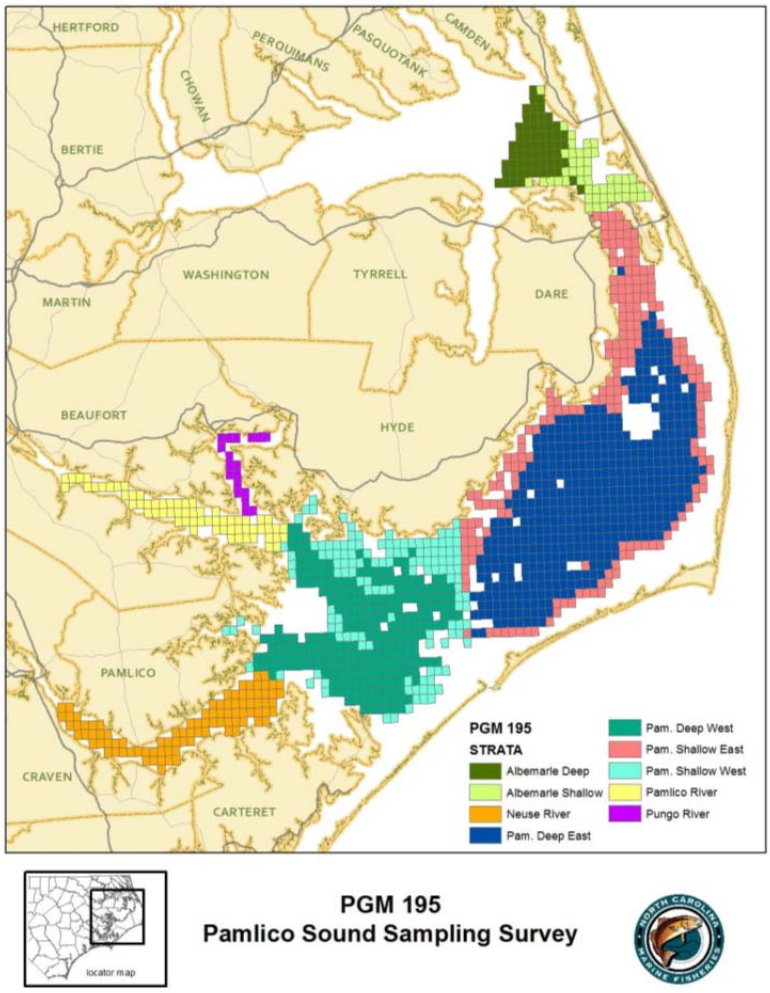


Fig. 2 – Locations of the North Carolina DMF random-stratified sampling program for estuarine waters of North Carolina.

Because of the estuarine-dependent nature of their life history, Atlantic croaker, spot, and weakfish spawn primarily in coastal and nearshore shelf waters (Barbieri et al. 1994a, Lowerre-Barbieri et al. 1995) and recruit as early juveniles into Pamlico Sound nursery habitats (Chao and Musick 1977, Weinstein and Walters 1981). Although adults of these species use open waters of the Sound as feeding grounds, the bulk of croaker, spot, and weakfish found in Pamlico Sound are small, young fish that have not had a chance to spawn or have spawned perhaps once before reaching maximum egg production and spawning capacity. If we follow the nursery habitat concept described by Heck and Crowder (1991) in which larvae are transported to estuaries, metamorphose, grow to sub-adult stages, and then move to adult habitats offshore, then there is no question that Pamlico Sound constitutes a major nursery habitat for these species.

Another serious concern with the current lack of protection for the main areas of Pamlico Sound and other inshore waters is the impact of shrimp trawling on the bottom. When attempting to assess the impact of trawling, two key pieces of information are required—the type of gear used and the frequency of disturbance (Hall 1999). Unfortunately, the lack of data on rates, distributions and intensities of fishing disturbance on the Pamlico Sound floor prevents a more quantitative analyses of these impacts. However, what we do have is a fairly clear picture of how bottom communities respond to fishing disturbance. For the most part this response is consistent with the generalized model of how biological benthic communities respond to perturbation: loss of erect and sessile *epifauna* (the invertebrates and small fishes that live on the bottom), increased dominance by smaller, faster-growing species, and a general reduction in species diversity and ecosystem services (Hall 1999).

Ecosystem services are the benefits people obtain from ecosystems (Palumbi et al. 2008). These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth. People seek many services from ecosystems and thus perceive the condition of an ecosystem in relation to its ability to provide desired services. In a narrow sense, the sustainability of a particular ecosystem service can refer simply to whether the biological potential of the ecosystem to sustain the yield of that service (such as food production) is maintained. Thus, a fish provision service is sustainable and promotes resilience if the *surplus* but not the *resource base* is harvested, and if the *fish's habitat* is not degraded by human activities. In fisheries management, this is what we call "sustained yield management." (Hilborn and Walters 1992, Walters and Martell 2004, Lowerre-Barbieri et al. 2016). The continued bottom trawling impacts on Pamlico Sound estuarine communities (Broome et al. 2011) and habitats is likely to seriously impact ecosystem health and interfering with essential ecosystem services.

V. THE CONSEQUENCES OF NOT PROTECTING JUVENILE, PRE-SPAWNING FISH IN PAMLICO SOUND

By imposing significant mortality on juvenile and pre-spawning fish, contributions to their respective populations in terms of both fishery yield and spawning potential are severely compromised. How and why does this happen?

A. Losses in Fishery Yield

In general, fishery harvest is similar to agriculture or farming. For example, to raise chickens, the farmer must wait until the chicks reach a certain size and weight before selling the chicks for meat. Obviously, killing small chicks for meat would be incredibly unprofitable because the chicks have not grown to the point that they have enough meat to be of any marketable value. Most fish follow this same rule of thumb. Fish grow fast when they are young, and it is much better to wait until fish reach an ideal size and weight to be harvested (Barbieri et al. 1997, Walters and Martell 2004). Growth overfishing results when a fish is harvested before it reaches this ideal weight (Hilborn and Walters 1992). Growth overfishing a stock is literally throwing away or wasting fishery yield production, not unlike the example with

the chicks and chickens above (Hilborn and Walters 1992, Barbieri et al. 1997, Walters and Martell 2004). It's that simple. Now, multiply this loss in fishery yield (actual pounds of fish meat) by the hundreds of millions of juvenile Atlantic croaker, weakfish, and spot killed by fishing gear in Pamlico Sound, and one gets an idea of the huge economic loss this is causing in North Carolina (Broome et al. 2011). A study conducted by the North Carolina Sea Grant program determined that of the top ten bycatch species by weight, five were commercially or recreationally important species such as blue crab, Atlantic croaker, weakfish, spot, and summer flounder (Broome et al. 2011).

B. Losses in Spawning Potential

Perhaps the greater concern is the extraordinary quantities of Pamlico Sound forage and food fishes that succumb to fishing-induced mortality prior to spawning at least once. Drawing on the same chicken farm example, it is easy to see that to have sustainable long-term production some level of egg production to generate enough chicks that can grow into full size chickens must be maintained. Killing a large number of chicks before they can lay eggs will eventually lead to trouble. In fisheries, this is what we call "recruitment overfishing" (Hilborn and Walters 1992, Walters and Martell 2004). This type of overfishing is just as detrimental to the fishery as growth overfishing, but it is much more dangerous because it depresses annual fishery yields, damages long-term stock productivity, and renders fisheries as economically unviable (Hilborn and Walters 1992, Lowerre-Barbieri 2009, Walters and Martell 2004, Lowerre-Barbieri et al. 2016). In other words, killing so many juveniles before their first spawning severely reduces the stocks' reproductive capacity and compromises the annual production of new recruits (i.e., fingerlings coming into the population). The consequences are manifold, but can be summarized into two main impacts: (1) the amount of spawning is inadequate to generate new recruits and keep the stock in a sustainable state, and (2) the reduced spawning and juvenile recruitment cause a reduction in the populations to a small fraction of its original size and allows other species (competitors) to take advantage of the open space and fill in the void (Botsford et al. 1997). For example, starting in the early 1900s, the California sardine fishery became the largest fishery in North America and supported a major industry (Radovich 1982). Due to overfishing, sardine populations in the area declined until it was no longer economical to fish sardines in Pacific North America. With the decline in the population of the California sardine came an increase in the population of its primary competitor, the anchovy (Radovich 1982). This only added fuel to the problem. The California Fish and Game Commission took lessons from the death of the sardine industry and since then has embraced scientifically-based fisheries management (Radovich 1992)

Although direct scientific evidence is lacking, the similarity with the phenomenal collapse of the weakfish fishery in the mid-Atlantic is instructive. Once a thriving commercial and recreational fishery throughout the mid-Atlantic, weakfish stocks started to steadily decline in the 1980s and by the mid-1990s were considered to be in serious trouble—landings dropped from over 19 million pounds in 1982 to roughly 200,000 pounds in 2014 (ASMFC 2016). The majority of landings occur in North Carolina and Virginia and, since the early 1990s, the primary gear used to harvest has been gillnets (ASMFC 2016). Discarding of weakfish by commercial

fishermen is known to occur, especially in the northern trawl fishery, and the discard mortality is assumed to be 100 percent (Broome et al. 2011).

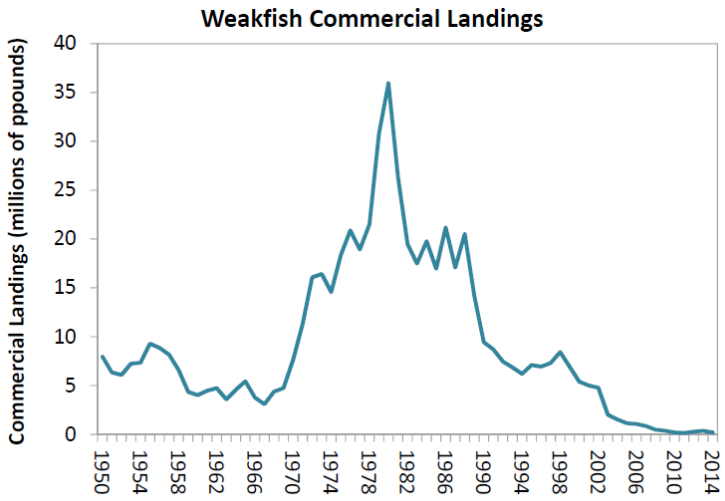


Fig. 3 – Weakfish Commercial Landings, 1950 – 2014

By 1996, the Atlantic States Marine Fisheries Commission (ASMFC) had adopted Amendment 3 as a long-term recovery plan to restore weakfish to healthy levels in order to maintain commercial and recreational harvests consistent with a self-sustaining spawning stock (ASMFC 2016). Unfortunately, while managers were preparing for a weakfish resurgence, something else was happening—unbeknownst to anyone—which would eventually cause a rapid increase in weakfish mortality. Increased predation from other species such as striped bass and spiny dogfish as well as competition with Atlantic croaker, decreasing prey items such as bay anchovy and Atlantic menhaden, and increasing water temperatures may all have been playing key roles in the weakfish decline (ASMFC 2016).

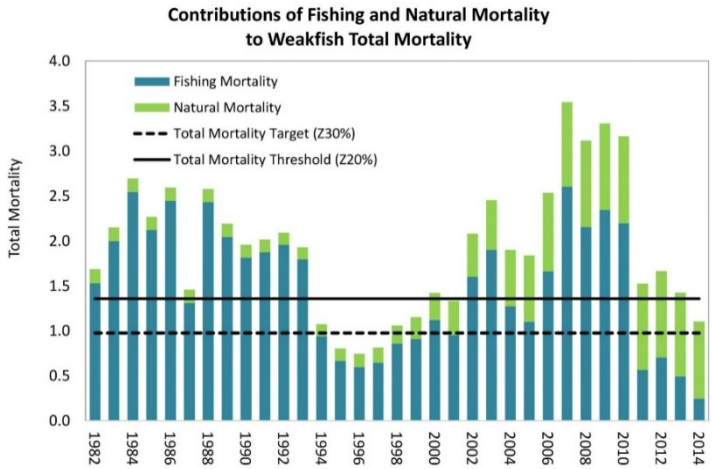


Fig. 4 – Fishing and Natural Mortality of Weakfish, 1982 - 2014

How many more productive North Carolina fisheries must go through this same precipitous decline before managers recognize that sustained injury to nursery habitats and the lack of adequate protection for juveniles and first time spawners is likely causing serious harm to the very ecosystem responsible for keeping North Carolina fisheries in business? In other words, although the main fisheries for weakfish and croaker take place in nearshore waters (Barbieri et al. 1994a, 1994b, Lowerre-Barbieri et al. 1995,1996), juvenile bycatch and nursery habitat destruction in Pamlico Sound will impact the fisheries by either increasing mortality of juvenile life stages or by destroying the habitats they inhabit (Broome et al. 2011).

VI. SOURCES OF MORTALITY FOR WEAKFISH, SPOT, CROAKER, AND OTHER SPECIES COMMONLY FOUND IN NORTH CAROLINA WATERS

Some people suggest that high fishing mortality on juvenile fishes has a negligible impact on population viability because natural mortality is already so high that, most likely, those fish would have died anyway. The key difference here is natural mortality versus fishing mortality. Natural mortality is the mortality fish populations experience due to natural causes such as old age, predation, disease, and environmental impacts. Fishing mortality is the mortality caused by any kind of fishing-related activity, including harvest, bycatch, and release mortality, to name a few (Hilborn and Walters 1992, Stearns 1992, Walters and Martell 2004). There is no question that early juvenile stages (i.e., young-of-the-year fingerlings) of weakfish, spot, croaker, and other species commonly found in Pamlico Sound have very high natural mortality (Barbieri et al. 1994b, Lowerre-Barbieri et al. 1995). This is due to a life history strategy selected (by natural selection) to produce huge numbers of eggs and larvae that can account for the high predation most fish species experience in early life. In other words, to compensate for the fact that most eggs, larvae, and early juveniles will be heavily preyed upon by larger-sized fish (sometimes other species but cannibalism is not uncommon) these fish have, over millions of years, evolved to produce very large numbers of young (Lowerre-Barbieri 2009). A good way to look at natural mortality in animals is to compare what is called their "Survivorship Curves" (Deevey 1947, Stearns1992, Walters and Martell 2004). Figure 3 below shows the typical shapes of

survivorship curves for fish, reptiles, and mammals. Type I survivorship curves are characterized by high age-specific survival probability in early and middle life, followed by a rapid decline in survival in later life. They are typical of species that produce few offspring but care for them well, including humans and many other large mammals (Deevey 1947, Stearns 1992, Walters and Martell 2004). Type II curves are an intermediate between Types I and III, where roughly constant mortality rate/survival probability is experienced regardless of age. Some birds and some lizards follow this pattern (Deevey 1947, Stearns 1992). In Type III curves, the greatest mortality (lowest age-specific survival) is experienced early in life, with relatively low rates of death (high probability of survival) for those surviving this bottleneck. This type of curve is characteristic of species that produce a large number of offspring (see r/K selection theory, Stearns 1992, Winemiller and Rose 1992). This includes most fish and marine invertebrates.

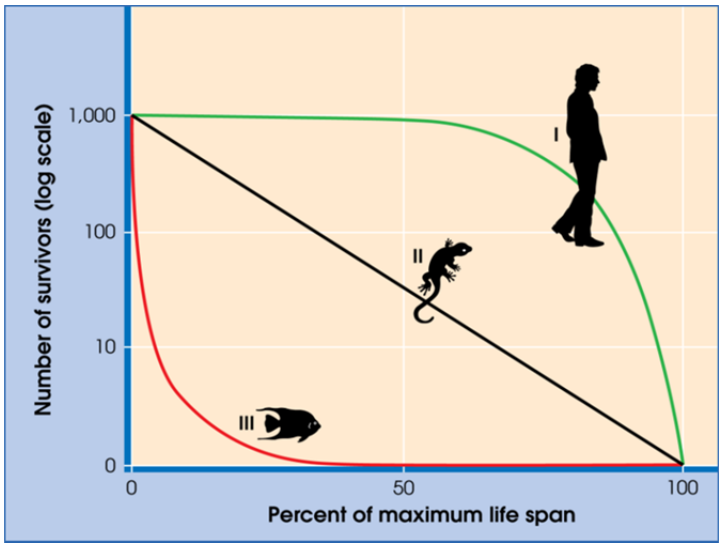


Fig. 5 – Most fishes (including Atlantic croaker, spot, and weakfish) have a type III natural survivorship curve, i.e., they experience exponentially higher mortality early in life (egg, larval, and juvenile stages).

Extrapolating this expected high rate of natural mortality to these species' ability to also withstand large rates of fishing induced mortality is nonsensical. Why is that?

Many decades of studies on fish population dynamics (e.g., Beverton and Holt 1957, Hilborn and Walters 1992, Walters and Martell 2004) clearly indicate that:

$$Z = M + F$$

Where, Z = total mortality, M = natural mortality, and F = fishing mortality.

Clearly, fishing mortality is *additive* to natural mortality, not a replacement for it. In other words, even though larvae and early juveniles of species that utilize nursery habitats in Pamlico Sound have been selected to have high rates of natural mortality this doesn't mean they are

capable of also withstanding an additional source of mortality, especially at the magnitudes observed in North Carolina estuaries (Murray et al. 1992, Broome et al. 2011). The result is literally the meaning of adding insult to injury. As juveniles inhabiting more protected nursery areas grow, their natural tendency is to move to more open, higher salinity waters of the larger sounds and bays (Barbieri et al. 1994b). These fishes have survived during periods of the highest natural mortality and the level of mortality drops exponentially as they grow (Deevey 1947, Winemiller and Rose 1992; Walters and Martell 2004; Able 2005). It is at this time that these fishes, fit enough to have survived the early period of high mortality, become subjected to intense sources of fishing mortality—either by direct harvest or bycatch mortality (Murray et al. 1992, Broome et al. 2011).

The fish and invertebrate species that inhabit North Carolina estuaries are part of a complex ecosystem that fuels the productivity of fisheries in state waters and beyond (Barbieri et al. 1994a, 1994b, 1997; Lowerre-Barbieri et al. 1995, 1996, 1998). With adequate management and habitat protection—i.e., designation of Pamlico Sound as nursery habitat—these fisheries can support long-term sustainable harvest, generating fresh local seafood, business opportunities and jobs for millions of people. The consequences of continuing the current pattern of juvenile bycatch and discard mortality in North Carolina estuaries is irreparable harm to the ecosystem and destruction of the businesses that rely on fish and shellfish species that use these areas as nursery habitats.

VII. THE STATUS OF SPOT, CROAKER, AND WEAKFISH IN NORTH CAROLINA WATERS

Juvenile spot, croaker and weakfish dominate the finfish bycatch, making up a majority of the total bycatch in North Carolina estuaries (Broome et al. 2011). Not surprisingly, the stock status of these three species is considered poor (ASMFC 2010, 2015, 2016). Spot and croaker are classified by the North Carolina Division of Marine Fisheries as being of "concern," and weakfish are classified as "depleted." Stock assessments and other data summary reports conducted by ASMFC show the same pattern (ASMFC 2010, 2015, 2016). This is not surprising. It is estimated that each year, approximately 100 million juvenile Atlantic croaker, 50 million juvenile spot, and 25 million juvenile weakfish are caught and killed by otter trawls in Pamlico Sound (Broome et al. 2011). All are shoveled back into the Sound where they either get eaten or rot (Broome et al. 2011). The impact of this bycatch is uncertain, but because of the large number of pre-spawning age fish that are killed, common sense points to it being a major factor in the decline of these fish populations (ASMFC 2010, 2015, 2016; Broome et al. 2011).

In fisheries management the practice of implementing a minimum size limit is based on the concept that stock productivity relies on having enough spawning and egg production to maintain the surplus production above the replacement line (see Figure 6 below).

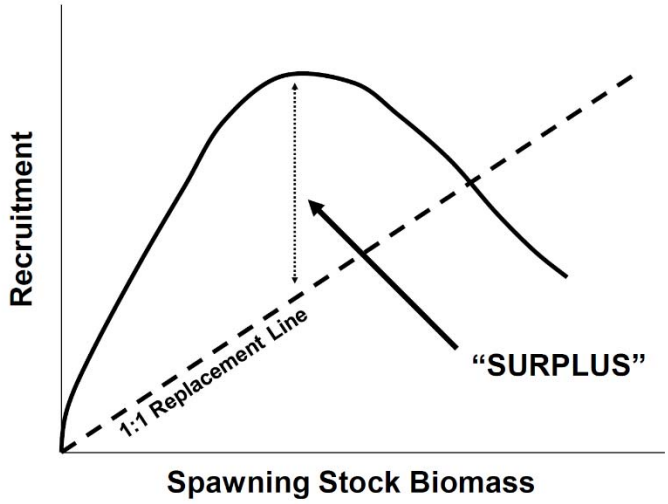


Fig. 6 – Recruitment and spawning stock biomass.

When fishing mortality removes too many young fish from the population, the result is a much smaller proportion of the population reaching sexual maturity and contributing to future stock productivity. Tropical and temperate fish populations like croaker, spot, and weakfish have the ability to withstand this type of negative impact for a short time given their high compensatory capacity (Kindsvater et al. 2016), but over time the ability of the stock to maintain long-term resilience is severely compromised (Lowerre-Barbieri et al. 2016). Consider the reproductive output (i.e., spawning potential, egg production) produced by a cohort of fish over its lifespan (by "cohort" we mean the fish born in a certain year). The equilibrium spawning potential (SP) per recruit is given by:

$$SP = \int_0^{\infty} B(a) \cdot Mat(a) \cdot \%Eggs \; da$$

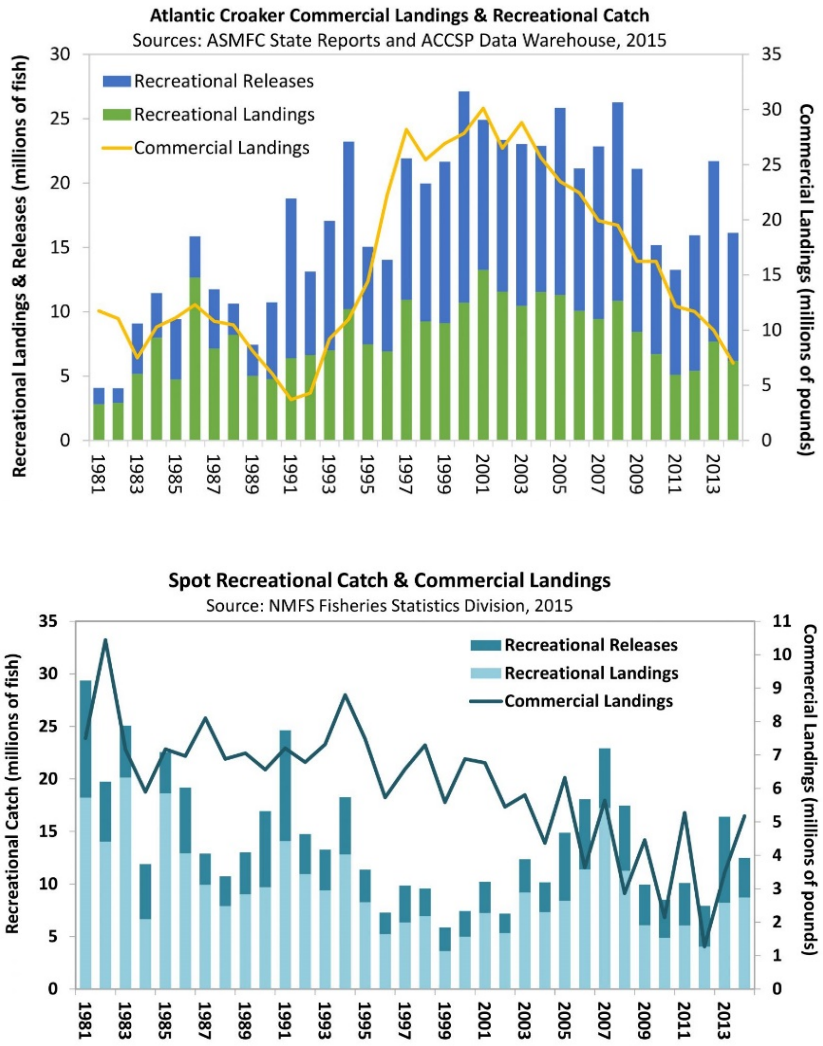
$$\frac{SP}{R} = \int_0^{\infty} \exp[-(M + F(a)) \cdot a] \cdot W(a) \cdot Mat(a) \cdot \%Eggs \; da$$

Where: **B**(**a**) is biomass at age of females, **Mat**(**a**) is the proportion mature at age, **%Eggs** is the proportion of a female's body mass that is ovaries.

It is clear from the equation above that the biomass of females at age, the proportion of females sexually mature at age, and the proportion of a female's body mass dedicated to reproduction (i.e., ovary tissue mass) are very important factors in maintaining the levels of reproduction needed to support long-term fisheries sustainability. Further, as discussed above,

preventing fish from growing to their ideal size and weight has tangible consequences in terms of fisheries yield. For example, the figure below shows the equilibrium fishery yield expected under two scenarios. The levels of yield produced at different fishing mortality rates are much higher when the fish selected by the gear have grown to their ideal size and weight (black line). When the fish selected by the fishing gear are too young—and therefore too small—the yields produced are much lower.

Unfortunately, the negative impact on weakfish has been massive. Although Atlantic croaker and spot are not in such critical condition as compared to weakfish, landings of both these species are a fraction of what they once were (ASMFC 200, 2015). For all practical purposes, stocks of Atlantic croaker and spot in North Carolina and the mid-Atlantic region are in a state fisheries biologists call "sustainably overfished." (Walters and Martell, 2004). This means that although their current level of depletion has not reached catastrophic levels and these stocks still support some level of fisheries harvest, the productivity of these stocks has been sapped to the point that they no longer support the fisheries and associated businesses that once thrived in the region (Hall 1999, Walters and Martell 2004).



Figs. 7, 8 - Atlantic Croaker and Spot Recreation and Commercial Landings, 1981 - 2013

As a result, the future of sustainable fisheries in North Carolina is at stake. Even with some fish populations displaying an extraordinary capacity for recovery, human interferences should never cause such drastic changes in the marine ecosystems we depend on (Walters and Martell 2004, Lowerre-Barbieri et al. 2015). Besides, the impacts caused by juvenile bycatch and discard mortality are multidimensional. For the economist, the impacts of these practices generate additional costs without affecting the revenues, and may hinder profitability. For the fishermen, these fishing practices cause conflicts among fisheries, give fishers a bad public image, generate regulations and limitations on the use of resources, and effect future yield.

In an article entitled "The Historical Collapse of Southern California Fisheries and the Rocky Future of Seafood," Katie Lee describes how economically valuable southern California

fisheries (kelp and barred sand bass) collapsed "right under the noses of management agencies." Though the media tends to focus on the effects of pollution, climate change, or overfishing, outdated systems of management that do not explicitly incorporate habitat protection as part of a broader conservation strategy are actually the main cause of the collapse in many cases. In the particular case of North Carolina, a combination of improved and updated regulations that can provide the habitat protection needed for early life stages, late juveniles, and first time spawners throughout Pamlico Sound and other estuarine waters must be incorporated into fisheries management *before* fish populations collapse. Further, this added habitat protection would certainly benefit stocks already impacted and at low abundance and greatly assist their rebuilding to a healthy condition.

VIII. CONCLUSION

Dead discards and bycatch are major problems for fisheries in the southeastern United States. In North Carolina, extensive trawling and the use of other non-selective fishing methods are likely impacting the abundance and productivity of important commercial and recreational species such as Atlantic croaker, spot, and weakfish. These fishing practices lead to high levels of juvenile bycatch and discards, as well as ecosystem-level impacts such as the destruction of bottom habitats and the disruption of trophic interactions.

It is difficult to imagine that fishermen and fisheries managers are not very aware of this problem and have a strong desire to do something about it. The scientific evidence discussed throughout this paper shows clear evidence that:

(1) There is a definite need for a more inclusive, expanded nursery habitat designation in North Carolina estuarine systems. The system currently in place is outdated and does not follow a rigorous and scientifically-informed process.

(2) This problem is causing large bycatch mortality of economically and ecologically important species that support valuable fisheries (e.g., Atlantic croaker, spot, weakfish, and summer flounder). Further, shrimp trawling in large expanses of Pamlico Sound is very likely disrupting the bottom and negatively impacting the benthic communities needed to maintain ecosystem health.

(3) The Primary Nursery Areas (PNAs) designation in North Carolina affords some level of protection to upper estuarine habitats used by the very early life stages of fishes and macroinvertebrates (e.g., eggs, larvae, and post-settlement early juveniles). However, late juveniles, sub-adults, and first-time spawners moving into more open areas of Pamlico Sound are still subject to fishing mortality due to shrimp trawl bycatch and discards by other fisheries activities.

(4) Designation of the entire Pamlico Sound as a nursery habitat area would expand the protection of larger juveniles, sub-adults, and first-time spawners from shrimp trawling and other fishery mortality impacts. This action would also prevent or substantially decrease the ecosystem-level impacts of habitat alteration and food-web disruptions in

Pamlico Sound caused by bycatch, discards, and physical damage to benthic communities.

LITERATURE CITED

Able, K. 2005. A re-examination of fish estuarine dependence: evidence for connectivity between estuarine and ocean habitats. Estuarine, Coastal, and Shelf Science, 64:5-17.

Atlantic States Marine Fisheries Commission (ASMFC). 2010. Atlantic Croaker Benchmark Assessment Report. Atlantic States Marine Fisheries Commission, Stock Assessment Report, 81 p.

ASMFC. 2015. Spot Management Overview. Atlantic States Marine Fisheries Commission.

ASMFC. 2016. Weakfish Stock Assessment and Peer Review Report. Atlantic States Marine Fisheries Commission, Stock Assessment Report, 435 p.

Barbieri, L.R., M.E. Chittenden, Jr., and S.K. Lowerre Barbieri. 1994a. Maturity, spawning, and ovarian cycle of Atlantic croaker, *Micropogonias undulatus*, in the Chesapeake Bay and adjacent coastal waters. U.S. Fish. Bull. 92:671-685.

Barbieri, L.R., M.E. Chittenden, Jr., and C.M. Jones. 1994b. Age, growth, and mortality of Atlantic croaker, *Micropogonias undulatus*, in the Chesapeake Bay region, with a discussion of apparent geographic changes in population dynamics. U.S. Fish. Bull. 92:1-12.

Barbieri, L.R., M.E. Chittenden, Jr., and C.M. Jones. 1997. Yield per recruit analysis and management strategies for Atlantic croaker, *Micropogonias undulatus*, in the Middle Atlantic Bight. U.S. Fish. Bull. 95:637-645.

Beck, M.W., K.L. Heck jr., K.W. Able, D. L. Childers, D.B. Eggleston, BM. Gillanders, B. Halpern, C.G. Hays, K. Hoshino, T.J. Minello, R.J. Orth, P.F. Sheridan, and M.P. Weinstein. 2001. The Identification, Conservation, and Management of Estuarine and Marine Nurseries for Fish and Invertebrates. BioScience, 51(8): 633-641.

Berkeley, S.A., Hixon, M.A., Larson, R.J., Love, M.S. 2004. Fisheries sustainability via protection of age structure and spatial distribution of fish populations. Fisheries 29, 23-32.

Beverton, R.J. H., and S.J. Holt. 1957. On the Dynamics of Exploited Fish Populations. Gt. Britain, Fishery Invest., Ser. II, Vol. XIX. 533 pp.

Botsford, L.W., J.C. Castilla, and C.H. Peterson. 1997. The Management of Fisheries and Marine Ecosystems. Science, 277:509-515.

Broome, J. D., J. W. Anderson and D. W. Anderson. 2011. By-Catch Volume Reduction Through Turtle Excluder Device (TED) Reduced Grid Spacing." Final report, N.C. Fishery Resource Grant Program, 10-FEG-03, available from www.ncseagrant.org. N.C. Division of Marine Fisheries. 2012. North Carolina Shrimp Fishery Management Plan, Draft Revision 2.

Brown-Peterson, N., Wyanski, D., Saborido-Rey, F., Macewicz, B., Lowerre-Barbieri, S. 2011. A standardized terminology for describing reproductive development in fishes. Marine and Coastal Fisheries: Dynamics. Management, and Ecosystem Science 3:52-70.

Cooper, W. T., L.R. Barbieri, M.D. Murphy, and S.K. Lowerre-Barbieri. 2013. Assessing stock reproductive potential in species with indeterminate fecundity: effects of age truncation and size-dependent reproductive timing. Fisheries Research, 138:31-41.

Crowder, L.B. and S.A. Murawski. 1998. Fisheries Bycatch: Implications for Management. Fisheries, 23:8-17.

Deegan, L. A. 1993. Nutrient and energy transport between estuaries and coastal marine ecosystems by fish migration. Canadian Journal of Fisheries and Aquatic Science 50:74–79.

Deevey, E.S., Jr. 1947. Life tables for natural populations of animals. Quart. Rev. Biol. 22: 283-314.

Hall, S.J. 1999. The effects of fishing on marine ecosystems and communities. Blackwell Science Press, London. 274 pp.

Heck Jr, K. L. and L. B. Crowder. 1991. Habitat structure and predator–prey interactions in vegetated aquatic systems. Pages 282–299 in Bell SS, McCoy ED, Mushinsky HR, eds. Habitat structure: The physical arrangement of objects in space. New York: Chapman and Hall.

Hilborn, R. and C.J. Walters. 1992. Quantitative fisheries stock assessment: choice, dynamics and uncertainty. Chapman & Hall, London. 570 pp.

Hixon, M.A., D.W. Johnson, and S.M. Sogard. 2014. BOFFFFs: on the importance of conserving old-growth age structure in fishery populations. ICES J. Mar. Sci. 71: 2171−2185.

Kindsvater, H.K., M. Mangel, J.D. Reynolds, and N.K. Dulvy. 2016. Ten principles from evolutionary ecology essential for effective marine conservation. Ecology and Evolution 6, 2125–2138.

Lowerre-Barbieri, S.K., M.E. Chittenden, Jr., and L.R. Barbieri. 1995. Age and growth of weakfish, *Cynoscion regalis*, in the Chesapeake Bay region, with a discussion of historic fluctuations in maximum size. U.S. Fish. Bull. 93:642-655.

Lowerre-Barbieri, S.K., M.E. Chittenden, Jr., and L.R. Barbieri. 1996. Variable spawning activity and annual fecundity of weakfish in the Chesapeake Bay. Trans. Am. Fish. Soc. 125:532-545.

Lowerre-Barbieri, S.K., J.M. Lowerre, and L.R. Barbieri. 1998. Multiple spawning and the dynamics of fish populations: inferences from an individual-based simulation model. Can. J. Fish. Aquat. Sci. 55:1-11.

Lowerre-Barbieri, S. K. 2009. Reproduction in relation to conservation and exploitation of marine fishes. Pages 371–394 in B. G. M. Jamieson, editor. Reproductive biology and phylogeny of Fishes (agnathans and bony fishes), volume 8B. Science Publishers. Enfield, New Hampshire.

Lowerre-Barbieri, S.K., L. Crabtree, T. Switzer, S. Walters-Burnsed, and C. Guenther. 2015. Assessing reproductive resilience: an example with South Atlantic red snapper Lutjanus campechanus. Marine Ecology Progress Series 526, 125-141.

Lowerre-Barbieri, S., G. DeCelles, P. Pepin, I.A. Catalan, B. Muhling, Brad Erisman, S.X. Cadrin, J. Alos, A. Ospina-Alvarez, M.M. Stachura, M.D. Tringali, S. Walters-Burnsed, and C.B. Paris. 2016. Inter-generational productivity and reproductive resilience in exploited marine fish. Fish and Fisheries 17:1-19.

Murray, J.D., J.J. Bahen, and R.A. Rulifson. 1992. Management Considerations for by-catch in the North Carolina and Southeast Shrimp Fishery. Fisheries, 17:21-26.

Palumbi, S.R., P.A. Sandifer, J.D. Allan, M.W. Beck, D.G. Fautin, M.J. Fogarty, B.S. Halpern, L.S. Incze, J. Leong, E. Norse, J.J. Stachowicz, D.H. Wall. 2008. Managing for ocean biodiversity to sustain marine ecosystem services. Frontiers in Ecology and the Environment, 7:204-211.

Porch, C.E, G. R. Fitzhugh, E. T. Lang, H. M. Lyon & B. C. Linton. 2015. Estimating the Dependence of Spawning Frequency on Size and Age in Gulf of Mexico Red Snapper, Marine and Coastal Fisheries, 7:233-245.

Radovich, J. 1982. The Collapse of the California Sardine Fishery: What Have We learned? CalCOFI Rep., Vol. XXIII.

Stearns, S.C. 1992. The Evolution of Life Histories. Oxford University Press, Oxford.

Walters, C.J., and S.J. D. Martell. 2004. Fisheries Ecology and Management. Princeton University Press. 448 pp.

Weinstein, M., and M.P. Walters. 1981. Growth, survival and production in young-of-year populations of *Leiostomus xanthurus* Lacépéde residing in tidal creeks. Estuaries, 4:185–197.

Winemiller, K.O. and Rose, K.A. 1992. Patterns of life history diversification in North American fishes: Implications for population regulation. Canadian Journal of Fisheries and Aquatic Sciences 49, 2196–2218.

EXHIBIT F

CURRICULUM VITAE

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EDUCATION

Ph.D. in Marine Science, The College of William and Mary, Virginia Institute of Marine Science, 1993
M.Sc. in Biological Oceanography, Rio Grande University, Brazil, 1986
B.S. in Biology, Santa Ursula University, Brazil, 1981

PROFESSIONAL EXPERIENCE

2003-present	Program Administrator, Marine Fisheries Research Program, Fish and Wildlife Research Institute, FWC
2000- present	Adjunct Graduate Faculty, Division of Marine and Environmental Systems, Florida Institute of Technology
1999-2003	Senior Research Scientist, Florida Marine Research Institute, FWC
1997-1999	Research Administrator, Florida Marine Research Institute, FWC
1995-1997	Assistant Research Scientist, Marine Institute, The University of Georgia
1993-1995	Postdoctoral Research Associate, Marine Institute, The University of Georgia

SCIENTIFIC PANELS AND COMMITTEES

2016-present	Co-Chair, 2016 Committee on Review of the Marine Recreational Information Program, Ocean Studies Board, National Academies of Science
2015-present	Chair, Scientific and Statistical Committee (SSC), Gulf of Mexico Fisheries Management Council
2012-present	Member, SSC, South Atlantic Fisheries Management Council
2012-2016	Chair, SSC, South Atlantic Fisheries Management Council
2010-2015	Florida Institute of Oceanography, Oil Spill Research Advisory Committee
2008-2012	Vice-Chair, SSC, South Atlantic Fisheries Management Council
2009-2010	Chair, ABC Control Rule Working Group, Gulf of Mexico Fishery Management Council
2009-2011	National SSC Working Group on Development of ABC Recommendations for Data Poor Stocks
2002-2008	Management and Science Committee, Atlantic States Marine Fisheries Commission

1998-2000	Marine Protected Areas Advisory Panel, South Atlantic Fisheries Management Council

SYNERGISTIC ACTIVITIES AND SERVICE

2015-present	Fisheries Forum Advisory Group – Fisheries Leadership & Sustainability Forum, Nicholas Institute for Environmental Policy Solutions at Duke University.
2014-present	Steering Committee – Southeast Marine Resource Education Program (MREP)
2013-present	Board of Directors – Gulf Wild Program, Gulf of Mexico Reef Fish Shareholders Alliance.
2009	Keynote Speaker – Ibero-American Symposium on Reproductive Ecology, Recruitment, and Fisheries Management (SIBECORP), Nov. 23-27, Vigo, Spain.

HONORS AND AWARDS

2015	Captain Phil Chapman Conservation Award – awarded by the Florida Guides Association.
2013	The Aylesworth Award – awarded by the Southeastern Fisheries Association for outstanding service as a government employee.

RESEARCH GRANTS

Synthesizing spatial dynamics of recreational fish and fisheries to inform restoration strategies: red drum in the Gulf of Mexico – Gulf Research Program Data Synthesis Grant. Co-PI with K. Lorenzen, C. Adams, R. Ahrens, M. Allen, E. Camp, J. Dutka-Gianelli, S. Larkin, W. Pine, J. Struve, S.K. Lowerre-Barbieri, M. Murphy, and J. Tolan. October 1, 2015-September 31, 2018. $480,000.

Is low male abundance limiting stock productivity? Assessing factors affecting reproductive potential of gag, *Mycteroperca microlepis,* in the Gulf of Mexico – National Marine Fisheries Service, NOAA, Marine Fisheries Initiative (MARFIN) Program. Co-PI's S.K. Lowerre-Barbieri, T. Switzer, A. Collins, and C. Koenig. September 1, 2015 - August 31, 2018. $495,555.

Sex Determination in Endangered Sturgeon: Using New Technology to Address Critical Uncertainties for Conservation and Recovery – National Marine Fisheries Service, NOAA, Protected Resources Program. Co-PI's J. Reynolds, D. Wetzel. July 1, 2015 – June 30, 2018. $589,293

Enhanced Assessment for Recovery of Gulf of Mexico Fisheries – Gulf Environmental Benefit Fund, National Fish and Wildlife Foundation. Co-PI's T. Switzer, R. Cody. Jan. 2014-Dec 2018. $26,385,000.

An evaluation of the effects of recreational catch and release angling on the survival of gag grouper (*Mycteroperca microlepis*) with additional investigation into gear and strategies designed to reduce pressure related fishing trauma – National Marine Fisheries Service, NOAA, Marine

Fisheries Initiative (MARFIN) Program. Co-PI A. Collins. September 1, 2013 - August 31, 2016. $274,563

Assessment of Florida's Marine Hatchery Programs – U.S. Fish and Wildlife Service, Federal Aid in Sport Fish Restoration Program. Co-PI J. Estes. April 2009-March 2015. $1,103,333.

An evaluation of the effects of catch and release angling on survival and behavior of goliath grouper (*Epinephelus itajara*) with additional investigation into long-term residence and movement patterns – National Marine Fisheries Service, NOAA, Marine Fisheries Initiative (MARFIN) Program. Co-PI A. Collins. September 1, 2010 - August 31, 2013. $184,777.

A Directed Study of the Recreational Red Snapper Fisheries in the Gulf of Mexico along the West Florida Shelf – NOAA Fisheries Congressional Appropriation. Co-PI with R. Cody, and B. Sauls. September 1, 2009 - August 31, 2010. $999,000.

Biodiversity links to habitat in Florida west coast waters: a foundation for marine ecosystem management – State Wildlife Grant, FWC. July 2007-June 2010. $136,500.

Cooperative Reef Fish Research and Monitoring Initiative for the West Florida Shelf – NOAA Fisheries Congressional Appropriation. Co-PI with B. Mahmoudi, T. Switzer, G. Fitzhugh, D. DeVries. September 1, 2008 - August 31, 2010. $940,000.

Development of standard methodologies to support a coast-wide approach to age determination of marine fishes – Atlantic Coastal Cooperative Statistical Program, ASMFC, NOAA. Co-PI with A.G. Woodward and D. DeVries. July 2002-June 2003. $61,661.

Fisheries habitat: identifying larval sources and essential fish habitat of juvenile snappers along the southeastern coast of the United States – National Sea Grant College Program, NOAA. Co-PI with S.R. Thorrold, R.K. Cowen, J.A. Hare, C.M. Jones and S. Sponaugle. August 2000-April 2003. $404,550.

Nearshore and Estuarine Gamefish Behavior, Ecology, and Life History – U.S. Fish and Wildlife Service, Federal Aid in Sport Fish Restoration Program. April 1998-March 2003. $1,704,789.

Reef Fish Abundance and Biology in Southeast Florida – U.S. Fish and Wildlife Service, Federal Aid in Sport Fish Restoration Program. April 1997-March 2001. $1,541,825.

Reproductive Parameters Needed to Evaluate Recruitment Overfishing of Spotted Seatrout in the Southeastern U.S. - National Marine Fisheries Service, NOAA, Saltonstall-Kennedy Program. Co-PIs S.K. Lowerre-Barbieri and J.J. Alberts. January-December 1997. $97,338.

Maturity, Spawning, and Fecundity of Red Drum in Nearshore Waters of the Central South Atlantic Bight - National Marine Fisheries Service, NOAA, Marine Fisheries Initiative (MARFIN) Program. Co-PIs S.K. Lowerre-Barbieri, R.T. Kneib and A.G. Woodward. July 1995-June 1998. $237,630.

Spawning Habitat and Spawning-Site Fidelity of Red Drum in Georgia Inshore Waters - Georgia Sea Grant College Program, NOAA. Co-PI with S.K. Lowerre-Barbieri. June 1995-August 1996. $48,459.

SELECTED PEER-REVIEWED PUBLICATIONS

Collins, A.S., **L.R. Barbieri**, R.S. McBride. E.D. McCoy, P.J. Motta. 2015. Sizing up the place: reef relief and volume are predictors of Atlantic goliath grouper presence and abundance in the eastern Gulf of Mexico. Bull. Mar. Sci. 91:399-418.

Patterson, W.F., J.H. Tarnecki, D.T. Addis, and **L.R. Barbieri**. 2014. Reef Fish Community Structure at Natural versus Artificial Reefs in the Northern Gulf of Mexico. Proceedings of the Gulf and Caribbean Fisheries Institute (GCFI) 66:4-8.

Murawski, S.A., W.T. Hogarth, E.B. Peebles, and **L.R. Barbieri**. 2014. Prevalence of External Skin Lesions and Polycyclic Aromatic Hydrocarbon Concentrations in Gulf of Mexico Fishes, Post-Deepwater Horizon. Trans. Am. Fish. Soc. 143:1084-1097.

Camp E.V., K. Lorenzen, R.N.M. Ahrens, **L.R. Barbieri**, and K.M. Leber. 2013. Understanding socioeconomic and ecological trade-offs in the enhancement of recreational fisheries: an integrated review of potential Florida red drum enhancement. Reviews in Fisheries Science 21: 388-402.

Cooper, W. T., **L.R. Bar**bieri, M.D. Murphy, and S.K. Lowerre-Barbieri. 2013. Assessing stock reproductive potential in species with indeterminate fecundity: effects of age truncation and size-dependent reproductive timing. Fisheries Research, 138:31-41.

Berkson, J., **L. Barbieri**, S. Cadrin, S. L. Cass-Calay, P. Crone, M. Dorn, C. Friess, D. Kobayashi, T. J. Miller, W. S. Patrick, S. Pautzke, S. Ralston, M. Trianni. 2011. Calculating Acceptable Biological Catch for Stocks That Have Reliable Catch Data Only (Only Reliable Catch Stocks – ORCS). U.S. Dep. Commerce, NOAA Technical Memorandum NMFS-SEFSC-616, 56 P.

Walter, J., B. Linton, W. Ingram, **L. Barbieri**, and C. Porch. 2011. Episodic red tide mortality in Gulf of Mexico red and gag grouper. Page 29 *In*: Brodziak, J., J. Ianelli, K. Lorenzen, and R.D. Method Jr. (eds.) Estimating natural mortality in stock assessment applications. U.S. Dep. Commerce, NOAA Technical Memorandum NMFS-F/SPO-119, 38 p.

Barbieri, L. R. and S. K. Lowerre-Barbieri. 2011. Sucesso reprodutivo e plasticidade de estoque pesqueiros: O que precisamos saber para melhorar o manejo da pesca. Pages 11-14 *In*: Saborido-Rey *et al*., (Eds.) Actas I Simposio Iberoamericano de Ecología Reproductiva, Reclutamiento y Pesquerías. Vigo, España. 400 pp. http://hdl.handle.net/10261/39081.

Luo, J., J.S. Ault, M.F. Larkin, and **L.R. Barbieri**. 2008. Salinity measurements from pop-up archival transmitting (PAT) tags and application to geo-location estimation for Atlantic tarpon (*Megalops atlanticus*). Marine Ecology Progress Series 357: 101-109.

Lowerre Barbieri, S. K., **L.R. Barbieri**, J.R. Flanders, A.G. Woodward, C.F. Cotton, and M. K. Knowlton. 2008. Using passive acoustics to determine red drum spawning in Georgia Waters. American Fisheries Society Special Publication, 137: 562-575.

Tringali, M. D., K.H. Leber, W. G. Halstead, R. McMichael, J. O'Hop, B. Winner, R. Cody, C. Young, C. , H. Wolfe, A. Forstchen, and **L. Barbieri**. 2008. Marine stock enhancement in Florida: a multi-disciplinary, stakeholder-supported, accountability-based approach. Reviews in Fisheries Science, 16:51–57.

Ault, J.S., R. Humston, M.F. Larkin, E. Perusquia, N.A. Farmer, J. Luo, N. Zurcher, S.G. Smith, **L. Barbieri**, and J. Posada. 2007. Population dynamics and resource ecology of Atlantic tarpon and bonefish. Chapter 16 *In* Ault, J.S. (ed.) Biology and Management of the World Tarpon and Bonefish Fisheries. Taylor and Francis Group. CRC Series on the Environment. Oxford, UK. 550 p.

Barbieri, L.R., J.A. Ault, and R.E. Crabtree. 2007. Science in support of management decision making for bonefish and tarpon conservation is Florida. Chapter 27 in Ault, J.S. (ed.) Biology and Management of the World Tarpon and Bonefish Fisheries. Taylor and Francis Group. CRC Series on the Environment. Oxford, UK. 550 p.

Allman, R.J., **L.R. Barbieri**, and C.T. Bartels. 2005. Regional and fishery-specific patterns of age and growth of yellowtail snapper, *Ocyurus chrysurus.* Gulf of Mexico Science 2005:211–223.

Lowerre-Barbieri, S.K., J.M. Lowerre, and **L.R. Barbieri**. 1998. Multiple spawning and the dynamics of fish populations: inferences from an individual-based simulation model. Can. J. Fish. Aquat. Sci. 55:1-11.

Barbieri, L.R., M.E. Chittenden, Jr., and C.M. Jones. 1997. Yield per recruit analysis and management strategies for Atlantic croaker, *Micropogonias undulatus*, in the Middle Atlantic Bight. U.S. Fish. Bull. 95:637-645.

Lowerre-Barbieri, S.K., M.E. Chittenden, Jr., and **L.R. Barbieri**. 1996. Variable spawning activity and annual fecundity of weakfish in the Chesapeake Bay. Trans. Am. Fish. Soc. 125:532-545.

Lowerre-Barbieri, S.K., M.E. Chittenden, Jr., and **L.R. Barbieri**. 1995. Age and growth of weakfish, *Cynoscion regalis*, in the Chesapeake Bay region, with a discussion of historic fluctuations in maximum size. U.S. Fish. Bull. 93:642-655.

Barbieri, L.R., M.E. Chittenden, Jr., and S.K. Lowerre-Barbieri. 1994. Maturity, spawning, and ovarian cycle of Atlantic croaker, *Micropogonias undulatus*, in the Chesapeake Bay and adjacent coastal waters. U.S. Fish. Bull. 92:671-685.

Barbieri, L.R., M.E. Chittenden, Jr., and C.M. Jones. 1994. Age, growth, and mortality of Atlantic croaker, *Micropogonias undulatus*, in the Chesapeake Bay region, with a discussion of apparent geographic changes in population dynamics. U.S. Fish. Bull. 92:1-12.

Chittenden, M.E., Jr., **L.R. Barbieri**, and C.M. Jones. 1993. Fluctuations in abundance of Spanish mackerel in Chesapeake Bay and the middle Atlantic region. N. Amer. J. Fish. Mgmt. 13:450-458.

Lowerre-Barbieri, S.K., and **L.R. Barbieri**. 1993. A new method of oocyte separation and preservation for fish reproduction studies. U.S. Fish. Bull. 91:167-170.

Chittenden, M.E., Jr., **L.R. Barbieri**, and C.M. Jones. 1993. Spatial and temporal occurrence of the Spanish mackerel, *Scomberomorus maculatus*, in Chesapeake Bay. U.S. Fish. Bull. 91:151-158.

Andreata, J.V., and **L.R. Barbieri**. 1993. Cranial osteology of *Geophagus brasiliensis* (Quoy and Gaimard, 1824) (Perciformes, Labroidei, Cichlidae). Biotemas 6:73-88.

Barbieri, L.R., R.P. dos Santos and J.V. Andreata. 1992. Reproductive biology of the marine catfish, *Genidens genidens* (Siluriformes, Ariidae) in the Jacarepaguá Lagoon system, RJ, Brazil. Envir. Biol. of Fishes 35:23-35.

Barbieri, L.R., J.V. Andreata, M.A. Santos, M.H.C. da Silva, A.S.C. Sebilia and R.P. dos Santos. 1991. Distribution, abundance and recruitment patterns of fishes in the Marapendi Lagoon, Rio de Janeiro, Brazil. Rev. Bras. Zool. 7:223-243.

Chao, N.L., J.P. Vieira and **L.R. Barbieri**. 1988. Lagoa dos Patos as a nursery ground for shore fishes off southern Brazil. Pages 144-150 *In*: Recruitment in Tropical Coastal Demersal Communities. D. Pauly, A. Yañez Arancibia, and J. Csirke (eds.) FAO International Oceanographic Commission, Workshop Report No. 44.

North Carolina Wildlife Federation
Affiliated with the National Wildlife Federation

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November 16, 2016

Via Electronic Mail and Hand Delivery

Chairman Sammy Corbett
N.C. Marine Fisheries Commission
Division of Marine Fisheries
PO Box 769
Morehead City, North Carolina 28557
samjcorbett3@gmail.com

Re: Clerical edits to Petition for Rulemaking Submitted to N.C. Marine Fisheries Commission on November 2, 2016

Chairman Corbett:

On behalf of the North Carolina Wildlife Federation ("the Federation"), the undersigned filed a Petition for Rulemaking ("Petition") on November 2, 2016. The Federation wishes to make the following non-substantive corrections to the Petition.

1. Page 11, final paragraph: The last full sentence on the page should read as follows: "For example, the maximum combined headrope length for shrimp trawls in Mississippi waters is 50 feet."

2. Page 14, carry over paragraph: The first full sentence on the page should read as follows: "To allow these species to grow to full maturity and spawn at least once, the Federation recommends establishing size limits for spot and Atlantic croaker for the commercial and recreational fisheries."

3. Page 15, second paragraph: Subsection (3) should read as follows: "cost of reducing tow time to 45 minutes and trawl effort to three days per week during daytime hours, if these reductions affect overall effort."

Please direct any questions regarding the Petition to Blakely Hildebrand at bhildebrand@selcnc.org or (919) 967-1450. Thank you for your consideration of this petition.

Sincerely,

Tim Gestwicki
Chief Executive Officer
North Carolina Wildlife Federation

Blakely E. Hildebrand
Associate Attorney
Southern Environmental Law Center

CC:

Vice Chairman, Commissioner Joe Shute, N.C. Marine Fisheries Commission
Commissioner Rick Smith, N.C. Marine Fisheries Commission
Commissioner Janet Rose, N.C. Marine Fisheries Commission
Commissioner Mike Wicker, N.C. Marine Fisheries Commission
Commissioner Alison Willis, N.C. Marine Fisheries Commission
Commissioner Mark Gorges, N.C. Marine Fisheries Commission
Commissioner Chuck Laughridge, N.C. Marine Fisheries Commission
Commissioner Brad Koury, N.C. Marine Fisheries Commission
Braxton Davis, Director, N.C. Division of Marine Fisheries

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January 12, 2017

Via Electronic Mail and U.S. Postal Service

Chairman Sammy Corbett
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Division of Marine Fisheries
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samjcorbett3@gmail.com

Re: Modification to Petition for Rulemaking Submitted to N.C. Marine Fisheries Commission on November 2, 2016

Chairman Corbett:

On behalf of the North Carolina Wildlife Federation ("the Federation" or "Petitioner"), the undersigned filed a Petition for Rulemaking ("Petition") on November 2, 2016. The Federation wishes to make two substantive modifications to the Petition and two recommendations to the N.C. Marine Fisheries Commission ("MFC" or "Commission"), which are described in detail below.

First, Petitioner wishes to modify its proposal to reduce headrope length on all shrimp trawls in North Carolina Coastal Fishing Waters. The Petition currently proposes limiting maximum headrope length on all shrimp trawls operating in all Coastal Fishing Waters to 90 feet under 15A N.C. Admin. Code 3L.0103. Petition at 11-12, Ex. A at 4-5. Upon further consideration, Petitioner now requests that headrope length be reduced from the current 220 feet to 90 feet in all Internal Coastal Fishing Waters and requests that the Commission establish a 110 headrope limit in all other Coastal Fishing Waters in the Atlantic Ocean. This modification is reflected in the updated proposed rules, attached hereto as Exhibit A.

This change to the Petition will allow commercial fishermen operating in Coastal Fishing Waters in the Atlantic Ocean to continue to use gear that was recently modified to meet the current 220 foot limit on headrope length for all trawls in Internal Coastal Fishing Waters; this rule went into effect on January 1, 2017. *See* Amendment 1 to Shrimp Fishery Management Plan (March 2015), *available at* http://portal.ncdenr.org/web/mf/fmps-under-development; *see also* 15A N.C. Admin. Code 3L.0103(d). A 110 foot headrope limit would allow commercial fisherman to continue to use existing nets that comply with the current 220 foot headrope limit.

Petitioner also wishes to modify its proposal regarding trawling activities in Special Secondary Nursery Areas ("SSNAs") under 15A N.C. Admin. Code 3N.0105 to allow for an additional day of shrimp trawling in Coastal Fishing Waters. The Petition proposes restricting trawling to a total of three days per week in all SSNAs. Upon further consideration and review of existing rules, Petitioner now requests that trawling in SSNAs in Internal Coastal Fishing Waters be limited to three days per week and that trawling in SSNAs in Coastal Fishing Waters in the Atlantic Ocean be limited to four days per week. This modification would increase the overall fishing days in Coastal Fishing Waters in the Atlantic Ocean from three to four days per week under Petitioner's proposal. This modification is also reflected in Exhibit A.

In addition to the above modifications, Petitioner also wishes to make the following recommendations to the Commission. In the Petition, Petitioner proposed a size limit for Atlantic croaker and spot for all commercial and recreational fisheries in order to limit the harvest of juvenile fish of these species. *See* Petition at 13-14. As noted in the expert technical report attached to the Petition, limits on mesh size in commercial fishing gear are often used to achieve the same result. *See* Petition, Ex. B at 19. Mesh selectivity studies evaluating the most appropriate mesh size to limit harvest of juvenile Atlantic croaker and spot are not available, however, and therefore, Petitioner is unable to propose a mesh size limit to complement the size limit contained in the proposed rules. Petitioner recommends that the MFC immediately commission a mesh selectivity study to evaluate the mesh size most effective at limiting the harvest of juvenile Atlantic croaker and spot. Once this analysis is complete, Petitioner recommends that the Commission re-evaluate the policy mechanisms to reduce harvest of juvenile Atlantic croaker and spot and to make adjustments to existing rules to reflect the best available data. This re-evaluation should take place no later than January 1, 2018.

Finally, if the Commission adopts the Petition, Petitioner recommends initiating rulemaking immediately, or no later than August 31, 2017, on all proposed rules. This would allow the Commission to choose the procedural mechanism it believes is most appropriate to effectuate Petitioner's requests, while at the same time ensure that they are acted on in a timely manner. Petitioner does not anticipate that any of the proposed rules severely curtail the "usefulness or value of equipment in which fishermen have any substantial investment," and therefore, the proposed rules, if adopted, should become effective immediately upon adoption or shortly thereafter. *See* N.C. Gen. Stat. § 113-221(d).

Please direct any questions regarding the Petition to Blakely Hildebrand at bhildebrand@selcnc.org or (919) 967-1450. Thank you for your consideration of the Petition.

Sincerely,

Tim Gestwicki
Chief Executive Officer
North Carolina Wildlife Federation
[signature page continues]

Blakely E. Hildebrand
Associate Attorney
Southern Environmental Law Center

Enclosure

CC:

Vice Chairman, Commissioner Joe Shute, N.C. Marine Fisheries Commission
Commissioner Rick Smith, N.C. Marine Fisheries Commission
Commissioner Janet Rose, N.C. Marine Fisheries Commission
Commissioner Mike Wicker, N.C. Marine Fisheries Commission
Commissioner Alison Willis, N.C. Marine Fisheries Commission
Commissioner Mark Gorges, N.C. Marine Fisheries Commission
Commissioner Chuck Laughridge, N.C. Marine Fisheries Commission
Commissioner Brad Koury, N.C. Marine Fisheries Commission
Braxton Davis, Director, N.C. Division of Marine Fisheries
Nancy Fish, N.C. Division of Marine Fisheries
Phillip Reynolds, Assistant Attorney General, N.C. Department of Justice

EXHIBIT A

MODIFICATIONS TO PROPOSED RULES

15A N.C. Admin. Code 3L .0103: Prohibited Nets, Mesh Lengths and Areas

(a) It is unlawful to take shrimp with nets with mesh lengths less than the following:

(1) Trawl net--one and one-half inches;
(2) Fixed nets, channel nets, float nets, butterfly nets, and hand seines--one and one-fourth inches; and
(3) Cast net--no restriction.

(b) It is unlawful to take shrimp with a net constructed in such a manner as to contain an inner or outer liner of any mesh length. Net material used as chafing gear shall be no less than four inches mesh length, except that chafing gear with smaller mesh may be used only on the bottom one-half of the tailbag. Such chafing gear shall not be tied in a manner that forms an additional tailbag.

~~(c) It is unlawful to take shrimp with trawls that have a combined headrope of greater than 90 feet in Internal Coastal Waters in the following areas~~:

~~(1) North of the 35| 46.3000' N latitude line;~~
~~(2) Core Sound south of a line beginning at a point 34| 59.7942' N--76| 14.6514' W on Camp Point; running easterly to a point 34| 58.7853' N--76| 9.8922' W on Core Banks; to the South Carolina State Line;~~
~~(3) Pamlico River upstream of a line from a point 35| 18.5882' N--76| 28.9625' W at Pamlico Point; running northerly to a point 35| 22.3741' N--76| 28.6905' W at Willow Point; and~~
~~(4) Neuse River southwest of a line from a point 34| 58.2000' N--76| 40.5167' W at Winthrop Point on the eastern shore of the entrance to Adams Creek; running northerly to a point 35| 1.0744' N--76| 42.1550' W at Windmill Point at the entrance of Greens Creek at Oriental.~~

~~(d)~~ (c) Effective January 1, 201~~7~~8 it is unlawful to take shrimp with trawls that have a combined headrope of greater than 90 feet in Internal Coastal Fishing Waters and 110 feet in Coastal Fishing Waters in the Atlantic Ocean. ~~220 feet in Internal Coastal Waters in the following areas:~~

~~(1) Pamlico Sound south of the 35| 46.3000' N latitude line and north of a line beginning at a point 34| 59.7942' N--76| 14.6514' W on Camp Point; running easterly to a point 34| 58.7853' N--76| 9.8922' W on Core Banks;~~
~~(2) Pamlico River downstream of a line from a point 35| 18.5882' N--76| 28.9625' W at Pamlico Point; running northerly to a point 35| 22.3741' N--76| 28.6905' W at Willow Point; and~~
~~(3) Neuse River northeast of a line from a point 34| 58.2000' N--76| 40.5167' W at Winthrop Point on the eastern shore of the entrance to Adams Creek; running northerly to a point 35| 1.0744' N--76| 42.1550' W at Windmill Point at the entrance of Greens Creek at Oriental.~~

~~(e)~~ (d) It is unlawful to use a shrimp trawl in the areas described in 15A NCAC 3R .0114.

~~(f)~~ (e) It is unlawful to use channel nets except as provided in 15A NCAC 3J .0106.

~~(g)~~ (f) It is unlawful to use shrimp pots except as provided in 15A NCAC 3J .0301.

~~(h)~~ (g) It is unlawful to use a shrimp trawl that does not conform with the federal rule requirements for Turtle Excluder Devices (TED) as specified in 50 CFR Part 222.102 Definitions, 50 CFR Part 223.205 (a) and Part 223.206 (d) Gear Requirements for Trawlers, and 50 CFR Part 223.207 Approved TEDs. These federal rules are incorporated by reference including subsequent amendments and editions. Copies of these rules are available via the Code of Federal Regulations posted on the Internet at http://www.gpoaccess.gov/cfr/index.html and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost.

~~(i)~~ (h) It is unlawful to use a shrimp trawl without two (2) authorized North Carolina Division of Marine Fisheries bycatch reduction devices properly installed and operational in the cod end of each net in Coastal Fishing Waters.

15A N.C. Admin. Code 3N .0105: Prohibited Gear, Secondary Nursery Areas

(a) It is unlawful to use trawl nets for any purpose in any of the permanent secondary nursery areas designated in 15A NCAC 3R .0104.

(b) It is unlawful to use trawl nets for any purpose in any of the special secondary nursery areas designated in 15A NCAC 3R .0105(1)-(12), except that the Fisheries Director, may, by proclamation, open any or all of the special secondary nursery areas listed in 15A NCAC 3R .0105(1)-(12), or any portion thereof, ~~listed in 15A NCAC 3R .0105~~ to shrimp or crab trawling from August 16 through May 14 subject to the provisions of 15A NCAC 3L .0100 and .0200.

(c) It is unlawful to use trawl nets for any purpose in any of the special secondary nursery areas designated in 15A NCAC 3R .0105(13), except that the Fisheries Director, may, by proclamation, open any special secondary nursery areas listed in 15A NCAC 3R .0105(13), or any portion thereof, to shrimp or crab trawling, subject to the provisions of 15A NCAC 3L. 0100 and .0200 and the restrictions described below:

(1) Trawling may only occur during shrimp season;
(2) Trawling is restricted to a total of three days per week in SSNAs located in Internal Coastal Fishing Waters;
(3) Trawling is restricted to a total of four days per week in SSNAs located in Coastal Fishing Waters in the Atlantic Ocean;
(4) Trawling is prohibited between sunset and sunrise; and
(5) Tow time may not exceed 45 minutes. Tow time begins when the doors of the trawl enter the water and ends when the doors exit the water.

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January 26, 2017

Via Electronic Mail Only

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Re: Public Comments in Support of N.C. Wildlife Federation's Petition for Rulemaking

Dear Chairman Corbett:

Thank you for the opportunity to present the N.C. Wildlife Federation's ("Federation's" or "Petitioner's") petition for rulemaking ("Petition"), originally submitted on November 2, 2016 and modified on January 12, 2017, to the Northern, Southern, Finfish, Habitat & Water Quality, and Shellfish/Crustacean Advisory Committees ("ACs") on Tuesday, January 17, 2017. The N.C. Division of Marine Fisheries ("DMF" or "Division") and AC members raised several issues for which the Federation would like to provide a brief response. The Federation will be happy to address these and other issues in more detail in its formal presentation of the Petition to the Commission at its February meeting.

I. Designation of Special Secondary Nursery Areas

In its presentation to the ACs, DMF noted that its internal protocols for the designation of new nursery areas requires a minimum of three continuous years of sampling in a geographic area in order to fully evaluate habitat function, and suggested that this data does not exist for several geographic areas proposed for designation as special secondary nursery areas ("SSNAs") by Petitioner. In addition, the Division noted that the peeler trawling, clam kicking/trawling, finfish trawling, and live bait harvest fisheries would be impacted and/or eliminated by new SSNA designations. As described more fully below, these concerns do not prevent the Commission from adopting the Petition.

a. *Availability of data to support SSNA designation*

DMF has access to extensive and substantial data sets that are sufficient to support the designation of new SSNAs in internal coastal fishing waters and coastal fishing waters in the Atlantic Ocean, as proposed by Petitioner. Indeed, these data sounded the alarm that Petitioner's requested actions are necessary for the health of finfish stocks in North Carolina waters. DMF conducts the Pamlico Sound Survey, or P195 Survey, in June and September, and among the objectives of the survey is to "determine which species utilize (and to what extent) the sound during their early life development and identify nursery areas for those species." *See* Petition for Rulemaking, Ex. B at 10 (Nov. 2, 2016) (citing Knight and Zapf 2015). This survey provides annual data regarding the distribution, size, abundance, and composition of species in the Pamlico Sound on an annual basis. *See id.* Data from the P195 survey supplies the Division with the data necessary to meet the requirements of its nursery area designation protocol in the Pamlico Sound and other geographic areas covered by the survey, and its results support Petitioner's proposal that all inshore waters not otherwise designated as nursery areas function as SSNAs.

Moreover, DMF's 2015 characterization study of the otter trawl fishery in estuarine and ocean waters of North Carolina provides extensive sampling information between 2012 and 2015. This study was not complete at the time of the Commission's consideration of Amendment 1 to the Shrimp Fishery Management Plan, but is available now. The study evaluates length frequency, biomass, and other metrics for several fish species over the course of the study period. *See* Petition at Ex. B, p. 9-10 (citing Brown 2015). DMF's sampling was conducted in ocean waters with high levels of shrimp trawling. DMF's data from this study demonstrates high abundance of juvenile fishes in the ocean waters sampled, and its results support Petitioner's proposal that all coastal fishing waters in the Atlantic Ocean not otherwise designated as nursery areas function as SSNAs. *See id.* DMF also has access to several public sources of data regarding juvenile abundance in near coastal waters, including the Southeast Area Monitoring & Assessment Program: South Atlantic ("SEAMAP-SA") Shallow Water Trawl Survey, an annual survey of shallow coastal waters between Cape Hatteras, North Carolina and Cape Canaveral, Florida. *See Southeast Area Monitoring & Assessment Program: South Atlantic – SEAMAP*, http://www.dnr.sc.gov/marine/mrri/SEAMAP/seamap.html (last visited Jan. 24, 2017). The SEAMAP-SA survey has been collecting abundance and biomass data each year in spring, summer, and fall since 1986. *Id.* The SEAMAP-SA survey data is yet another public source of data available to DMF that supports the designation of additional waters as SSNAs.

b. *Impacts to other fisheries*

Shrimp trawl bycatch is the largest source of bycatch in North Carolina waters, and bycatch levels are unsustainably high. *See* Petition at 2-3. The goals of the Petition are to protect important nursery area habitat, reduce bycatch of juvenile finfish, and sustain the commercial and recreational fishing industries by designating new nursery areas, establishing criteria for the opening of shrimp season, and managing the gear used in the shrimp trawl fishery.

The proposed rules in the Petition allow for the opening of both the crab trawl and shrimp trawl fisheries. Petitioner did not intend to impact activity in other fisheries, including but not limited to the peeler trawling, clam kicking, finfish trawling, and live bait harvest fisheries.[1] While several of these fisheries also raise concerns regarding habitat damage and bycatch, including clam kicking and peeler trawls, our main focus and intent is to address shrimp trawls as the primary source of juvenile mortality. However, because these activities are prohibited in existing SSNAs because they negatively impact nursery areas, we believe that maintaining these protections is consistent with and essential to protecting finfish nursery areas overall.

II. Opening of Shrimp Season

DMF raised several considerations regarding Petitioner's proposal to delay the opening of shrimp season until the shrimp reaches 60 shrimp per pound, heads on, ("SPP") in the Pamlico Sound, including that sampling efforts in the Pamlico Sound would be required under the proposed rule and that geographic and seasonal distribution of shrimp species varies in North Carolina waters.

DMF already conducts sampling prior to the opening of shrimp season. If the Petition is adopted and the proposed rules go into effect, DMF would be required to adjust its existing shrimp sampling regime to gather appropriate sampling data to open the season. An overwhelming majority of the shrimp trawl effort in North Carolina's shrimp trawl fishery occurs in the Pamlico Sound. *See* Petition at 10-11; *see also* Ex. B at 10-11. Opening the shrimp season when the shrimp count reaches 60 SPP in the Pamlico Sound gives shrimp the opportunity to grow to a larger, and thus more valuable, size, and allows fishermen to begin fishing in the most productive areas as soon as the resource is viable. Petitioner limited the sampling to Pamlico Sound because it is where most shrimp trawling occurs in North Carolina waters, and to serve as a workable proxy for other areas—rather than imposing shrimp counts all along the coast. Other states with shrimp fisheries comprising several species of shrimp, including South Carolina, Georgia, and Mississippi, established shrimp count requirements and guidelines for the opening of shrimp season. *See* Ga. Code. § 27-4-133(a) (2016) (requiring the shrimp count to reach 45 SSP for the opening of shrimp season in several state waters); Miss. Admin. Code § 22-1-15:06 (2016) (establishing 68 SSP as legal size limit for shrimp in Mississippi waters); *Shrimp season opens May 16 with plentiful forecast*, S.C. Dep't of Natural Res. (May 13, 2016), http://www.dnr.sc.gov/news/2016/may/may13_shrimp.html ("Before the season can open to commercial trawling, biologists look for evidence that a majority of female white shrimp have spawned."); S.C. Code § 50-5-35 (2016) (giving the Department the authority to open or close commercial fishing season). The proposed rules in the Petition do not address

[1] These fisheries are limited in North Carolina jurisdictional waters. Commercial peeler trawl landings in 2015 were so few as to be designated as confidential, and clam kicking landings were reported at 6,118 pounds with only nine participants. *North Carolina Division of Marine Fisheries 2016 Annual Report*, N.C. Dep't of Envt'l Quality II-108 (2016), http://portal.ncdenr.org/c/document_library/get_file?uuid=0671b388-e404-4354-a4ae-0ec29278d186&groupId=38337. Flynet landings, north of Cape Hatteras were 166,025 pounds in 2015, *id.*, and the current number of participants in the flynet fishery has ranged from three to eleven since 2012. *Id.* at II-118. Flounder trawl landings were 3,543,173 pounds in 2015. *Id.* at II-108. A large majority, if not all, landings come from fishing grounds north of North Carolina's jurisdictional boundaries. Flynets and flounder trawls are only permitted in specified Atlantic Ocean waters and are prohibited in estuarine waters. *See* 15A N.C. Admin. Code 3J.0202, 0104(a).

closing the shrimp season if and when the shrimp count falls below 60 SPP in the Pamlico Sound; the decision regarding whether to close the fishery is within the discretion of the Fisheries Director.

III. Size Limits for Atlantic Croaker and Spot

DMF noted that management triggers have not been met for Atlantic croaker and spot and that neither species is considered overfished or experiencing overfishing. While true, these indicators alone do not counsel against the adoption of size limits for Atlantic croaker and spot—particularly when both species are listed as species of concern. As noted in Petitioner's expert report, size limits provide basic biological protection to ensure exploited species have the opportunity to spawn at least once.

The DMF presentation failed to account for all information in the current Stock Status Report ("SSR") on Atlantic croaker. In its comments at the AC meeting, DMF indicated that Atlantic croaker biomass is increasing and age structure is expanding. Yet, the SSR states that "analysis shows declining trends in indexes of abundance and commercial and recreational harvest," resulting in a designation of concern. *Stock Status Report 2016*, N.C. Div. of Marine Fisheries, *available at* http://portal.ncdenr.org/web/mf/2016-stock-status-report (last visited Jan. 26, 2017). These pertinent facts were omitted from DMF's presentation.

Additionally, several commenters criticized Petitioner's use of landings data to examine stock status. It is DMF's and the Atlantic States Marine Fisheries Commission's ("ASMFC's") common practice to use landings and harvest estimates as a trigger for action in management models, as demonstrated in DMF's blue crab Fishery Management Plan ("FMP") and the ASMFC's Atlantic croaker and spot FMPs. Finally, the ASMFC acknowledges uncertainty regarding the impact of shrimp trawl bycatch on the overall stock in the stock assessments for spot and Atlantic croaker, suggesting that a precautionary approach to management is prudent. *See 2015 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Atlantic Croaker (*Micropogonias undulates)*: 2014 Fishing Year*, Atl. States Marine Fisheries Comm'n at 5 (2015), http://www.asmfc.org/uploads/file/55d65a662015AtlCroakerFMPReview.pdf.

The best available data shows that spot and Atlantic croaker ages are truncated in North Carolina and the directed harvest is comprised of a large percentage of juvenile fish. *See* Petition, Ex. B. Age truncation among spot and Atlantic croaker, extraordinary bycatch levels of these species, and declining landings of these species are cause for great concern. Petitioner does not believe the MFC has adequately addressed these issues.

Finally, Petitioner focused on spot, Atlantic croaker, and weakfish to illustrate the magnitude of the shrimp trawl bycatch problem in North Carolina. It is critically important not to discount the impacts to numerous other valuable commercial, recreational, and ecosystem species, contained in large numbers in shrimp trawl bycatch, including summer flounder, southern flounder, kingfishes, blue crabs, Spanish mackerel, among other species. Many of these species are designated as Concern, Depressed, or Unknown by DMF and the ASMFC. *See Stock*

Status Report 2016; *ASMFC Stock Status Overview*, Atl. States Marine Fisheries Comm'n (June 2016), http://www.asmfc.org/files/pub/ASMFC_StockStatus_June2016.pdf.

IV. Science Supporting the Petition

Petitioner understands, appreciates, and welcomes scientific differences of opinion. We interpreted several comments made during the public meeting to suggest we failed to take certain points in to consideration. We will be prepared to address those points in more detail in February, if necessary, but believe the general comments below are important at this time.

Petitioner is aware of and familiar with Dr. Rebecca Deehr's study referenced by several commenters during the AC meeting. Dr. Deehr's study is an important modeling exercise that evaluated different methods of reviewing effective trophic levels in Core Sound. Dr. Deehr's study is, however, limited in scope and geography and based on data from 2007. Petitioner agrees with Dr. Deehr's statement that "further experimental work is required to test these model-derived hypotheses," and believes that her study requires further review before it is used as a basis for management decisions. Dr. Deehr's study, while informative in an academic context, is not appropriate as a basis for management decisions at this time.

Several commenters suggested that shrimp trawl bycatch may provide a "subsidy" for species such as blue crabs and other predatory species. We are unaware of any studies that validate this suggestion.

An AC member questioned whether Petitioner considered density-dependent controls on fish populations in developing the Petition. This is indeed an important topic. In essence, density-dependent controls may indicate that increasing the abundance of juvenile fishes by, in this case, reducing anthropogenic sources of mortality (shrimp trawl bycatch) could lead to additional mortality of those fishes as a result of space limitation, food availability, or other factors. *See generally* Kenneth Rose, James Cowan, Kirk Winemiller, Ransom Myers, Ray Hilborn, *Compensatory density dependence in fish populations: importance, controversy, understanding and prognosis*, Fish and Fisheries (2001). The suggestion may further include a conclusion that these fish would have died anyway. The Petition provides ample information to demonstrate that the fish populations in North Carolina waters are in a depressed state and that important habitat areas are left unprotected. *See* Petition, Ex. B. Moreover, the supporting documentation provided with the Petition explains that the benefits of protecting these fishes far outweigh the potential impacts of status quo trawling practices. Further, the extensive data required to validate the actual occurrence of density-dependent controls and quantify their impacts are unavailable. A pertinent response to this concern is provided by several experts in this area: "[t]he debates over compensation and compensatory reserves are rarely ever resolved, and often act to delay the initiation of needed management actions." Rose et al. (2001) at 296.

We do not disagree that these issues are pertinent to an overall discussion of shrimp trawl bycatch and its impacts on fish populations. We do object, however, to the use of unproven theories to suggest that the Petition lacks merit in the face of the current state of our coastal fisheries.

V. Other Issues Raised at AC Meeting

DMF incorrectly described Petitioner's proposal to modify existing limits on maximum headrope length. DMF's presentation ignores the Petition's distinction between the proposed headrope limit in internal coastal waters and coastal waters in the Atlantic Ocean, and suggests that the proposed modification to existing limits on headrope length apply in SSNAs only. Petitioners have proposed a maximum headrope length of 90 feet for all internal coastal waters and a maximum headrope length of 110 feet for all coastal waters in the Atlantic Ocean. *See* Letter from Tim Gestwicki, N.C. Wildlife Federation, to Chairman Sammy Corbett, N.C. Marine Fisheries Commission at 1-2 (Jan. 12, 2017) (modifying Petitioner's original Petition to allow for longer headrope in coastal fishing waters in the Atlantic Ocean) [hereinafter Petition Modification].

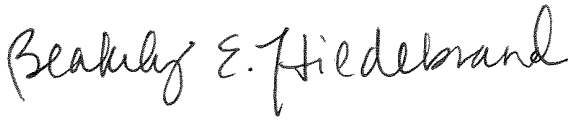
Similarly, DMF's presentation incorrectly described Petitioner's proposal to limit the number of trawling days each week by failing to acknowledge the Petition's distinction between internal coastal waters and coastal waters in the Atlantic Ocean. As amended, the Petition would allow for trawling for three days per week in SSNAs located in internal coastal fishing waters and four days per week in SSNAs located in coastal fishing waters in the Atlantic Ocean. *See* Petition Modification at 2. Petitioner did not intend to recommend specific days for closure; this decision is best left to the discretion of the Fisheries Director.

Finally, as noted by DMF Director Braxton Davis, development activities, including real estate development, dredging, and other activities, in the coastal zone of North Carolina will not impacted by the designation of SSNAs. *See* 15A N.C. Admin. Code Chapter 7.

The Federation looks forward to formally presenting the Petition to the Commission on February 16, 2017 and to the Commission's final determination regarding the Petition. Should you have any questions before the February meeting, please contact Blakely Hildebrand at bhildebrand@selcnc.org and Ramona McGee at rmcgee@selcnc.org. Thank you for your consideration of these comments.

Sincerely,

Tim Gestwicki
Chief Executive Officer
North Carolina Wildlife Federation



Blakely E. Hildebrand
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Marine Fisheries
ENVIRONMENTAL QUALITY

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Secretary
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Director

February 3, 2017

MEMORANDUM **NCWF Petition 2-17**

TO: Marine Fisheries Commission

FROM: Division of Marine Fisheries

SUBJECT: N.C. Wildlife Federation Petition for Rulemaking

Please find attached the Division's technical review of the N.C. Wildlife Federation's Petition for Rulemaking, which was filed on Nov. 2, 2016 and amended on Jan. 12, 2017. The intent of this review document is to provide the Commission with relevant background information, scientific and technical comments, and suggestions regarding additional clarifications that may be needed. Review of the petition was divided into four main topics:

- the designation of all coastal fishing waters (not otherwise designated as nursery areas) as a special secondary nursery area (SSNA);
- the proposed criteria for opening the shrimping season;
- the definition of the types of gears and how/when gear may be used in the proposed special secondary nursery area; and
- the management of Spot and Atlantic Croaker.

As noted in the document, the petition itself should also be carefully read and referred to as you consider the Division's technical review.

At the time of this mailing of the commission's meeting materials, the petition for rulemaking is still undergoing legal review by the Department of Environmental Quality's Office of General Counsel due to potential legal interactions between the proposed rules and existing commission rules, previously adopted fishery management plans, and requirements and procedures outlined in the N.C. Fisheries Reform Act and the N.C. Administrative Procedures Act. For this reason, the Division cannot provide an official recommendation or position statement with respect to the petition at this time. We look forward to presenting our review and analysis to the Commission at its February meeting.

DIVISION OF MARINE FISHERIES
REVIEW OF THE PETITION FOR RULEMAKING TO AMEND 15A ADMIN. CODE 3I .0101, 3L .0101, 3L .0103, 3N .0105, AND 3R .0105 AND ADOPT 3M .0522 AND 3M .0523 TO DESIGNATE SPECIAL SECONDARY NURSERY AREAS AND REDUCE BYCATCH MORTALITY IN NORTH CAROLINA COASTAL FISHING WATERS

PURPOSE

A principle support role of the North Carolina Division of Marine Fisheries (DMF) for the North Carolina Marine Fisheries Commission (MFC) is to provide adequate information on which to base management decisions made by the commission to meet its statutory mandate. The intent of this document is to review the North Carolina Wildlife Federation (Petitioner) petition for rulemaking filed on November 2, 2016 and provide the commission with considerations and relevant scientific information for the subject areas of the Petition. Review of this Petition will be in divided into four main topics: the designation of all coastal fishing waters (not otherwise designated as nursery areas) as a special secondary nursery area (SSNA); the proposed criteria for opening the shrimping season; the definition of the types of gears and how/when gear may be used in the proposed special secondary nursery area; and the management of Spot and Atlantic Croaker.

The Petition should be carefully read and referred to throughout the following review. Excerpted verbatim text is shown in italic herein, along with the Petition page number reference.

BACKGROUND

The Petitioner filed a Petition for rulemaking on November 2, 2016 to the Chairman of the MFC, pursuant to and in accordance with the North Carolina Administrative Procedure Act, N.C. Gen. Stat. § 150B-20, and 15A N.C. Admin. Code 3P .0301. The Petitioner filed clerical edits to the Petition on November 16 and filed a modification to the original Petition on January 12, 2017. This Petition and modifications seek amendments to the following sections of Title 15A of the North Carolina Administrative Code: 3R .0105, 3L .0101, 3L .0103, 3N .0105, and 3I .0101. In addition, the Petitioner urges the adoption of two new sections to Title 15A of the Code: 3M .0522 and 3M .0523. The January 12 modification recommends initiating rulemaking immediately, but no later than August 31, 2017.

Reasons provided by the Petitioner for the proposed rule amendments include concerns about "*adequate habitat protections and declining and depleted status of many coastal fish stocks*" (page 5). The Petitioner is concerned about bycatch of juvenile fish, including Atlantic Croaker, Spot, and Weakfish in the shrimp trawl fishery in the estuarine and near shore waters of North Carolina under the MFC's jurisdiction. In addition, the Petitioner states that the MFC's effort to minimize bycatch of juvenile finfish has been unsuccessful and that the recently adopted 2015 North Carolina Shrimp Fishery Management Plan (FMP) fell short of necessary actions to protect habitat and reduce bycatch of juvenile finfish. The intent of the proposed new rules for possession of Spot and Atlantic Croaker will allow these species to mature and spawn at least once.

Proposed Rule Changes in the Petition

15A NCAC 3R .0105 Special Secondary Nursery Areas

The MFC has jurisdiction in waters out to three miles offshore in the Atlantic Ocean under 15A NCAC 03 Q .0103. The effect of proposed changes would be to designate all undesignated areas in all coastal fishing waters and ocean under the MFC's jurisdiction as a special secondary nursery area. This does not include waters under the jurisdiction of the Wildlife Resources Commission (inland waters).

15A NCAC 3L .0101 Shrimp Harvest Restrictions

The effect of proposed changes would be to limit the use of the Marine Fisheries Director's proclamation authority in opening the shrimping season until the shrimp count reaches 60 shrimp per pound, heads-on, in the Pamlico Sound.

15A NCAC 3L .0103 Prohibited Nets, Mesh Lengths and Areas

The effect of proposed changes from the original November 2 Petition would be to restrict the maximum headrope length to 90 feet in the Atlantic Ocean (from 0 to 3 miles) and in estuarine waters under the MFC's jurisdiction, to become effective January 1, 2018. This change includes areas where existing maximum headrope length is 220 feet. The January 12, 2017 modification to the Petition would change the maximum headrope length in the Atlantic Ocean (from 0 to 3 miles) to 110 feet.

15A NCAC 3L .0103 Prohibited Nets, Mesh Lengths and Areas

The effect of proposed changes would be to create a rule requiring the use of two bycatch reduction devices (BRDs) in shrimp trawls correctly installed and operational.

15A NCAC 3N .0105 Prohibited Gear, Secondary Nursery Areas

The effect of proposed changes would be to allow the Fisheries director to open all or part of the Atlantic Ocean (0 to 3 miles) and estuarine waters under the jurisdiction of the MFC, excluding waters already designated as primary, secondary and all other special secondary nursery areas, with the following restrictions: Only shrimp and crab trawling may occur during open shrimp season and are restricted to a total of three days a week. No shrimp or crab trawling may occur at night and tow times are restricted to a maximum of 45 minutes. The January 12 modification to the Petition would change the number of days allowed to fish in the Atlantic Ocean (0 to 3 miles) to a total of four days a week.

15A NCAC 3I .0101 Definitions

The effect of this proposed change would be to change the definition of secondary nursery areas (SNA) to include the Atlantic Ocean from 0 to 3 miles offshore.

15A NCAC 3M .0522: Spot (new section)

15A NCAC 3M .0523: Atlantic croaker (new section)

The effect of the proposed changes would be to implement a size limit of 8-inches for Spot and 10-inches for Atlantic Croaker. There is currently no size limit on either species.

The January 12 proposed modification to the Petition makes a recommendation to the MFC to immediately commission a gill net mesh selectivity study to determine a mesh size that would be the most effective at limiting the harvest of juvenile Atlantic Croaker and Spot. Upon completion of this study, it is recommended that the MFC re-evaluate the policy mechanisms to reduce harvest of juvenile Atlantic Croaker and Spot and to make adjustments to existing rules to reflect the best available data. This evaluation would be required to take place no later than January 1, 2018.

2015 Shrimp Fishery Management Plan Amendment 1

A review of the Petition by the NC Department of Environmental Quality (DEQ) Office of General Counsel is needed to evaluate the MFC's authority to implement rules independent of the adopted management strategies in the 2015 Shrimp FMP and Interjurisdictional FMP, which included Spot, Atlantic Croaker, Weakfish, Summer Flounder and Atlantic Striped Bass. The Petition may also interact with other FMPs, such as those for Blue Crabs and Hard Clams.

The Division began review of the 2006 Shrimp FMP in 2011 and concluded that current management strategies in the plan continued to meet the goals and objectives of the Shrimp FMP and initially recommended to the Director of the DMF that the 2011 Shrimp FMP proceed as a revision. Based on concerns voiced at the various MFC Advisory Committee meetings regarding bycatch in the shrimp trawl fishery, the DMF later recommended amending the 2006 Shrimp FMP. The MFC, at its November 2012 meeting, directed the DMF to amend the plan but to limit the scope of the amendment to bycatch issues in the commercial and recreational shrimp fisheries.

Twenty-nine different management options were brought forward to a Shrimp FMP Advisory Committee (AC) to address different bycatch management issues during monthly meetings from January through September 2013. Management strategies that were discussed included: Alternative fishing gears, Turtle Excluder Devices (TEDs) in skimmer trawls, gear modifications, effort management, head rope lengths, number of nets and vessel lengths, and area restrictions. Specific management options related to this Petition included adding an additional day to the weekend closure in internal coastal waters, closing shrimp trawling at night in internal coastal waters, and reducing maximum headrope length in all internal coastal waters for commercial and recreational fisheries. In addition, at the request of the Southern AC, the New River trawl fishery and the consideration of a live bait shrimp fishery were also addressed through Amendment 1.

The MFC approved the Shrimp FMP Amendment at its February 2015 meeting. Petition Among other management measures, the amendment implemented a requirement for two state-authorized BRDs in each shrimp trawl by Fisheries Director proclamation due to variable

conditions, which was intended to allow flexibility in BRD requirements. This differs from the Petition, which proposes this same requirement in rule rather than by Director's proclamation. The Shrimp FMP Amendment also required a collaborative shrimp trawl gear study, which is currently underway. The study focuses on bycatch reduction, with a target of 40 percent reduction in bycatch, while minimizing shrimp loss.

Implementation of a tow time limit in internal coastal waters was discussed during the development of the Shrimp FMP Amendment, but the Shrimp Advisory Committee voted to eliminate this option from the 29 original options that were listed for discussion in July of 2013. Implementing a seasonal closure (December or January through May) was also discussed but not selected during the development of the amendment, and is related to the Petition's proposed rule change to open the shrimp season when the shrimp size is 60 count heads-on in Pamlico Sound.

The NC Wildlife Federation (Petitioner) was actively engaged during the development of the Shrimp FMP Amendment and provided comments to the MFC on the 2015 Shrimp FMP Amendment and the associated MFC rules needed to implement the amendment. These comments were included along with other public comments in the Amendment.

NURSERY AREA DESIGNATION

History of Nursery Area Designations

The Petition states under Section III (page 5) *"The lack of adequate habitat protections and declining and depleted status of many of our coastal fish stocks suggests a failure of the MFC, through its existing regulations, to meet its duties to "conserve, protect, and regulate" marine and estuarine resources."*

Over the past three decades, the MFC has implemented several measures to conserve and protect fish and habitat resources, based in part on a framework of fish habitat classifications and other restrictions (see Table 1). The MFC's broad definition of fish habitat is similar to the designation of Essential Fish Habitat (EFH) by federal fishery management councils, and is described in MFC rule 15A NCAC 03I .0101(4) as "The estuarine and marine areas that support juvenile and adult populations of fish species, as well as forage species utilized in the food chain. Fish habitats as used in this definition, are vital for portions of the entire life cycle, including the early growth and development of fish species." Habitat types noted in rule 15A NCAC 03I .0101(4) include anadromous fish spawning and nursery areas, corals, intertidal oyster beds, live rock, nursery areas, shellfish producing habitat, submerged aquatic vegetation and strategic habitat areas. To date, only primary, secondary, special secondary nursery areas (for a specific guild of species), and anadromous fish spawning areas have been adopted in rule for North Carolina, with coordinate boundaries that encompasses discrete fish habitat areas.

The other named fish habitats noted in this MFC rule, as well as the same habitat types within the Coastal Habitat Protection Plan (CHPP), have not been formally designated with discrete boundaries in rule. Initial actions have been taken to accomplish this through mapping of submerged aquatic vegetation and shell bottom habitat. Spatial distribution of these habitats is more variable over time than waterbody locations used for nursery areas, and therefore has been

more challenging to map and sample. Building on the concept of identification of nursery habitats, the division is working on identifying strategic habitat areas for further protection (discussed in more detail below). DMF is unaware of any other east coast state with a similarly comprehensive fish habitat identification, delineation, and protection process.

Primary Nursery Area (PNA) Designations

In 1970, a large scale sampling program (Program 120) to delineate the estuarine nursery areas of economically important species was initiated by DMF. Year round sampling over two years was done to determine nursery area nominations. Catch-per-unit-effort data for all samples collected during the major recruiting period were examined and plotted against cumulative number of stations as the method to quantify a level of abundance for use as one criteria to select PNAs. The resulting Poisson distribution illustrated the probability of a given catch-per-unit-effort value. The following species had a sufficient number of sampled individuals to use this technique: Spot, Atlantic Croaker, Atlantic Menhaden, Southern Flounder, Weakfish, Blueback Herring, Brown Shrimp, White Shrimp, and Blue Crabs. The designation of the original PNAs also took into account the association between fish abundance and different abiotic factors (bottom type, sediment size, salinity and temperature), and the practical aspect of enforceable boundaries (Street and Noble 1989). Sampling was focused within bays and creeks, and minimally extended into the adjacent larger sounds (Purvis 1976; Wolff 1976; Spitsbergen and Wolff 1974). The majority of the stations were in water less than 2 m deep.

In 1977, the MFC defined and designated Primary Nursery Areas in rule. Nursery areas are defined in 15A NCAC 03I .0101 4(f) as "Areas that for reasons such as food, cover, bottom type, salinity, temperature, and other factors, young finfish and crustaceans spend the major portion of their initial growing season. Primary nursery areas are those areas in the estuarine system where initial post-larval development takes place. These are areas where populations are uniformly early juveniles." Gear restrictions in PNAs, including prohibition of trawls, long haul seines, swipe nets, dredges and mechanical methods for shellfish harvest, protect both the physical habitat as well as small juveniles.

Following the initial PNA designations, additional work was done by division staff and other researchers to verify nursery area designations, analyze data for correlation with environmental factors, and make recommendations for expanding critical habitat protection (NCDMF 1981; Ross and Epperly 1985; Noble and Monroe 1991). A subset of PNA stations continued to be sampled to investigate new areas and to augment data for existing designated areas. The designation process was further developed over time and the current process for this PNA habitat category (nursery areas for a suite of winter ocean spawners) is based on analysis of abundance, size composition, and species diversity, in addition to abiotic conditions including bottom type (coarse silt or clay with high organic content) and depth (less than six feet). Once a waterbody has been identified as a potential nursery area, a sampling station is established and is sampled a minimum of three years prior to designation to account for annual variability. This process also includes comparisons to other nursery areas to ensure consistent application of the methodology (NCDMF 2002).

Additional rules that also protect PNAs are under the authority of the Coastal Area Management Act (CAMA) of 1974. Following designation of PNAs in MFC rule, the NC Coastal Resources

Commission (CRC) implemented rules prohibiting new dredging of channels, canals, and boat basins in PNAs (15A NCAC 07H .0208). The NC Environmental Management Commission (EMC) designated all PNAs as High Quality Waters [15A NCAC 02B .0301 (c)], providing more stringent storm water controls and water quality standards. Various in-water work moratoria are also regularly required by state and federal agencies to protect sensitive habitat areas such as nursery and spawning areas from turbidity-related impacts.

Secondary and Special Secondary Nursery Designations

Secondary Nursery Areas (SNA) were defined in 1977 in MFC rule 15A NCAC 03I .0101 4(f) as "those areas in the estuarine system where later juvenile development takes place. Populations are composed of developing sub-adults of similar size that have migrated from an upstream primary nursery area to the secondary nursery area located in the middle portion of the estuarine system." The Secondary (SNA) and Special Secondary Nursery (SSNA) designations are based primarily on the life histories of the same suite of species used in the PNA designations. While SNA and SSNA were sampled in the original 1970s nursery inventory and part of the rule definition, they were not designated (delineated) in rule with associated gear restrictions until 1986. As these species grow, they begin to move out of PNAs and toward the middle portion of the estuarine bays and sounds (secondary), then into the lower portions of the system (originally called temporary nursery or transport areas) and eventually the ocean (NCDMF 1978, Ross and Epperly 1985). Noble and Monroe (1991) reported that as of 1988, there were 80,165 acres of PNA, 35,355 acres of SNA, and 13,358 acres of SSNA.

Historically, prohibition of trawl nets in SNA ensured protection of shrimp for additional growth before migration out into open shrimping waters, as well as protection of juvenile fish that had grown and moved out of the PNAs. The SSNAs were originally designated to allow shrimping to occur once substantial out-migration of fish had occurred, so as to provide access to the marketable shrimp resource that might otherwise be lost due to out-migration (NCDMF 1978). Areas considered for SSNA designation were those where the shrimp populations would empty into unfishable bottom and where no substantial oyster habitats would be damaged by trawling. Unlike PNAs, the SNAs do not have other protections from other agencies rules, except for a Coastal Management policy restricting impacts to secondary nursery areas (among several other natural resources areas) in the siting of energy facilities [7M .0403 (f)(10)(A)].

Proposed amendments in paragraph (b) of 15A NCAC 03N .0105 provide an exception for existing special secondary nursery areas from the more restrictive harvest practices that would be required in the proposed new special secondary nursery areas listed in new paragraph (c) of the rule, such as no trawling at night, tow time limits, and trawling only three days per week. This results in two different sets of restrictions tied to the term "special secondary nursery areas." Having two types of these areas with a gradient of restrictions could displace fishing effort to the less restricted areas upstream of the proposed new special secondary areas, allowing more harvest in these upstream, potentially more "nursery-like" areas.

Critical Habitat Area Concept[1]

In the 1980s the division formed an internal Critical Habitat Committee to work with the MFC Habitat Advisory Committee to discuss the concept of expanding habitat protections. While not used for any rule designations, analysis of the secondary nursery area data was included in the division's 1991 Classification of Pamlico Sound Nursery Areas; Recommendations for Critical Habitat Criteria report (Noble and Monroe 1991). This study identified other species groupings that were not considered in the nursery designation process. It recommended a better understanding of the spatial-temporal distributions in the estuarine complex and associated habitat characteristics. In particular, staff recommended expanding fish sampling to identify anadromous spawning and nursery areas, estuarine areas important to reef fish like Gag Grouper, Black Sea Bass, and Sheepshead, and mapping of shellfish and submerged aquatic vegetation resources due to their importance for numerous economically important species. Critical habitat definitions were put into rule in 1994. Sampling was conducted for anadromous fish spawning and nursery areas, and the division implemented a Bottom Mapping Program (1990). Anadromous fish spawning areas were designated in rule in 2007.

Selective gear restrictions in certain areas (without formal habitat area designations) were also used to provide protection for critical habitats. The MFC prohibited trawling and dredging over submerged aquatic vegetation beds in Pamlico Sound through a "No Trawl Area" designation (15A NCAC 03R .0106). Submerged Aquatic Vegetation beds are nursery areas for summer/fall spawners like Spotted Sea Trout, Red Drum, Black Sea Bass, and many others. Trawling was prohibited in Albemarle and Currituck sounds due to user conflicts, but this also provides ancillary protections for habitat and bycatch of juvenile anadromous fish (15A NCAC 03J .0104). Trawl net, long haul seine, and swipe nets are prohibited in any designated Shellfish or Seed Management Area (15A NCAC 03K .0103). Crab Spawning Sanctuaries (15A NCAC 03L .0205) and inlet trawling restrictions (15A NCAC 03J .0401) may provide a "no trawl corridor" around inlets that not only protect crabs but allow migration of sub-adult fish to the ocean. In the ocean (from the beach out to three miles), there are approximately 630,000 acres of waters, of which approximately 10% (60,000 acres) are currently closed to trawling off of Onslow County, Carteret County and from Oregon Inlet to the Virginia line (Figure 2).

The division currently does not conduct ocean-based fishery independent sampling that could be evaluated for new nursery classifications in the ocean. The Petitioner noted other data sets sufficient to support designation of the proposed SSNAs. The division shrimp trawl characterization study (Program 570), conducted from 2012 to 2015 in the ocean, does evaluate finfish length frequency, biomass, and other metrics, as indicated by the Petitioner. However, it may be inappropriate to designate nursery areas from this study or any fishery-dependent characterization study due to sampling bias. Lack of standardization in the gears observed (mesh size, BRDs, TEDs, net type), tow times, tow speed, and geographic locations in the characterization study do not produce comparable catch rates across tows (Brown 2015). Fishery-independent surveys address sources of bias through standardized techniques.

[1] The following sections do not address the designation of "Critical Habitats" under the Endangered Species Act (ESA), which is applicable only to species listed as endangered or threatened and has specific meaning as defined in the ESA.

Under the Southeast Area Monitoring and Assessment Program (SEAMAP), a cooperative State/Federal program coordinated by the Atlantic States Marine Fishery Commission (ASMFC), South Carolina conducts a fishery-independent Coastal Shallow Water Trawl Survey. The survey has sampled two depth-zones (4 m and10 m) off the NC coast south of Cape Hatteras beginning in 1989. The "outer deep" zone was dropped in 2001 due to budget cuts and a decision to increase samples in the inner strata (ASMFC 2011). There are approximately 40 stations off North Carolina in the inner strata, with an average depth of 8 meters (4 m min and 14 m max). Nearly 4,000 tows have been made, averaging 148 per year. This is an extensive dataset that has primarily been used for shrimp and finfish indices in coast-wide stock assessments, and could be evaluated for habitat purposes.

With the implementation of the Pamlico Sound Trawl Survey (Program 195) in 1987 (also SEAMAP survey) there is species abundance and habitat preference data for the sound and the lower reaches of Neuse, Pungo, and Pamlico rivers. This data has been provided to a NOAA Fisheries Essential Fish Habitat database which assembled trawl surveys from state and academic organizations, covering the Gulf of Maine to South Carolina, as well as NOAA groundfish surveys. Division sampling under the Estuarine Trawl Program (Program 120) in SNA and SSNA has decreased in the past 25 years with changes in shrimp management strategies (intended to avoid "grand openings"), as well as with budget reductions to state-funded programs (over 44% reduction since 2008).

There are approximately 2.2 million acres of open water and 200,000 acres of salt/brackish marsh in coastal North Carolina. The MFC has designated 161,830 acres as nursery areas (PNA, SNA, and SSNA), which represent 8% of the total estuarine waters. Additionally, the NC Wildlife Resources Commission (WRC) has designated acreage of inland waters under their jurisdiction as inland nursery areas (30,384 acres). In order to protect fish habitat, it is important to be able to designate additional critical habitats based on acceptable data, criteria and analysis (see Table 2, Figure 2 and 3).

Evolving Scientific Concept of Nursery Area

In more recent years, the scientific literature has refined the concept of nursery areas. In earlier days an entire estuary was initially considered a nursery area because of the occurrence of juveniles. But as ecosystem sciences advance, it has been found that in addition to density, other factors such as growth, predator protection, and movement out of the nursery into the adult habitat influence determination of nursery areas. Based on Beck et al. (2001), Dahlgren et al. (2006), and Peterson (2003), nursery areas are a subset of juvenile habitat that contributes disproportionally more to the production of juveniles that recruit into a population than another area of similar size. Shallow habitats with structure, such as wetlands, submerged aquatic vegetation, and oyster reefs, provide more predator protection and food than soft bottom habitat, enhancing growth and survival (Lehnert and Allen 2002; Ross 2003; Grabowski et al. 2005). However, juvenile species have specific optimal abiotic conditions such as salinity and temperature to maximize growth. Productive nursery areas occur where ideal abiotic factors, structured habitat, and landscape position overlap (Figure 1). While all waterbodies may have juvenile fish present at any given time, the combination of factors may not align, resulting in low nursery value (Beck et al. 2001; Peterson 2003).

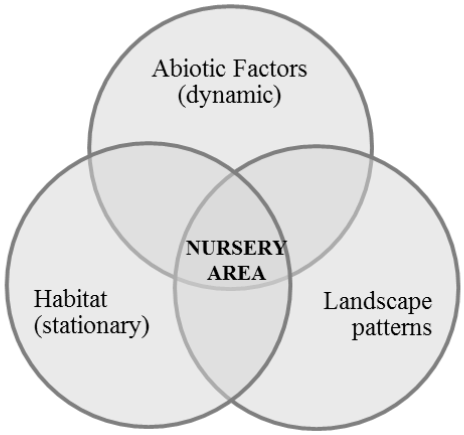

Figure 1. Depiction of the nursery area concept – the location where abiotic and habitat conditions, as well as the landscape setting are optimal for productivity. Abiotic factors – salinity, temperature, depth, currents; Habitat factors – wetlands, shell bottom, submerged aquatic vegetation, substrate; Landscape setting – geomorphology of the waterbody, proximity to inlets or adult habitat, habitat connectivity (adapted from Peterson 2003 and Beck et al. 2001).

Fishery Reform Act and Habitat Protection

The Petition, under Section II (page 5), states that "expanding nursery area designation to accurately account for nursery habitat and affording these habitats additional protection furthers the goals of the CHPP."

The North Carolina Fisheries Reform Act (1997) mandated development of Fishery Management Plans and a Coastal Habitat Protection Plan (CHPP) to manage fish and their habitat. All Fishery Management Plans include a section that describes habitat and water quality aspects for the plan species and also include recommendations for species-specific habitat and water quality actions and research needs. The CHPP is a resource and guide compiled by Department of Environmental Quality staff to assist the Marine Fisheries, Environmental Management, and Coastal Resources commissions in managing fish habitat for the continued protection and restoration of fishery habitats of North Carolina. Under the mandates of North Carolina's Fisheries Reform Act, DMF habitat efforts have focused on spearheading the development of the CHPP, conducting more comprehensive reviews of development permits and related impacts, advancing habitat protections through the CHPP and FMP recommendation process, and the establishment of a Habitat Section in the division in 1998. The first CHPP was adopted in 2005 (Street et. al. 2005). Goals and recommendations of the CHPP address mapping and evaluating trends in habitats, assessing linkages between habitats and fish species at all life stages, restoring habitat, particularly oyster habitat and wetlands which have been greatly reduced by various human impacts, and improving water quality since it is the foundation of healthy fish and habitat.

As habitat designations evolve to more holistic approaches, the nursery ecological function is a critical component, along with other ecological functions such as refuge and forage.

Goal 2 of the CHPP addresses strategic coastal habitats (referred to in rule at 15A NCAC 03I .0101(4)(h) as Strategic Habitat Areas, and renamed as "strategic coastal habitats" in the 2016 CHPP). Identification of Strategic Habitat Areas represents a movement away from single species management and toward the conservation and enhancement of varied and connected fisheries habitat. Strategic Habitat Areas are meant to be a subset of all coastal habitats that are a priority for protection due to their exceptional condition or an imminent threat to their ecological functions that support estuarine and coastal fish and shellfish species. Deaton et al. (2006) describe the process for identifying exceptional areas of Strategic Habitat Areas in North Carolina's coastal waters. Site selection software is used to select a subset of high quality, strategically located habitat areas that are needed to maintain fish abundance and diversity and ecological function. The model seeks to maximize connectivity between resource targets. The amount to maintain is adjusted based on relative ecological importance, rarity, vulnerability, sensitivity to alteration, and/or historic losses. Three of the four regional assessments have been completed and presented to the Marine Fisheries Commission. The analysis for the fourth region, the Cape Fear area, is projected for completion in 2017. Before Strategic Habitat Areas can influence regulatory management strategies, sampling of indicators is needed to verify ecosystem function and identify site-specific management needs (NCDEQ 2016).

In the Pamlico Sound System (Region 2), Strategic Habitat Areas were finalized in 2011 (NCDMF 2011). Analysis used in identifying Strategic Habitat Areas included fish abundance data from the DMF Pamlico Sound Trawl Survey in addition to other model inputs. The spatial data indicated that one group is widely abundant throughout both the sound and the rivers (e.g. Spot, Atlantic Croaker, Southern Flounder, and Weakfish), while the other is abundant only in Pamlico Sound (e.g. Fringed Flounder, Southern Kingfish, Striped Anchovy, Lizardfish, and Brown Shrimp). Although areas of higher fish abundance were included as a target, the majority of Strategic Habitat Areas nominated in Pamlico Sound occurred along the edge of the sound and in the mouths of the rivers because of the greater diversity of shallow productive habitats in those locations that support juvenile fish. These include wetlands, submerged aquatic vegetation, and shell bottom. In contrast, the center of Pamlico Sound had lower habitat diversity and offered minimal structure for the protection of juvenile fish. These results indicated that the edges of Pamlico Sound are principally where benthic habitat and juvenile fish concentrate as compared to the deeper, open water portions of Pamlico Sound.

However, it should be noted that DMF identified during their preliminary 1970s investigations that Weakfish did not adhere to the typical nursery area pattern of other sciaenid species. They found that juveniles preferred open waters for nursery areas in the middle and lower portions of the system, such as shallow bays and channels of moderate depth (Purvis 1975). Analysis of Pamlico Sound Survey data found that sublegal Weakfish were most abundant in the Pamlico Sound Trawl Survey deep east stratum (east of Bluff Shoal, water depth > 12 ft.) (J. Rock, DMF, personal communication 2016).

Alternative Strategies for Habitat Protection

Goal 3 of the CHPP is to enhance and protect habitat from physical impacts and includes recommendations to: protect habitat from fishing gear effects through improved enforcement; expand habitat restoration in accordance with restoration plan goals, including restoring submerged aquatic vegetation habitat and shallow soft bottom nurseries; and, develop coordinated policies including management adaptations and guidelines to increase resiliency of fish habitat to ecosystem changes. Increasing nursery area designations that lead to increased habitat protections could enhance fisheries; however, there are other management strategies such as selective gear restrictions in certain areas as previously discussed in the Critical Habitat Area Concept section.

The effects of trawling on benthic habitat were summarized in two reports: NCDMF (1999) and NCDEQ (2016). Within the scope of these reports, trawling was documented to be more damaging when occurring on structurally complex biotic habitat, such as hard bottom, oyster reefs, or submerged aquatic vegetation. Trawling was documented to be less damaging in sandy shallow soft bottom since the habitat lacks major surface structure, dominated by infauna, and characteristically dynamic. Other studies have been done to assess the effect of trawling in North Carolina and similar environments and found variable effects on turbidity and productivity (Tables 3 and 4). While trawling elevated turbidity, the length of time varied based on wind, currents, water depth, substrate, and trawling frequency. Trawling did not appear to negatively impact productivity of the benthic algae or invertebrates, and in one study resulted in an increase (Deerh 2013). Benthic recovery also varied with environmental factors. In shallow waters such as Pamlico Sound, with an average depth of 12 feet, wind has been shown to cause as much resuspension of sediment as trawling (Cahoon et al. 2002; Corbett et al 2004).

Regional Habitat Management Through Designations

The Petition states in Appendix B, page 12, that *"ASMFC designates all estuaries as Habitat Areas of Particular Concern for Spot and Atlantic Croaker".*

Many important North Carolina species (e.g. Spot, Atlantic Croaker, and Weakfish) are managed by the federal fishery management councils or the ASMFC, and thus it is necessary to understand the federal system of habitat designations. The following discussion does not include federal habitat protection under the Endangered Species Act. Their term of "critical habitat" is applicable only to species listed as endangered or threatened and has specific meaning as defined in the Endangered Species Act. The 1996 amendment to the federal Magnuson-Stevens Act recognized the loss of marine and estuarine habitat as a long-term threat to the viability of U.S. fisheries. It emphasized habitat conservation as an important component of fisheries conservation and management and defined essential fish habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." (Magnuson-Stevens Act 16 U.S.C. 1802 §3(10)). Furthermore, Habitat Area of Particular Concern (HAPC) is a designation for a subset of EFH. Designations do not confer any specific habitat protections, but can focus habitat conservation efforts. The councils have taken diverse approaches to designating HAPCs. The SAFMC designates both habitat types (e.g., submerged aquatic vegetation) and discrete sites of habitat with known boundaries (e.g. the "Point" and "Ten Fathom Ledge") as

HAPCs within its jurisdiction. Others, such as the Gulf and Caribbean Councils, designated discrete areas (MAFMC 2016). Both the Mid-Atlantic Fishery Management Council (MAFMC) and the ASMFC use the more general and broad application of the HAPC terminology by designating habitat types and not discrete sites. NMFS has encouraged the councils to shift HAPC designations from broad habitat types to discrete, geographically defined sites to enhance ability to manage more effectively (SAFMC 2016).

The ASMFC draft "Sciaenid Habitat" source document identifies all estuaries as HAPC for Atlantic Croaker and Spot (although not described for Weakfish) (ASMFC 2016a). The report lists threats to habitat and lists recommendations to improve habitat. In general, the report advocates for each state to implement a protection plan for sciaenid habitat within its jurisdiction to ensure the sustainability of the spawning stock that is produced or resides within its state boundaries. Each program should inventory the historical and present range of these species, specify the habitats that are targeted for restoration, and impose or encourage measures to preserve the quantity and quality of sciaenid habitats. The applicable recommendation for trawling states: "The use of any fishing gear that is determined by management agencies to have a negative impact on sciaenid habitat should be prohibited within habitat areas of particular concern (e.g. trawling in spawning areas or primary nursery areas should be prohibited)." MFC rules prohibit trawling in NC designated Primary Nursery Areas. The report's recommendations also emphasized addressing pollution and destructive or unregulated practices in silviculture, agriculture, or coastal development that contribute to increased turbidity and hypoxia.

Nursery Areas Summary

The main considerations with respect to the Petitioner's proposal regarding nursery area designation are:

- The division and the MFC have in place many measures to protect fishery habitat (Table 1, Figures 2 and 3).
- Broad habitat designations may not maximize the level of protection that may be available from discrete habitat area designations that encourage other natural resource agencies to build upon.
- Although the primary nursery area designation process is already in place, as well as investigations of new Strategic Habitat Areas in accordance with the CHPP, improvements in the overall North Carolina fishery habitat designation process could be made. This could be achieved by designing habitat surveys using the latest ecological techniques, and developing habitat models similar to what has been used in the strategic coastal habitats designation process. DMF could also prioritize the collection and analysis of the inlet system and beach/ocean habitat (0 to 3 miles offshore) and how these areas are used for spawning and larval transport. Due to resource constraints in recent years, data collection and analysis for FMP development has been a higher priority than habitat designation. However, considerable effort has been spent on habitat definition rules, and analyzing data for the strategic coastal habitats in accordance with the CHPP.

CRITERIA FOR OPENING THE SHRIMPING SEASON

Determining a shrimping season through the use of count size may be more appropriate for management of the shrimp fishery in terms of economics – where larger shrimp are more valuable than smaller shrimp; however, it is not necessarily an appropriate measure to reduce bycatch because this measure may or may not reduce the length of a shrimping season. For example, under existing procedures, a warm winter with favorable environmental conditions may lead to an early season opening, while harsh environmental conditions may lead to a later season opening. The Petitioner states that opening the fishery when the shrimp count reaches 60 shrimp per pound (heads-on) would reduce concerns that shrimp are too small or that bycatch is too high when the fishery traditionally opens in the Pamlico Sound in mid-May.

Analysis of DMF Trip Ticket data indicates that a 60-count opening target size for Pamlico Sound may not provide a predictable outcome in delaying the opening of shrimp season. Landings (by count size) in Pamlico Sound indicate that the shrimping season may not close if a proposed 60-count opening target size is established and no consideration of shrimp species is accounted for (see Table 5). Roughly 90 percent or greater of all shrimp (brown, white, pink) harvested in Pamlico Sound are 60 count or larger. Furthermore, only a minimal delay in the opening date would occur if the proposed measures were to include species-specific openings. By May, 52 percent of all brown shrimp landed in Pamlico Sound from 1994-2015 were 56/60 count or bigger, and by June, 95 percent were 56/60 count or bigger (Table 6). The same count size of white shrimp landed ranged from a low of 87 percent in June to a high of 100 percent in January (Table 7). By April, 95 percent of the pink shrimp landed from Pamlico Sound were 56/60 count or bigger (Table 8). While setting species-specific target sizes may or may not delay the opening of the shrimping season, the brown shrimp fishery in the southern portion of the state would likely be delayed as well as the spring shrimp fishery in the Atlantic Ocean.

Enacting a closure until shrimp sizes reach 60-count in Pamlico Sound could also result in "grand openings," where a large number of vessels operate in an area following a closure. Reductions in bycatch may then be offset by "recoupment" from the increased effort once an area is opened.

As proposed, the Petitioner recommends that all areas open once Pamlico Sound Shrimp are 60-count head-on. Based on comments received from the Petitioner, they proposed the use of Pamlico Sound as a "proxy" for other areas to determine coast-wide opening of the shrimp season because the majority of effort occurs in Pamlico Sound. The Shrimp FMP Amendment provides guidance on count sizes for opening shrimping in different areas, especially in the southern and central coast, and is used to manage for economic value of the larger sized shrimp. Under the Petition, DMF would be required to develop new sampling protocols that will likely involve significant effort by the DMF to sample shrimp in Pamlico Sound.

TRAWLING GEAR AND USE IN THE PROPOSED SPECIAL SECONDARY NURSERY AREA

Head-rope Length

The Petitioner interprets Brown (2015) to say that otter trawl headrope length has increased over time. The Petition states that in 2012, the average maximum headrope length was 94 feet and in 2015, this length increased to 134 feet. However, it should be noted that observer coverage during this time was approximately 1.2 percent of the commercial shrimp otter trawl fishery (fishing days) for 2015 and may not provide a true representation of the fishery.

The Shrimp FMP Amendment 1 examined headrope lengths for the years 2010 and 2011 by area, using data from the Commercial Fishing Vessel Registration survey, and found that average total headrope length in Pamlico Sound was 128 feet and 117 feet respectively (Table 9). In the mouths of the Neuse, Pamlico Rivers and in the Bay River, the average total headrope length was 55 feet in 2010 and 52 feet in 2011. Total headrope lengths in Carteret County waterbodies averaged 47 to 46 feet during those same years. South of Carteret County, vessels with average total headrope lengths measuring 40 feet or less made up the majority of the fleet in both years in the ocean, vessels using total headrope lengths less than 120 feet accounted for 44 percent of the fleet in 2010 and 46 percent in 2011. Average total headrope length for skimmer trawlers was less than 50 feet in the Pamlico sound as well as other parts of the state.

North Carolina's headrope regulations were put in place following the 2006 Shrimp FMP as a means to allocate the resource fairly among vessels of all sizes, reduce bycatch, and to limit the effects of trawling in the prescribed areas. Greater headrope length and the use of multiple smaller nets ("double-barrel" and "four-barrels" rigs) allow trawlers to sweep a larger total area per gallon of fuel, resulting in increased catch per unit effort and efficiency (Watson 1984). Currently, there are no data that show that larger headrope lengths yield more bycatch per unit effort. Restricting the total headrope length of otter trawls would essentially restrict the total number of rigs as well as vessel size in most parts of the state (Table 9). It is also important to note that the fishing power, efficiency and selectivity of the gear rely on more than just the length of the headrope. Currently it is unlawful to use shrimp trawls that have a combined headrope greater than 90 feet in internal coastal waters except Pamlico Sound and in the mouths of the Pamlico and Neuse rivers. Through the Shrimp FMP Amendment, the areas of Pamlico Sound and the mouths of the Pamlico and Neuse rivers have a maximum headrope length of 220 feet. This became effective on January 1, 2017 and was implemented to cap the fishing capacity of the fleet. In both South Carolina and Georgia, maximum headrope length is also 220 feet. The Atlantic Ocean of North Carolina has no headrope limits.

Number of Required Bycatch Reduction Devices (BRD)

In 1992, North Carolina became the first state to require a BRD and did so prior to implementation of federal BRD regulations. The Shrimp FMP Amendment adopted the requirement of either a T-90 panel/square mesh tailbag or other applications of square mesh panels (e.g., skylight panel), reduced bar spacing in a TED, or another federal or state certified BRD, in addition to existing TED and BRD requirements in all skimmer and otter trawls. This

was accomplished by proclamation in 2015 (SH-2-2015) and provides the requirement of a second type of BRD but allows flexibility for fishermen to select from a wide variety of state and federally-certified BRDs appropriate for the fishing situation. This also made North Carolina the first state to require two BRDs. Based on characterization data and anecdotal reports from fishermen, most have selected the reduced bar spaced TED or a second fish eye. Based on anecdotal information from fishermen and DMF observations, this second BRD appears to be having noticeable effects on bycatch reduction. However, other factors may be contributing to this reduction in bycatch, including higher concentrations of shrimp.

In accordance with the 2015 Shrimp FMP Amendment, the MFC has formed a BRD Testing/Industry Workgroup made up of fishermen, net makers, and scientists from DMF, National Marine Fisheries Service (NMFS), and NC Sea Grant to develop different BRD gears. During the 2015 shrimping season, preliminary results from this gear testing ranged from 26 to 38 percent reductions in finfish bycatch and in 2016, preliminary results ranged from 24 to 52 percent. The more promising gears and results are summarized in Table 10 along with the amount of shrimp that was either lost or gained during testing. It should be noted that the results shown are based only on one season and additional testing over multiple seasons will be required in the future. The third year of work will entail testing of BRDs on small boats and boats that fish in the ocean.

Limit to Three Days per Week (Internal) and Four Day per Week (Ocean)

Reducing the number of days in a week to fish would reduce shrimp trawling effort (i.e. fewer trips), however, it may be difficult to quantify associated reductions in bycatch. It is possible that recoupment may occur (e.g. increased number of tows during open periods resulting in a minimal reduction of bycatch). The Petitioner correctly points out that it has been observed that the best catches of shrimp are usually immediately after the existing weekend closure (currently in rule). The literature cited by both the Petitioner and the Shrimp FMP Amendment 1 state there are as much as twice as many pounds of shrimp caught early in the five-day trawling week than later in the week (Johnson 2006). This suggests that time restrictions could improve the efficiency of the shrimp fishery. However, reducing allowable days to three per week does not take into account days lost to weather, unfavorable tides, and moon phases. Johnson (2006) further notes that the efficiency of the fishery may be improved by increasing the number of breaks in the week, either by having two one-day closures during the week rather than one two-day closure, or by reducing the number of total days during the week for which trawling is allowed.

The Petition does not address which days of the week to close and stated in their comments that they did not intend to recommend specific days for closure and that decision is best left to the Fisheries Director.

Night-time Restrictions

Life histories of the three shrimp species determine night time or day time shrimping. Brown and Pink Shrimp stay burrowed during the day and are more active at night while White Shrimp tend to be found more in the water column and can be caught during both day and night. Ingraham

(2003), which is cited by the Petitioner, looked at night time versus day time trawling only off the coast of Brunswick County. They found that the catch of shrimp did not vary significantly between day and night, but catch rates of shrimp were generally higher during the day. They also observed that catch rates of Southern Flounder, Spot, Atlantic Croaker, and Southern Kingfish were significantly higher during night trawling. It should also be noted that this is one study in one geographic area, and may not be representative of the fishery across the state. Currently there are other areas in the state that do not allow night time trawling. In New River, night time trawl restrictions from 9:00 PM through 5:00 AM from August 16 through November 30 were put in place due to user conflict and are also in place in the ocean off Brunswick County.

Limit Tow Times

Similar to statements regarding headrope length, the Petitioner interprets Brown (2015) to say that tow times have increased over time. The Petition states that in 2012 average tow times were 100 minutes in Pamlico Sound and in 2015, tow times increased to an average of 181 minutes. It must again be considered that these times are from data collected from less than two percent of the fishery and may not indicate trends in the fishery overall.

Reduced tow times were also considered as a potential management measure in the Shrimp FMP Amendment. Reduced tow times would likely reduce bycatch mortality by reducing contact time with the fishing gear, culling time and exposure on the deck, since total catch per tow will be reduced. However, fish aggregations as well as shrimp aggregations are not uniformly distributed, thus the reductions in catch per unit of effort may be minimal. Johnson (2006) found that tow duration patterns were inconsistent. Short tow times sometimes produced less bycatch and sometimes they produced more bycatch. Decreasing tow times means increasing the time gear is out of the water (increased number of haul backs) which may decrease effort, but some recoupment with additional tows would likely occur. Finally, increased frequency of gear deployment and haul back may result in a greater chance of fouling the gear, as well as increased risks of crew injury from doors and winches. This management option was removed by the Shrimp AC FMP from the overall option list during the development of Amendment 1.

The skimmer trawl fishery is currently under tow time limits instead of TED requirements for sea turtles. Tow times vary by season: 55 minutes from April 1 through October 31 and 75 minutes from November 1 through March 31 (50 CFR 223.206 (d)(2)(ii)(A)). It was found by National Marine Fisheries Service (NMFS) that skimmer trawlers have often been out of compliance with these tow time requirements and therefore a TED requirement for skimmer trawls is now being considered by NMFS. It must also be noted that the tow time requirement proposed by the Petitioner is less than what was federally required of skimmer trawls.

Overall Effect of the Combination of Proposed Rules on Effort

The Shrimp Fishery is the second largest and second most valuable fishery in North Carolina. The combination of management strategies proposed by the Petitioner, including setting the season based on a count size, decreasing headrope length in both the ocean (where there is no headrope length maximum) and the internal coastal waters, and limiting the number of days in combination with limits on time of day and length of tow, has the potential to significantly

reduce the commercial shrimping industry effort. Shrimp are considered an annual crop and are highly influenced by the environment; therefore, shrimp abundance and recruitment to the fishery can be highly variable and differ by species and latitude, making it difficult to estimate total reductions in landings and bycatch.

Given the high variability in the timing and abundance of each of the three species that make up North Carolina's shrimp fishery, it is difficult to accurately predict when the count size would open the season. The Petitioner suggests that based on count sizes in the Pamlico Sound, the fishery would open sometime after mid-May. Recognizing that effort is fairly low from January to May, this potentially reduces the shrimping season by approximately 42 percent.

Currently, fishermen are allowed to shrimp trawl approximately 74 percent of the year in internal coastal waters with the existing weekend trawl closures in place (9:00 PM Friday through 5:00 PM Sunday). If restricted to fishing three days in internal coastal waters (example: Wednesday-Friday), trawling would be limited to approximately 45 percent of the year. Since weekend fishing is allowed in the ocean, a four-day reduction would limit fishing to approximately 57 percent of the year. By incorporating night time restrictions along with limited tow times, the amount of allowable trawling time in both the ocean and internal coastal waters is further reduced. Unfavorable weather, tides, and moon phases lead to additional loses in days fished.

Restricting total headrope length from 220 feet to 110 feet in the ocean would cut the maximum allowable headrope length by 50 percent. Restricting maximum total headrope length from 220 feet to 90 feet in internal coastal waters would reduce maximum allowable headrope length by 59 percent. It is again noted that not all vessels fish the maximum headrope sizes. While it is not possible to estimate the magnitude of what the reduction in fishing effort would be if the proposed rules are implemented, overall effort will be reduced due to a loss of fishing power. However, it is also important to note that reductions in bycatch may be less if crews of larger vessels begin operating multiple smaller vessels, which could not only increase effort (participants and trips), but the total headrope size of the fleet as a whole.

As described in the Social and Economic Impacts Section below, the proposed rules only allow trawling for shrimp and crabs and would therefore also eliminate clam trawling in the estuarine waters and finfish trawling in ocean waters.

MANAGEMENT OF SPOT AND ATLANTIC CROAKER

The Petition states (page 13) *"A size limit will supplement efforts in the commercial fishery to reduce bycatch, preserve habitat, and protect sensitive juvenile finfish populations. Currently, no size limits exist for the possession of Atlantic Croaker or Spot in North Carolina waters."*

Interjurisdictional Fishery Management Plan 2015 Information Update

The management authority for Atlantic Croaker and Spot (as well as Weakfish) is the ASMFC. These species are managed as coast-wide stocks across the Atlantic seaboard and undergo annual migrations. As such, the ASMFC is the appropriate entity and has the authority to implement management measures as needed, including minimum size limits. Each of these species has an

existing FMP developed through the ASMFC. The plans offer a rigorous framework through which stock assessments are conducted and management strategies are developed and implemented. Under each of the current interstate fishery management plans for Spot and Atlantic Croaker, there is no coast-wide minimum size limit for either species. However, Amendment 1 to the Interstate Fishery Management Plan for Atlantic Croaker encouraged states with existing size and creel limits to maintain those regulations (ASMFC 2005).

Bycatch Estimates

While shrimp trawl bycatch is a concern for species of commercial and recreational importance to North Carolina, no estimates of the magnitude of shrimp trawl bycatch occurring in North Carolina currently exist for these species in the peer-reviewed literature. The estimates of shrimp trawl bycatch presented by the Petitioner in Exhibit B have not been validated by DMF, and are based on ratio extrapolation that has been found to be inaccurate in peer-reviewed literature (Diamond 2003; see also NCDMF 2015, which provides a full literature review on quantifying bycatch). Ratios have been shown to overestimate bycatch by as much as two to seven times higher than those based on CPUE estimates (Diamond 2003). The use of ratios also implies that the catch of shrimp and the catch of finfish are correlated, which is rarely true (Nance 1998). Bycatch estimates should not be derived from ratios to estimate the catch of a non-target species when they are not correlated. Bycatch estimates also cannot be applied state-wide because they are spatially and temporally variable. It is also not reasonable to assume that bycatch rates in neighboring areas can give an accurate approximation of an un-sampled area (Alverson et al. 1994; Alverson and Hughes 1996; Diamond-Tissue 1999; Diamond 2003).

Stock Assessment Considerations

The majority of the Petition focuses on declining trends in commercial and recreational landings of Atlantic Croaker, Spot, and Weakfish and negative stock status for these species as reasoning for the Petition. With the exception of Weakfish, these statements are not necessarily supported by the most recent stock assessments (ASMFC 2010, 2015c, 2016). The following is an inclusive accounting of the considerations in the stock status determinations for these three species, from both the North Carolina and regional (ASMFC) perspective.

Spot
Spot is a short-lived species, maturing at age two, with males maturing at 7.9 inches and females maturing at 8.4 inches. A coast-wide stock assessment for Spot has not been completed but is currently underway. Without a valid, peer-reviewed stock assessment, it cannot be determined if the stock is currently "overfished" or experiencing "overfishing." NCDMF lists Spot as a species of concern. This designation was made due to the lack of a stock assessment and declining trends in the fishery based on the Traffic Light Analysis (ASMFC 2014a). This designation was not based on increased effort in the fishery, truncated age distribution (no coast-wide data currently available), or other biotic and abiotic factors. This designation is only applicable to North Carolina and cannot be used to broadly assess the status of the Spot population, that designation can only be accomplished through a stock assessment. Ultimately ASMFC, the management authority for Spot, designates the coast-wide stock status for this species based on results of a completed stock assessment. When the stock assessment is completed ASMFC, and the state of North Carolina, will be able to more accurately designate the status of the Spot stock.

Coast-wide commercial landings of Spot have declined considerably since 1950 (ASMFC 2015b). Commercial landings of Spot in North Carolina have declined since 1994 (Table 11). However, since 2006 landings have remained steady fluctuating between 1,364,743 lbs. and 377,358 lbs. Currently, no single commercial gear accounts for a significant majority of Spot landings in North Carolina. However, long haul seines have traditionally been a high volume Spot fishery. Effort in this fishery has declined dramatically, with just 31 long haul trips landings Spot in 2015 (mean of 372 long haul trips per year from 1994-2015; Table 12). The 31 long haul trips in 2015 landed 51,109 lbs. of Spot (mean of 628,301 lbs. of Spot landed per year from 1994-2015).

Coast-wide recreational landings of spot have declined since 1981 but have been generally consistent since the late 1980s (ASMFC 2015b). Recreational harvest (lbs.) of Spot in North Carolina has fluctuated annually since 1994 with the largest declines in harvest occurring relatively recently (Table 13). Recreational harvest increased from 2012 through 2014 (704,445 lbs.) before declining sharply in 2015 (395,268 lbs.). Over this same time period number of directed Spot trips and recreational discards (number of fish) have fluctuated but not changed drastically.

Addendum I to the Omnibus Amendment for Spot established the Traffic Light approach to evaluate trends in the Spot fishery in years between stock assessments (ASMFC 2014a). Annually, harvest and abundance indices are analyzed; if established thresholds for both the harvest and abundance indices, are exceeded for two consecutive years, management actions are triggered. The extent of management actions is determined based on whether a 30 percent or 60 percent threshold has been exceeded. Because the stock assessment is currently under development, the last Traffic Light update for Spot was for 2014. The harvest index was below the 30 percent threshold in 2013 and 2014 (ASMFC 2015b).

The abundance index was above the 30 percent threshold for the 2013-2014 period. While the abundance index has generally been above 30 percent since 1989, from 2005 through 2012 the index was well below the 30 percent threshold, indicating higher abundance. While the abundance index exceeded the 30 percent for two consecutive years, management action has not been triggered because the harvest index has not reached the 30 percent threshold.

Croaker

Atlantic Croaker is a short-lived species, maturing at age two, with males maturing at 7.25 inches and females maturing at 7.5 inches total length. Atlantic Croaker is not experiencing overfishing (ASMFC 2010, 2015a). Overfished status could not be determined in the most recent ASMFC stock assessment due to uncertainty in the biomass estimates as a result of uncertainty in the shrimp trawl bycatch estimates. The stock assessment does suggest that biomass has been increasing, that age structure has been expanding, and fishing mortality has been decreasing since the late 1980s. Estimated recruitment has been variable, but generally increasing over time. Uncertainty in the shrimp trawl bycatch estimates does introduce uncertainty into the stock status, but the degree of uncertainty is unknown without a reliable estimate of the magnitude of shrimp trawl bycatch. NCDMF lists Atlantic Croaker as a species of concern. This designation was made due to recent declining trends in the fishery based on the Traffic Light Analysis

(ASMFC 2014b). In addition, uncertainty in stock status determination in the most recent stock assessment (2010) contributed to this conservative designation. This designation was not based on increased effort in the fishery, truncated age distribution (see ASMFC 2010) or other biotic and abiotic factors. This designation is only applicable to North Carolina and cannot be used to broadly assess the status of the Atlantic Croaker population, that can only be accomplished through a stock assessment. Ultimately ASMFC, the management authority for Atlantic Croaker, designates the coast-wide stock status for this species based on results of a completed stock assessment. When the stock assessment is completed ASMFC, and the state of North Carolina will be able to more accurately designate the status of the Atlantic Croaker stock.

Coast-wide commercial landings of Atlantic Croaker have fluctuated since 1971 but have been generally declining since the early 2000's (AMFC 2015a). Commercial landings of Atlantic Croaker in North Carolina have been declining since the early 2000's (Table 14). The decline in landings can, in part, be linked to declining effort in the traditionally high volume, flynet fishery. In 1997, 304 flynet trips landed Atlantic Croaker in North Carolina accounting for 6.9 million lbs. (Table 15). From 2011 through 2015 only 76 flynet trips have landed Atlantic Croaker in North Carolina accounting for 1.9 million lbs. The decrease in effort has been attributed to shoaling at Oregon Inlet making it difficult for flynet boats to pass through. While landings of Atlantic Croaker from all gears has declined, landings from the ocean sink net fishery have remained relatively steady since 2006, fluctuating between 1.2 and 4.4 million lbs.

Coast-wide recreational landings of Atlantic Croaker have fluctuated since 1981 but have generally declined since the mid 2000's (ASMFC 2015a). While recreational harvest of Atlantic Croaker in North Carolina has declined since 1994, harvest since 2005 has been relatively steady, fluctuating between 99,298 lbs. and 241,993 lbs. (Table 6). The number of Atlantic Croaker harvested has remained relatively steady since 1998, the number of recreational discards has generally increased since 1995, and the number of directed Atlantic Croaker trips has fluctuated little since 1994.

Exhibit B raises concern over the decline of the commercial and recreational fisheries for Atlantic Croaker in the South Atlantic. A northward shift of the Atlantic Croaker population that has been occurring since at least the 1970s may help partially explain the decline in landings from the southeast (Hare and Able 2007; Nye et al. 2009), with some models predicting the center of the Atlantic Croaker population to shift northward by 50-100 km at current fishing levels (Hare et al. 2010).

Addendum II to Amendment I to the Interstate Fishery Management Plan for Atlantic Croaker established the Traffic Light approach as a means to monitor trends in the Atlantic Croaker fishery in years between stock assessments (ASMFC 2014b). Annually, harvest and adult abundance indices are analyzed. If both indices exceed established thresholds for three consecutive years, management actions are triggered. The extent of management actions is determined based on whether a 30 percent or 60 percent threshold has been exceeded.

Because the stock assessment is currently being developed, the last Traffic Light update for Atlantic Croaker was for 2014. The harvest index was above the 30 percent threshold in 2013 and 2014. While the negative trend in the harvest index is due in part to declining recreational

landings, the decline is largely the result of significant declines in commercial landings in 2013 and 2014. From 1997 through 2010 the harvest index indicated a largely positive trend, and the harvest index did not begin to approach the 30 percent threshold until 2011. The adult abundance index was not above the 30 percent threshold from 2012-2014. Since 2004, the index has been low, only exceeding the 30 percent threshold in 2008. Management triggers have not been tripped because the indexes in both population characteristics (harvest and adult abundance) were not above the 30 percent threshold for the 2012-2014 time period.

Weakfish

Exhibit E uses Weakfish as an example of a collapsed fishery due to overfishing and loss of spawning potential, but also states the scientific evidence of this is lacking. There is no doubt that fishing mortality contributed to the decline of Weakfish stocks in the mid-Atlantic, but it remains unclear if the relative contribution of dead discards from the shrimp trawl fishery are affecting the recovery of the stock. The most recent ASMFC stock assessment reviewed numerous juvenile and adult abundance indices and noted that the stock-recruit relationship for Weakfish was weak due to the fact that young-of-year indices did not show the same decline in abundance as the adult indices (ASMFC 2016b).

Exhibit B makes the argument for growth overfishing of Weakfish based on the truncated age structure seen in the recreational harvest of the species and imply that this is due to high mortality of age-0 and age-1 fish from bycatch in the shrimp trawl fishery. The observed decline in harvest of age-1+ adults in the recreational fishery is more likely to be caused by increased adult and total natural mortality rather than failed recruitment to the fishery (Figure 4). The stock assessment noted that young-of-year indices of Weakfish throughout the Atlantic coast did not show the same declining trend as adult abundance (Figures 5 and 6), suggesting that the stock-recruitment relationship for the species was weak and that mortality on the age-0 fish at current levels is independent of the total stock. Based on the weak stock-recruitment relationship, highlighted in the most recent assessment (ASMFC 2016b), other factors acting on the survival of adult fish (increased natural mortality of age-1+ fish) would most likely lead to the observed age truncation. The weak stock-recruitment relationship observed for weakfish and the consistency in the young-of-the-year indices suggest that dead discards of age-0 Weakfish have not directly contributed to the observed size and age truncation in the recreational fishery. The recent (2016) peer reviewed ASMFC assessment of the Weakfish stock concluded that the stock is depleted, but overfishing is not occurring in the Weakfish stock (ASMFC 2016). The stock has experienced some dramatic declines over the previous decades largely attributed to overfishing and increasing natural mortality. The recent emergence of a Weakfish bottleneck at age 0 is thought to be largely due to enhanced predation by striped bass and spiny dogfish rather than a surge in unreported landings and discards. However, empirical evidence for the increase in natural mortality due to predation is inconclusive and further work on this topic is needed (ASMFC 2016b).

Management of Spot and Atlantic Croaker Summary

It should be noted that the North Carolina Stock Status Report does not assign the status "overfished" or "overfishing" to any stock, only a peer-reviewed stock assessment approved by the NCDMF can provide those designations (for North Carolina-managed species). The 2016

stock assessment update for Summer Flounder concluded that the stock is not overfished but is experiencing overfishing (ASMFC 2015c). The status of Southern Flounder is unknown as the most recent completed assessment was rejected by the NCDMF and a new regional stock assessment is being conducted.

Traditionally, size limits have been used to protect the spawning stock by setting the minimum size larger than the size at sexual maturity. The average size at maturity for male spot is approximately 7.9 inches and the average size at maturity for female spot is 7.5 inches. The length at 50% maturity for male Atlantic Croaker is 7.25 inches and the length at 50% for female Atlantic Croaker is 7.5 inches. The recommendation for instituting or increasing minimum size limits could be beneficial but is ideally better justified when supported by the results of a stock assessment and per-recruit analyses and accomplished through the ASMFC management process, given that both species are coast-wide stocks. No state along the Atlantic coast has a size limit for Spot (Georgia removed their 8" minimum size limit for Spot in 2014), and only Delaware (8"), and Maryland (9") currently have size limits for Atlantic Croaker (Georgia removed their 8" size limit in 2014).

One additional consideration related to new size limits was partially addressed in a modification to the Petition. The originally-proposed size limits could result in increased discards of Spot and Atlantic Croaker from small mesh gill-net, pound net, haul seine and flynet fisheries. For this reason, in the January 12 modification, the Petitioner recommends that the MFC should commission a mesh selectivity study to evaluate mesh sizes that would be most effective at limiting harvest of juvenile Atlantic Croaker and Spot. Even with mesh size modifications, discards will still occur in commercial and recreational fisheries.

The Petitioner stated (page 5) *"Size limits for several species not the subject of a state fishery management plan have been adopted by the MFC*" and gave bluefish as an example. The North Carolina Interjurisdictional FMP, which covers Bluefish along with the several other sciaenid species, is a North Carolina FMP developed in accordance with the N.C. Fisheries Reform Act. The bluefish rule change noted by the Petitioner was made under the North Carolina Interjurisdictional FMP in order to effectively comply with ASMFC actions on Bluefish. Other species, such as sheepshead, that are not subject to a NC FMP have had rules promulgated, but for those species under a FMP rules are considered as a part of implementing the management strategy adopted in each FMP.

For species in the North Carolina Interjurisdictional FMP, proclamation authority is granted in rule 15A NCAC 03M.0512 to the division director, along with a subsequent review by the MFC. It is important to note the required applicable variable condition for a proclamation under the rule is "compliance with a Fishery Management Plan", thus enacted measures are constrained to the South Atlantic, Mid-Atlantic councils or ASMFC compliance purposes. The lowering of the Atlantic Striped Bass quota or the numerous changes to size and bag limits for the Snapper-Grouper complex are examples of this.

Discard Mortality

While discards account for significant mortality in all fisheries (Bellido et al. 2011), and stock assessments will assume 100 percent mortality when estimates are not available, not all fish have 100 percent discard mortality. Coale et al. 1994 found survival of finfish caught in otter trawls ranged from 34 percent for Spot and 63 percent for Atlantic Croaker and overall survival of all finfish was also higher in skimmer trawls. Johnson (2006) found that 78 percent of fish died in trawl nets or subsequent stress on deck. More selective fishing practices can reduce discards by avoiding unwanted catches and maximizing the marketable portion of the catch (Bellido et al. 2011). Therefore, recent innovations in gear development and new BRD requirements have likely reduced discards in the North Carolina shrimp fishery. Alverson and Hughes (1995) noted that the overall consequences of discard mortality are frequently unknown and speculative. For these reasons, Exhibit B would benefit from more extensive data in support of comments made with regard to discard mortality associated with shrimp trawls.

OTHER CONSIDERATIONS

Enforcement

There are two main enforcement concerns related to the Petitioned rules. The first pertains to having two different sets of restrictions for the category of "special secondary nursery areas." The second pertains to enforcing shrimp trawl tow times. Additional concerns include the need for increased Marine Patrol enforcement of proposed nighttime closures and closures due to the potential elimination of certain fisheries, displacing other enforcement efforts.

Because each of the 12 existing SSNAs (that would be exempted from the new requirements) adjoin a proposed new special secondary nursery area that would be subject to the more restrictive harvest practices, there could be an increase in user conflicts. Patrolling these transition zones across the state could be time-consuming and displace other enforcement efforts.

The second main enforcement concern pertains to shrimp trawl tow times. Enforcement of a tow time is extremely difficult without constant marine patrol oversight for the entire duration of a tow or costly vessel monitoring systems. A marine patrol officer must be able to observe when the trawl doors go into the water and observe when the doors are out of the water, as well as determine how long the tow lasts. One officer can only observe one vessel at a time, so it is a labor-intensive process and one where the vessels outnumber the officers.

As written, the Petition's proposal to implement shrimp trawl tow times would be very difficult to enforce. Even if a marine patrol officer is in close proximity to a shrimp trawl while it is in the middle of a tow, it is difficult for the officer to see if the trawl door comes completely out of the water, which determines the stopping point of the time limit. The proposed rule may also need a requirement to empty the contents of the net at the end of the tow in order to clearly distinguish a single tow event.

Tow times in the ocean were enforced from 1996 through 2005 under a now-expired Incidental Take Permit from NMFS issued to the DMF to allow trawlers from Browns Inlet to Rich's Inlet to operate without turtle excluder devices due to the presence of grass (brown algae). This

involved constant monitoring and numerous observers and was very difficult to enforce. Proclamations issued to regulate that permit (such as SH-15-2001) established a tow time definition and required the nets to be emptied in between tows, which were critically important restrictions.

Another component of the enforcement concern about shrimp trawl tow times is the lack of a definition of a start and stop for skimmer trawls. This would be needed to enable monitoring by marine patrol officers. Skimmer trawls do not have doors, but the frames remain in the water at all times. These issues, as well as responding to the anticipated complaints regarding operation of legal tow times, would likely impact the ability of officers to enforce other fishery regulations.

Impacts to Other Rules

One consideration about impacts to other rules is the unintended consequences of proposed changes to 15A NCAC 03N .0105(c), making it unlawful "to use trawl nets" instead of "to take shrimp with trawl nets" in the Petitioned new special secondary nursery areas. Without this important distinction, numerous fisheries would be impacted, resulting in amendments to the concomitant rules and proclamations. As written, the Petitioned rule would not allow trawling for anything other than crabs or shrimp, effectively eliminating clam trawling (kicking) in the mechanical clam harvest areas in estuarine waters and finfish trawling in state ocean waters. In its Jan. 26, 2017 letter to MFC Chairman Sammy Corbett, the Petitioner states it "did not intend to impact activity in other fisheries, including but not limited to the peeler trawling, clam kicking, finfish trawling, and live bait harvest fisheries." This is evident by the proposed amendments that would change 15A NCAC 03L .0103 to restrict headrope length and require the use of two bycatch reduction devices only for taking shrimp with trawls, and not for other types of trawling activities.

The peeler trawl and crab trawl fisheries operate primarily at night, but this activity would be prohibited in areas where it is currently allowed under the proposed nursery area designations. As written, the proposed amendments to 15A NCAC 03N .0105 would subject any remaining effort in these two fisheries to the new requirements of no trawling at night, tow time limits, and trawling only three days per week in estuarine waters and four days per week in the state ocean waters. The harvest of crabs with trawls would also be contingent on opening the shrimp season, which (under the Petition) would require a shrimp count of 60 shrimp per pound, heads-on, in the Pamlico Sound.

Clam trawl harvest (kicking) currently occurs during the winter in specific areas that are open by proclamation, but this would be eliminated in areas where it is currently allowed under the proposed nursery area designations. The proposed rules would only allow shrimp or crab trawling. This would also be the case for finfish trawl fisheries. Finfish trawls such as flynets are allowed in state ocean waters north of Cape Hatteras, while flounder trawls are allowed in state ocean waters. Species targeted with trawls north of Cape Hatteras include croaker, bluefish, menhaden, summer flounder, and striped bass. In addition, trawls targeting striped bass can only fish in state ocean waters since it is unlawful to fish for striped bass in federal waters. Petitioned rules only allow shrimp or crab trawling in all areas not already designated as nursery areas today, so each of these fisheries would be eliminated.

A second consideration about impacts to other rules is the potential effect on rulemaking currently underway by the Marine Fisheries Commission to implement the Permit for Weekend Trawling for Live Shrimp, as authorized by the North Carolina Shrimp Fishery Management Plan Amendment 1. These rules are expected to become effective May 1, 2017. Petitioned rules would require further amendments to be made to 15A NCAC 03J .0104 (Trawl Nets), 03L .0102 (Weekend Shrimping Prohibited), and 03O .0503 (Permit Conditions; Specific) to address the differences in the new requirements under the Petition and make conforming changes. Amendments to 15A NCAC 03J .0104 and 03L .0102 currently underway include exceptions to the weekend closure for trawling for live shrimp. Amendments to 15A NCAC 03O .0503 constrain this exception to 12:00 noon on Saturday. The Petition does not address how the proposed rules will impact the rules to implement the Permit for Weekend Trawling for Live Shrimp, other than stating it did not intend to impact them.

Social and Economic Impacts

The proposed rules have a high probability of having a substantial economic impact on stakeholders affected by the proposed changes. The term "substantial economic impact" is defined in statute as an aggregate financial impact on all persons affected of at least one million dollars ($1,000,000) in a 12-month period. This includes both costs and benefits combined. For example, if a hypothetical project by a municipality is anticipated to result in $800,000 in extra revenue, but cost the municipality $200,000 the aggregate impact is $1,000,000. If rules will have a substantial economic impact, the agency (Marine Fisheries Commission) is required to consider at least two alternative to the proposed rule. As alternatives were not identified by the Petitioner, the burden falls to the agency to develop the alternatives.

In analyzing substantial economic impact, an agency must estimate any additional costs that would be created by implementation of the proposed rule by measuring the incremental difference between the baseline and the future condition expected after implementation of the rule. The analysis needs to include direct costs as well as opportunity costs. Direct costs are expenses associated with production of a good or service. Opportunity costs are the value produced from the next best alternative lost while making a decision; this includes items such as a person's time. Cost estimates must be monetized to the greatest extent possible. Where costs are not monetized, they must be listed and described. Following are general considerations of the costs that would need to be quantified.

Operating and enforcement costs for the division must be considered, such as the cost to the Marine Patrol to monitor tow times and enforce additional closures and modified gear restrictions. This also presents opportunity costs to the Marine Patrol not being able to perform other duties already assigned. Another significant division cost would be the monitoring of shrimp size for the timing to open the shrimp season when a shrimp count of 60 shrimp per pound, heads on, in the Pamlico Sound is reached. Sampling efforts have been proven to be costly, as sampling in the northern district was discontinued due to budget cuts and shifting resources to address the development of fishery management plans.

Costs to commercial fisherman also must be considered and quantified. Additional gear restrictions and modifications will require some commercial fisherman to purchase new gear and/or reconfigure vessels. Examples of this include needing to decrease the overall headrope length. This would decrease the horizontal spread measurement, and the total area swept by each trawl. This would also decrease the average total pounds of shrimp landed on each trawl, and therefore have a negative effect on revenue. Overall loss in gear efficiency from additional restrictions will likely result in a decrease in landings and income. Efficiency losses would also likely increase operating costs such as fuel costs from increased travel time to non-restricted areas, and an increase in the number of haul backs.

Additionally, costs to recreational anglers must be quantified. Recreational Commercial Gear License (RCGL) holders have the potential to be disproportionately affected by additional closure days and nighttime restriction limitations. A RCGL allows for recreational anglers to use limited amounts of specific commercial fishing gear such as trawls for personal consumption or recreational purposes. Additional weekend closures could result in decreased effort by RCGL holders, and in turn result in a reduction of license sales.

As written, the petitioned proposed rules would not allow trawling for anything other than crabs or shrimp, effectively eliminating clam trawling (kicking) in the mechanical clam harvest areas in estuarine waters and finfish trawling in state ocean waters. The following estimations were made using commercial trip ticket data from 2014-2016, while substituting 2015 price data for 2016 preliminary data. Clam trawling accounted for an estimated annual average of 86 directed trips with 21 vessels participating. These participants harvested an average of 5,534 pounds of clams for an estimated value of $45,391 annually. The peeler crab trawling fishery is exclusively a night time fishery, and under the petitioned rules, the fishery would also be eliminated. This would result in an average loss of 1,537 pounds of peeler crabs, 19 directed fishing trips and value estimated to be $4,124 dollars annually. Finfish trawling had six participants total from 2014-2016 that each took an average of four trips annually, accounting for an average of 28,047 pounds of landings at an estimated value of $47,690 dollars annually.

Limitations on the number of days available to all forms of trawling would have a significant impact on the overall landings and revenue available to the commercial fishermen of North Carolina. An annual average of 431 participants were able to take 7,303 trips accounting for 8.8 million pounds of seafood with an estimated value of $18.8 million dollars using trawls for all species combined in all areas within state territorial waters.

Estuarine trawlers averaged 1,075 pounds of landings, and $2,243 of revenue per hour of allowable fishing under current regulations annually. Under the petitioned proposed rules, limiting trawling to three days per week and no night time trawling, trawlers would be reduced from 124 hours per week available for trawling during season, to 36 hours per week. This would result in an estimated loss of 4.9 million pounds of landings, 10.2 million dollars in revenue and 3,974 trips annually.

Ocean trawlers in state territorial waters averaged 290 pounds of landings, and $669 of revenue per hour of allowable fishing under current regulations. Under the petitioned proposed rules, limiting trawling to four days per week and no night time trawling, trawlers would be reduced

from 124 hours per week available for trawling during season, to 48 hours per week. This would result in an estimated loss of 1.2 million pounds of landings, 2.9 million dollars in revenue and 1,146 trips annually.

Losses to the trawling industry would be significant, and would likely result in participants having to exit the fishery. This would result in additional costs to the state in lost license revenue, and further detrimental economic impacts to local communities and other businesses.

The Petition states that commercial and recreational fisheries will benefit if there are increases in the availability of fish for harvest under the proposed rules. According to the petition, this could result from stocks that are currently in a depleted or declining status rebounding as a result of the proposed rules. Based on the proposed rules, there is also an expectation to see an increase in the overall size of shrimp harvested, and therefore an increase in shrimp values. An increase in overall biological productivity, and exploitable biomass may yield greater returns to North Carolina fishermen, but it is difficult to quantify the value of such increases because projection data on stock abundance are not available.

Using simple estimation techniques and broadly looking at the impacted fisheries under the petitioned rules, it is readily apparent that the threshold of one-million dollars ($1,000,000) in a 12-month period will be easily exceeded. This will require a full fiscal analysis of the proposed rules as well as at least two alternatives to the proposed rules. The need for consideration of alternatives may not be identified until after the MFC has voted to deny or grant the rulemaking petition. It is unclear what the impacts to the timeline for rulemaking would be if this occurs. The fiscal analysis must be approved by the Office of State Budget and Management before it is presented to the Marine Fisheries Commission with the proposed rules for approval to begin the rulemaking process.

PETITION FOR RULEMAKING PROCESS

Procedural Requirements for Rulemaking That Results from a Petition for Rulemaking

Under North Carolina General Statute 150B-20(b), the MFC must grant or deny a rulemaking Petition within 120 days after it is submitted. If the rulemaking Petition is granted, the notice of text published in the North Carolina Register may include:

- A statement that the agency is initiating rulemaking as a result of a rulemaking Petition;
- The name of the person who submitted the rulemaking Petition;
- The text of the requested rule change submitted with the Petition; and
- Whether the agency endorses the proposed text.

Each agency must quantify the costs and benefits to all parties of a proposed rule to the greatest extent possible. If a proposed rule has a substantial economic impact, the agency must consider at least two alternatives to the proposed rule. The alternatives may be identified by the agency or by members of the public. Each agency must accept comments on the text of a proposed rule that is published in the North Carolina Register and any fiscal note that has been prepared in

connection with the proposed rule for at least 60 days after the text is published or until the date of any public hearing held on the proposed rule, whichever is longer. The public comment period can be longer than the minimum required period of 60 days.

Each agency shall not adopt a rule until after the public comment period has ended and then has up to 12 months from that end date to adopt a rule. If more than 12 months elapse the process would have to begin again.

Considerations for the Timeline of the Rulemaking Process if the Petition is Granted

If the substantial economic impact threshold of one million dollars in a twelve-month period is exceeded, the agency must consider at least two alternatives to the proposed rules. The need for consideration of alternatives may not be identified until after the MFC has voted to deny or grant the rulemaking Petition. It is unclear what the impacts to the timeline for rulemaking would be if this occurs. Since the MFC has never had a fiscal note for proposed rules with a substantial economic impact before, significant time will be required by division staff to work with the Office of State Budget and Management to obtain an approved fiscal note.

Under North Carolina General Statute 150B-21.4(a), an approved fiscal note is required before publication in the North Carolina Register of proposed text of a permanent rule change that would require the expenditure or distribution of funds subject to the State Budget Act.

Typically, the Marine Fisheries Commission votes on the approved fiscal note and the proposed rules at the same time. If the commission opted to vote on the proposed rules at one meeting and did not vote on the approved fiscal note until a subsequent meeting, the proposed rules would not be allowed to be published in the North Carolina Register until both votes had passed.

LITERATURE CITED

Alverson, D. L. and S. E. Hughes, 1996. Bycatch: from emotion to effective natural resource management. Reviews in Fish Biology and Fisheries 6: 443–462.

Alverson, D.L., M.H. Freeberg, S.A. Murawski and J.G. Pope. 1994. A global assessment of fisheries bycatch and discards. FAO Fisheries Technical Paper. No. 339, Rome, FAO. 233p.

ASMFC (Atlantic States Marine Fisheries Commission). 2005. Amendment 1 to the interstate fishery management for Atlantic Croaker. ASMFC, Arlington, VA. 92 p.

ASMFC (Atlantic States Marine Fisheries Commission). 2010. Atlantic croaker 2010 benchmark stock assessment. ASMFC, Arlington, VA. 366 p.

ASMFC 2011 SEAMAP 2011-2015 Management Plan, US Department of Commerce, National Oceanic and Atmospheric Administration Award No. NA11NMF4350029, p101

ASMFC. 2014a. Addendum I to the omnibus amendment to the interstate fishery management plans for Spanish mackerel, Spot, and Spotted seatrout. ASMFC, Arlington, VA. 7 p.

ASMFC. 2014b. Addendum II to amendment I to the interstate fishery management plan for Atlantic Croaker. ASMFC, Arlington, VA. 7 p.

ASMFC. 2015a. 2015 Review of the Atlantic States Marine Fisheries Commission fishery management plan for Atlantic croaker (*Micropogonias undulatus*)—2014 fishing year. ASMFC, Arlington, VA. 20 p.

ASMFC. 2015b. 2015 Review of the Atlantic States Marine Fisheries Commission fishery management plan for Spot (*Leiostomus xanthurus*) - 2014 fishing year. ASMFC, Arlington, VA. 18 p.

ASMFC. 2015c. 2015 Review of the Atlantic States Marine Fisheries Commission fishery management plan for the 2014 summer flounder fishery—summer flounder (*Paralichthys dentatus*). ASMFC, Arlington, VA. 10 p.

ASMFC 2016a. Atlantic Sciaenid habitats: A review of utilization, threats, and recommendations for conservation, managements and research needs. 132 p.

ASMFC. 2016b. Weakfish benchmark stock assessment and peer review report. ASMFC, Arlington, VA. 263 p.

Beck, M.W., and 12 Others. 2001. The identification, conservation and management of estuarine and marine nurseries for fish and invertebrates. Bioscience 51: 633–641.

Bellido, J. M., Santos, M.B., Pennino, M.G. Valeiras X., and G. J. Pierce. 2011. Fishery Discards and bycatch: solutions for an ecosystem approach to fisheries management? Hydrobiologia 670: 317-333.

Brown, K.B. 2009. Characterization of the near-shore commercial shrimp trawl fishery from Carteret County to Brunswick County, North Carolina Completion report for NOAA award no. NA05NMF4741003 North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, 29p.

Brown, K.B. 2010. Characterization of the inshore commercial shrimp trawl fishery in Pamlico Sound and its tributaries, North Carolina Completion report for NOAA award no. NA05NMF4741003 North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, 28p.

Brown, K.B. 2015. Characterization of the commercial shrimp otter trawl fishery in the estuarine and ocean (0-3 miles) water of North Carolina Completion report for NOAA award no. NA08NMF4740476 and NA13NMF4740243. North Carolina Department of Environment Quality, Division of Marine Fisheries, 177p.

Cahoon, L. B., M.H. Posey, T.D. Alphin, D. Wells, S. Kissling, W. H. Daniels, and J. Hales. 2002. Shrimp and crab trawling impacts on estuarine soft-bottom organisms. UNC-Wilmington, Wilmington, NC.

Corbett, D.R., T. West, L. Clough, and H. Daniels. 2004. Potential Impacts of Bottom Trawling on Water Column Productivity and Sediment Transport Processes. North Carolina Sea Grant Fisheries Resource Grant Program, Project #01-EP-04. 61 pp.

Corbett, D. R., J. P. Walsh, and K. Marciniak. 2009. Temporal and spatial variability of trace metals in sediments of two adjacent tributaries of the Neuse River Estuary, North Carolina, USA. Marine Pollution Bulletin 58(11):1739-1759.

Coale, J. S., R. A. Rulifson, J. D. Murray, and R. Hines. 1994. Comparisons of shrimp catch and bycatch between a skimmer trawl and an otter trawl in the North Carolina inshore shrimp fishery. North American Journal of Fisheries Management 14:751-768.

Dahlgren, C.P., and 8 Others. 2006. Marine nurseries and effective juvenile habitats: Concepts and applications. Mar. Ecol. Prog. Ser. 312: 291–295.

Deaton, A., S. Chappell, and K. West. 2006. Process for identification of Strategic Habitat Areas in coastal North Carolina. North Carolina Division of Marine Fisheries, Morehead City, NC.

Deehr, R.A. 2012. Measuring the ecosystem impacts of commercial shrimp trawling and other fishing gear in Core Sound, NC, using ecological network analysis. Dissertation, East Carolina University. 410 p.

Delapenna, T.M., M.A. Allison, G.A. Gill, R.D. Lehman, and K.W. Warnken. 2006. The impact of shrimp trawling and associated sediment resuspension in mud dominated, shallow estuaries. Estuarine, Coastal and Shelf Science. 69: 519-530.

Diamond-Tissue, S. L. 1999. Characterization and estimation of shrimp trawl bycatch in North Carolina waters. Doctorate dissertation, North Carolina State University, Department of Zoology, Raleigh, NC 27695. 54 p.

Diamond S.L. 2003. Estimation of bycatch in shrimp trawl fisheries: a comparison of estimation methods using field data and simulated data. Fishery Bulletin 101*(*Supplement 3*)*, 484–500.

Grabowski, J. H., A. R. Hughes, D. L. Kimbro, and M. A. Dolan. 2005. How habitat setting influences restored oyster reef communities. Ecology 86(7):1926-1935.

Gunnell, J.R., A.B. Rodriguez, and B.A. McKee. 2013. How a marsh is built from the bottom up. Geology. 41(8):859-862.

Hare, J.A., and K.W. Able. 2007. Mechanistic links between climate and fisheries along the east coast of the United States: explaining population outbursts of Atlantic Croaker (*Micropogonias undulatus*). Fisheries Oceanography 16(1):31-45.

Hare, J.A., M.A. Alexander, M.J. Fogarty, E.H. Williams, and J.D. Scott. 2010. Forecasting the dynamics of a coastal fishery species using a coupled climate-population model. Ecological Applications 20(2):452-464.

Ingraham, B. 2003. Night Vs. Day Bycatch Comparison for Shrimp Trawling in the Southern District of North Carolina. North Carolina Fisheries Resource Grant. FRG-98-FEG-46.

Johnson, G. A. 2003. The role of trawl discards in sustaining blue crab populations. North Carolina Fisheries Resource Grant. FRG-99-EP-07.

Johnson, G. A. 2006. Multispecies interactions in a fishery ecosystem and implications for fisheries management: the impacts of the estuarine shrimp trawl fishery in North Carolina. Dissertation. University of North Carolina at Chapel Hill, Department of Marine Science. 159pp.

Lehnert, R. L., and D. M. Allen. 2002. Nekton use of subtidal oyster shell habitat in a southeastern U.S. estuary. Estuaries 25(5):1015-1024.

MAFMC (Mid-Atlantic Fisheries Management Council) 2016. Regional use of the Habitat Area of Particular Concern Designation. Prepared by the Fisheries Leadership and Sustainability Forum for the MAFMC. 48p.

Nance, J. M. (Editor). 1998. Report to Congress. Southeastern United States Shrimp Trawl Bycatch Program, 154p.

Noble, E. B., and R. J. Monroe. 1991. Classification of Pamlico Sound nursery areas: recommendations for critical habitat criteria. North Carolina Department of Environment, Health, and Natural Resources, A/P Project No. 89-09, Morehead City, North Carolina

NCDEQ (North Carolina Department of Environmental Quality) 2016. North Carolina Coastal Habitat Protection Plan Source Document. Morehead City, NC. Division of Marine Fisheries. 475 p.

NCDMF (North Carolina Division of Marine Fisheries) 1978. North Carolina Division of Marine Fisheries shrimp management policy. 7 p.

NCDMF (North Carolina Division of Marine Fisheries) 1981. Report of the Committee on Critical Fishery Habitats. Prepared by S.W. Ross, M.G. Allison, D.W. Crocker, and J.H. Hawkins for the NCDMF. 9 p.

NCDMF (North Carolina Division of Marine Fisheries) 1999. Shrimp and crab trawling in North Carolina's estuarine waters. Report to NC Marine Fisheries Commission. DENR, Morehead City, NC.

NCDMF (North Carolina Division of Marine Fisheries). 2015. North Carolina shrimp fishery management plan amendment 1. North Carolina Department of Environmental Quality. Morehead City, N.C. 519 p.

Nye, J.A., J.S. Link, J.A. Hare, and W.J. Overholtz. 2009. Changing spatial distribution of fish stocks in relation to climate and population size on the Northeast United States continental shelf. Marine Ecology Progress Series 393:111–129.

Peterson 2003. A conceptual view of environment-habitat-production linkages in tidal river estuaries. Reviews in Fisheries Science. 11(4) 291-313.

Purvis, C. 1976. Nursery area survey of northern Pamlico Sound and tributaries. Completion Report for Project No. 2-230-R. 66 p.Ross, S. W., and S. P. Epperly. 1985. Utilization of shallow estuarine nursery areas by fishes in Pamlico Sound and adjacent tributaries, North Carolina. Pages 207-229 *in* A. Yanez-Arancibia, editor. Fish Community Ecology in Estuaries and Coastal Lagoons: Towards an Ecosystem Integration. UNAM Press, Mexico.

Ross, S. W. 2003. The relative value of different estuarine nursery areas in North Carolina for transient juvenile marine fishes. Fishery Bulletin 101:384-404.

SAFMC (South Atlantic Fishery Management Council) 2016. Users guide to Essential Fish Habitat designations by the South Atlantic Fishery Management Council. Final November 2016. 22 p.

Schoellhamer, D.H. 1996. Anthropogenic sediment resuspension mechanisms in a shallow microtidal estuary. Estuarine, Coastal and Shelf Science. 43: 533-548.Spitsbergen, D. and M. Wolff. 1974. Survey of nursery areas in western Pamlico Sound. Completion Report for Project No. 2-175-R. 83 p.

Street and Noble. 1989. Nursery areas. Prepared for the Albemarle-Pamlico Estuarine Study Status and Trends Report. NCDEHNR. 25p.

Street, M. W., A. S. Deaton, W. S. Chappell, and P. D. Mooreside. 2005. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC.

Van Dolah, R. F., P. H. Wendt, and M. V. Levisen. 1991. A study of the effects of shrimp trawling on benthic communities in two South Carolina sounds. Fisheries Research 12:139-156.

Warnken, K.W., G.A. Gill, T.M. Dellapenna, R.D. Lehman, D.E. Harper, and M.A. Allison. 2003. The effects of shrimp trawling on sediment oxygen consumption and the fluxes of trace metals and nutrients from estuarine sediments. Estuarine Coastal and Shelf Science. 57:25-42.

Watson, J. W. 1984. *Configurations and relative efficiencies of shrimp trawls employed in southeastern United States waters*. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Walters, C.J., and S.J. D. Martell. 2004. Fisheries Ecology and Management. Princeton University Press. 448 pp.

Wolff, M. 1976. Nursery area survey of the Outer Banks region. Completion Report for Project No. 2-222-R. 53 p.

TABLES

Table 1 Overview of North Carolina Fishery Habitat Actions by Year, 1970-2015.

YEAR	ENTITY	ACTION
1970-1976	NCDMF	Trawl and seine surveys to inventory the estuarine resources (Program 120)
1977	NCMFC	Rule adopted defining nursery areas (primary-PNA and secondary-SNA); only primary delineated and designated; Bottom disturbing gear not allowed
1978-current	NCDMF	Proclamations for shrimp trawling not allowed in SNA; Periodically add Program 120 sampling stations to evaluate juvenile abundance for nursery consideration
1981	NCDMF	Critical Habitat Committee formed; Recommendation to broaden critical habitat framework to include specific designations such as anadromous fish spawning areas, and general designations such as SAV beds, shellfish beds, fish productivity areas, anadromous fish nursery areas
1986	NCMFC	Rule adopted for Secondary and Special Secondary (SSNA) to delineate and designate; Rule adopted to not allow trawling year round SNA and seasonal for SSNA
1987	NCDMF	Pamlico Sound Trawl Survey (Program 195) initiated
1987	NCMFC	Rule adopted to not allow trawling in Albemarle Sound
1987-1989	NCDMF	Additional Program 120 sampling in likely Inland nursery areas; Report to NCWR on nomination 10,386 acres of the Inland Waters for primary nursery area designation.
1989	NCDMF	Rule adopted for 1st Trawl Net Prohibited (Cape Lookout Bight area)
1990	NCWRC	Rules adopted to delineate and designate Inland Primary Nursery Areas (IPNA) and established
1990	NCDMF	Division begins Shellfish Mapping Program
1991	NCDMF	Albemarle Pamlico Estuarine Study Report #89-09 on Pamlico Sound Nursery Areas; Recommendations for Critical Habitat Criteria
1991	NCDMF	Formalize PNA sampling and analysis protocol for new designations
1993	NCDMF	Report to NCMFC on inside waters shrimp and crab trawling
1994	NCMFC	Rules adopted: prohibit trawling in SAV beds; additional 23 Trawl Net Prohibited areas; and established definition of critical habitat areas
1997	General Assembly	Fisheries Reform Act passed (G. S. 143B-279.8), requires Coastal Habitat Plan and Fishery Management Plans (FMPs); FMPs contain environmental and habitat sections
1999	NCDMF	Report to NCMFC on shrimp trawling habitat impacts including request to General Assembly for funds for area comparison study
2002	NCDMF	Updated PNA sampling and analysis protocol for new designations
2005,2010	NCDMF	Initial and 2nd Coastal Habitat Protection Plan adopted by three DEQ commissions
2006	NCMFC	With adoption of the Shrimp FMP rule adopted prohibiting shrimp trawls in southern flounder areas in upper Pamlico, Neuse and Pungo rivers
2006-2008	NCDMF	Process for Identification of Strategic Habitat Areas in Coastal North Carolina report issued.; Region 1 SHAs nominated in 2009
2007	NCMFC	Rule established Anadromous Fish Spawning areas
2008	NCDMF	SAV Mapping Inventory (1981-2008) for APE (SAV) Mapping Partnership
2008	NCDMF	Biological Review Team Habitat Subcommittee implements additional biotic elements collected in all DMF fishery independent surveys
2011	NCDMF	Updated Process for Identification of Strategic Habitat Areas in Coastal North Carolina report; Region 2 SHAs nominated
2012-2016	DENR	Guidance to DENR regulatory and review agencies on identification of Submerged Aquatic Vegetation (SAV) habitat and how to take this resource into account in the permit review process; SAV remapped by SAV Partnership, including DMF
2014	NCDMF	Region 3 SHAs nominated
2017-2018	NCDMF	Pilot study sampling in SHAs to occur

Table 2. Designated areas protected from trawling in coastal and joint waters. Acres of nursery area designations are included in the totals for shrimp trawl net prohibited and managed acres.

Designation	Acreage	Percent
Fisheries Nursery Areas		
Primary Nursery Areas	76,927	3.5
Permanent Secondary Nursery Areas	47,462	2.1
Special Secondary Nursery Areas	37,441	1.7
Total	161,830	7.3
Shrimp Trawl Net Prohibited Areas (permanent closure)[1]		
Estuarine Waters	999,470	45.0
Ocean Waters	59,225	9.4
Total	1,058,695	54.4
Shrimp Trawl Net Managed Areas (seasonal openings determined by management)[2]		
Estuarine Waters	65,128	2.9
Ocean Waters	86,174	13.7
Total	151,302	16.6

[1] Includes Primary and Secondary Nursery Areas, Oyster Sanctuaries, Trawl Net Prohibited Areas, and Military Danger and Prohibited Zones

[2] Includes Special Secondary Nursery Areas, Crab Spawning Sanctuaries, Designated Pot Areas, No Trawl Net Areas, and areas managed by proclamation

Table 3. Study conclusions related to sedimentation and trawling effects (TSS = Total Suspended Solids)

Reference	State	Waterbody Location	Objectives	Findings
Corbett et al. 2004	NC	South Creek (Pamlico River tributary)	Examined effect of experimental crab trawling on sedimentation, turbidity, and productivity (before/after comparisons)	• TSS concentrations increased 1-3X but were at pre-trawl levels by next day (did not sample in shorter time increments); • TSS dispersed when winds and currents high, redeposited quickly in same area when low and some salinity. • Concluded trawling had limited impact on sediment dynamics.
Corbett et al. 2009	NC	Slocum and Hancock creeks (Neuse tributaries)	Determined rate and timing of sedimentation	• Slocum and Hancock were indicated to be retaining moderate-high sedimentation • Source was development of Cherry Point Marine Corps Base and wastewater discharge • Neuse mainstem was indicated to have low sedimentation rates and contamination due to higher energy of system flushing sediment out.
Gunnell et al. 2013	NC	Upper Newport River	Determined rate, timing, and source of sedimentation	• Found sharp increase in sedimentation ~ 1964 and remained about the same • Sedimentation rate as high 0.58-0.97 cm/yr • Attributed to land clearing and ditching from forestry • Shallow shoal got shallower, and then starts supporting marsh which accelerates sedimentation.
Delapenna et al. 2006	TX	Trinity Bay (upper Galveston Bay)	Examined effect of shrimp trawling on bottom substrate, resuspension, turbidity and deposition.	• Trawl doors cut into bottom approx. 1.5 cm • TSS concentrations increased more than 2X • Redeposited as flocculants within 14 min., then dispersed by bottom currents • Concluded that based on the extent of trawling and resuspension in the bay TSS load from trawling was ~200% of what was transported into the bay from the upstream river.
Schoellhamer 1996	FL	Hillsborough Bay, (upper Tampa Bay)	Compared effect of trawling and vessel wakes on resuspension and transport of sediment	• Suspended sediment increased similarly from trawl passes and large vessel wakes • Sediment plumes persisted more than 8 hours • TSS transported up and downstream with some settling (~ half in one tide cycle) • Amount flushed vs settled depended on currents, sediment type, wind • Once suspended and redeposited as flocculants, sediment was more easily resuspended • Trawls & vessels had larger effect than wind

Table 4. Study conclusions related to trawling effects on productivity

Reference	State	Waterbody Location	Objectives	Findings
Cahoon et al. 2002	NC	Rose Bay, Pungo Creek, South Creek	Compared change in primary and secondary production before and after experimental trawling	• Trawling resulted in no significant difference in benthic microalgae; • inconsistent difference with meiofauna (nematodes); • no significant difference with macrofauna
Corbett et al. 2004	NC	South Creek	Examined effect of trawling on primary production by comparing nutrient and chlorophyll a levels before and after experimental crab trawling.	• Trawling increased nutrients but not significantly higher, for less than 24 hr • Concluded trawling didn't significantly increase nutrient loading • Effect will vary based on magnitude of disturbance, hydrologic conditions, wind.
Deerh 2013	NC	Core Sound vs. Jarrett, Nelson, and Thoroughfare Bays	Compared biomass of macroinvertebrates, meiofauna, and zooplankton in waters open to trawling in all seasons to waters open in the fall season only and looked at effect of trawling on trophic structure of the system.	• Open areas of Core Sound had significantly lower abundance of total meiofauna (nematodes) but significantly higher abundance of total macroinvertebrates (deposit feeding polychaetes) • Indicates no negative impact to benthic community from trawling • Large positive impact on crabs.
Van Dolah 1991	SC	Port Royal and St Helena Sounds	Compared change in secondary productivity (benthic invertebrates) before and after 5 months of trawling	• Trawled areas showed no significant change in abundance, diversity, composition of benthic organisms
Warnken et al 2003	TX	Galveston Bay	Examined bottom pre and post trawling to determine the effects of trawling on sediment oxygen consumption and flux of nutrients and trace metals between sediment and water.	• Trawling reduced the depth of oxygenated sediment by resuspending surface sediments and some trace metals and ammonium, but no change to oxygen • Effect was less when sediment redox conditions were low initially (note: deeper oxygenated sediment/sediment oxygen consumption= higher dissolved oxygen and better conditions for benthic community) • No significant change in abundance, diversity, composition of benthic macrofaunal abundance.

Table 5. Monthly shrimp* (all species) landings and trips by size for Pamlico Sound, 1994-2015. *Does not include live/bait shrimp (number/dozen).

All Species	Month																									
	1		2		3		4		5		6		7		8		9		10		11		12		Total	
Size	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%
0/15	16,988	35.2	854	8.5	89	4.4	648	1.9	13,321	3.2	77,458	3.3	3,061,672	11.1	7,158,976	30.5	3,245,806	28.4	4,750,376	40.8	2,369,011	49.2	212,549	48.2	20,907,749	25.4
16/20	5,175	10.7	2,307	23.1	774	38.5	1,064	3.2	58,519	14.2	262,518	11.2	7,461,671	27.1	8,260,325	35.1	2,599,565	22.8	2,310,767	19.8	690,220	14.3	63,389	14.4	21,716,294	26.4
21/25	17,099	35.4	6,311	63.1	295	14.7	2,717	8.1	79,202	19.2	484,069	20.6	8,217,683	29.8	3,944,475	16.8	2,145,877	18.8	1,777,708	15.3	638,042	13.2	95,751	21.7	17,409,230	21.2
26/30	1,395	2.9	78	0.8	1	<0.1	5,113	15.2	93,225	22.6	545,250	23.2	4,973,122	18.1	1,688,741	7.2	912,582	8.0	437,025	3.8	128,741	2.7	8,920	2.0	8,794,194	10.7
31/35	4,416	9.1	275	2.8	162	8.1	6,492	19.3	64,546	15.7	278,068	11.8	1,258,997	4.6	491,852	2.1	742,568	6.5	924,798	7.9	436,873	9.1	28,081	6.4	4,237,127	5.2
36/40	1,756	3.6	51	0.5			6,469	19.3	41,528	10.1	340,845	14.5	1,275,412	4.6	591,198	2.5	761,373	6.7	705,102	6.1	292,851	6.1	15,925	3.6	4,032,509	4.9
41/45	816	1.7			438	21.8	3,237	9.6	7,540	1.8	93,762	4.0	119,993	0.4	176,394	0.8	345,036	3.0	287,006	2.5	140,381	2.9	6,258	1.4	1,180,860	1.4
46/50	5	<0.1			33	1.6	3,666	10.9	9,599	2.3	88,529	3.8	170,885	0.6	86,795	0.4	132,489	1.2	106,013	0.9	18,425	0.4	1,380	0.3	617,820	0.8
51/55							797	2.4	339	0.1	12,358	0.5	13,076	<0.1	15,993	0.1	20,287	0.2	9,503	0.1	1,638	<0.1	134	<0.1	74,124	0.1
56/60							232	0.7	2,488	0.6	21,076	0.9	20,519	0.1	23,663	0.1	30,238	0.3	11,221	0.1	2,516	0.1	263	0.1	112,216	0.1
60/70									1,959	0.5	14,156	0.6	7,371	<0.1	10,507	<0.1	20,571	0.2	4,783	<0.1	1,813	<0.1	339	0.1	61,498	0.1
70/80											1,950	0.1	2,845	<0.1	3,697	<0.1	6,433	0.1	881	<0.1	596	<0.1	94	<0.1	16,496	<0.1
80+									11	0.0	1,463	0.1	9,045	<0.1	6,562	<0.1	7,214	0.1	7,199	0.1	93	<0.1	16	<0.1	31,603	<0.1
MIXED	672	1.4	126	1.3	220	10.9	3,135	9.3	39,402	9.6	125,804	5.4	958,718	3.5	1,044,876	4.4	453,753	4.0	315,390	2.7	95,468	2.0	7,762	1.8	3,045,327	3.7
Total	48,321	0.1	10,002	<0.1	2,013	<0.1	33,570	<0.1	411,679	0.5	2,347,306	2.9	27,551,008	33.5	23,504,052	28.6	11,423,791	13.9	11,647,772	14.2	4,816,669	5.9	440,861	0.5	82,237,044	
Size ≥ 56/60	47,649	98.6	9,877	98.7	1,792	89.0	30,435	90.7	370,307	90.0	2,203,933	93.9	26,573,030	96.5	22,438,411	95.5	10,935,820	95.7	11,319,519	97.2	4,718,699	98.0	432,651	98.1	79,082,121	96.2
Size ≥ 60/70	47,649	98.6	9,877	98.7	1,792	89.0	30,435	90.7	372,266	90.4	2,218,089	94.5	26,580,400	96.5	22,448,917	95.5	10,956,391	95.9	11,324,301	97.2	4,720,512	98.0	432,990	98.2	79,143,619	70.8

Table 6. Monthly brown shrimp* landings and trips by size for Pamlico Sound, 1994-2015. *Does not include live/bait shrimp (number/dozen).

Brown Shrimp	Month																													
	1		2		3		4		5		6		7		8		9		10		11		12		Total					
Size	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%				
0/15										0.0	23,275	2.3	2,739,682	11.8	5,890,906	31.9	1,645,421	34.9	562,875	44.0	79,625	49.4	6,263	53.7	10,948,047	22.4				
16/20									3,123	16.3	72,436	7.1	6,682,595	28.8	6,875,050	37.2	1,275,097	27.0	304,779	23.8	27,125	16.8	1,633	14.0	15,241,837	31.2				
21/25					273	100.0					181,267	17.9	6,688,592	28.9	2,750,898	14.9	643,822	13.7	114,587	9.0	19,264	11.9	1,230	10.6	10,399,932	21.3				
26/30									1,884	9.9	249,333	24.6	4,417,103	19.1	1,490,067	8.1	458,996	9.7	115,842	9.1	14,251	8.8	1,079	9.3	6,748,554	13.8				
31/35									981	5.1	120,196	11.9	739,386	3.2	154,944	0.8	68,404	1.5	21,526	1.7	11,136	6.9			1,116,573	2.3				
36/40									1,143	6.0	207,876	20.5	943,251	4.1	377,932	2.0	305,316	6.5	68,554	5.4	7,498	4.7	804	6.9	1,912,374	3.9				
41/45									66	0.3	37,928	3.7	64,304	0.3	82,750	0.4	50,056	1.1	10,907	0.9	251	0.2			246,262	0.5				
46/50									1,510	7.9	43,399	4.3	127,043	0.5	45,143	0.2	28,397	0.6	10,518	0.8	904	0.6			256,914	0.5				
51/55											5,454	0.5	8,650	<0.1	5,384	<0.1	3,104	0.1	1,296	0.1	40	<0.1			23,928	<0.1				
56/60									1,136	5.9	9,949	1.0	14,531	0.1	7,591	<0.1	4,281	0.1	845	0.1	48	<0.1			38,381	0.1				
60/70											6,418	0.6	4,050	<0.1	2,173	<0.1	6,339	0.1	148	<0.1					19,127	<0.1				
70/80											4	<0.1	1,058	<0.1	283	<0.1	528	<0.1	41	<0.1	14	<0.1			1,928	<0.1				
80+											4	<0.1	7,934	<0.1	5,329	<0.1	1,019	<0.1	544	<0.1					14,830	<0.1				
MIXED									9,271	48.5	56,438	5.6	730,718	3.2	800,570	4.3	225,791	4.8	66,349	5.2	1,067	0.7	650	5.6	1,890,854	3.9				
Total					273	<0.1			19,114	<0.1	1,013,976	2.1	23,168,896	47.4	18,489,018	37.8	4,716,571	9.7	1,278,811	2.6	161,224	0.3	11,658	<0.1	48,859,542					
Size ≥ 56/60					273	100.0			9,843	51.5	951,112	93.8	22,425,137	96.8	17,680,664	95.6	4,482,894	95.0	1,211,728	94.8	160,143	99.3	11,008	94.4	46,932,803	96.1				
Size ≥ 60/70					273	100.0			9,843	51.5	957,530	94.4	22,429,187	96.8	17,682,836	95.6	4,489,233	95.2	1,211,876	94.8	160,143	99.3	11,008	94.4	46,951,930	96.1				

Table 7. Monthly white shrimp* landings and trips by size for Pamlico Sound, 1994-2015. *Does not include live/bait shrimp (number/dozen).

White Shrimp	Month																									
	1		2		3		4		5		6		7		8		9		10		11		12		Total	
Size	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%
0/15	15,493	43.4	131	98.7			103	20.1	209	100.0	10,208	65.9	7,062	22.4	36,455	16.1	669,981	21.3	3,136,115	44.5	1,826,022	55.7	170,825	53.8	5,872,604	41.7
16/20	4,615	12.9									777	5.0	507	1.6	40,555	17.9	727,041	23.1	1,550,635	22.0	537,116	16.4	45,635	14.4	2,906,881	20.6
21/25	9,096	25.5					390	76.0			1,510	9.8	6,001	19.0	40,614	18.0	834,828	26.6	1,115,585	15.8	411,283	12.5	56,168	17.7	2,475,474	17.6
26/30	1,303	3.6			1	5.3	20	3.9			858	5.5	1,727	5.5	14,079	6.2	198,856	6.3	188,949	2.7	63,109	1.9	3,801	1.2	472,703	3.4
31/35	3,006	8.4									70	0.5	7,607	24.1	45,024	19.9	366,092	11.6	541,674	7.7	241,024	7.3	22,772	7.2	1,227,269	8.7
36/40	1,325	3.7									89	0.6	4,347	13.8	14,438	6.4	98,561	3.1	197,914	2.8	59,825	1.8	8,583	2.7	385,081	2.7
41/45	816	2.3											1,657	5.2	8,434	3.7	111,561	3.5	116,931	1.7	70,053	2.1	4,566	1.4	314,018	2.2
46/50													112	0.4	4,952	2.2	17,300	0.6	23,771	0.3	7,567	0.2	667	0.2	54,369	0.4
51/55															294	0.1	3,326	0.1	1,612	<0.1	572	<0.1	114	<0.1	5,918	<0.1
56/60													845	2.7	2,886	1.3	5,618	0.2	3,430	<0.1	1,355	<0.1	80	<0.1	14,214	0.1
60/70															62	<0.1	1,859	0.1	800	<0.1	1,208	<0.1	224	0.1	4,152	<0.1
70/80															786	0.3		<0.1	121	<0.1	459	<0.1	52	<0.1	1,418	<0.1
80+															29	<0.1	1,568	0.0	2,489	<0.1	37	<0.1	10	<0.1	4,133	<0.1
MIXED	78	0.2	2	1.3	18	94.7					1,971	12.7	1,725	5.5	17,384	7.7	105,983	3.4	165,732	2.4	60,187	1.8	4,315	1.4	357,395	2.5
Total	35,734	0.3	133	0.0	19	0.0	513	0.0	209	0.0	15,483	0.1	31,590	0.2	225,992	1.6	3,142,573	22.3	7,045,758	50.0	3,279,817	23.3	317,812	2.3	14,095,631	
Size ≥ 56/60	35,656	99.8	131	98.7	1	5.3	513	100.0	209	100.0	13,512	87.3	29,865	94.5	207,731	91.9	3,033,163	96.5	6,876,617	97.6	3,217,925	98.1	313,211	98.6	13,728,533	97.4
Size ≥ 60/70	35,656	99.8	131	98.7	1	5.3	513	100.0	209	100.0	13,512	87.3	29,865	94.5	207,793	91.9	3,035,021	96.6	6,877,417	97.6	3,219,133	98.1	313,435	98.6	13,732,685	97.4

Table 8. Monthly pink shrimp landings and trips by size for Pamlico Sound, 1994-2015.

Pink Shrimp	Month																									
	1		2		3		4		5		6		7		8		9		10		11		12		Total	
Size	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%
0/15									5,892	2.5	40,620	5.2	218	0.1	534	3.8	776	9.4	11,498	20.8	645	4.7			60,182	4.2
16/20							1,053	6.2	51,243	21.4	174,945	22.2	46,985	14.9	3,846	27.3	491	6.0	9,990	18.0	100	0.7			288,654	19.9
21/25							2,327	13.8	65,151	27.2	212,865	27.1	69,881	22.2	5,201	37.0	197	2.4	11,115	20.1	200	1.5			366,936	25.3
26/30	22	10.8					3,375	20.0	56,525	23.6	189,408	24.1	120,233	38.2	818	5.8	985	12.0	8,483	15.3	2,404	17.4			382,253	26.4
31/35			36	87.8			4,387	26.0	22,803	9.5	44,564	5.7	33,184	10.6	2,415	17.2	3,285	39.9	3,717	6.7	9,520	69.1			123,911	8.5
36/40							2,486	14.7	18,578	7.7	62,810	8.0	24,823	7.9	496	3.5	1,000	12.1	7,877	14.2	300	2.2	414	100.0	118,784	8.2
41/45					123	67.6	1,290	7.6	3,296	1.4	11,436	1.5	887	0.3	436	3.1	970	11.8	1,723	3.1	583	4.2			20,745	1.4
46/50					33	18.1	1,038	6.2	3,390	1.4	22,282	2.8	3,152	1.0	22	0.2	52	0.6	261	0.5					30,230	2.1
51/55							488	2.9	274	0.1	1,597	0.2	339	0.1		0.0	400	4.9	615	1.1					3,713	0.3
56/60							232	1.4	384	0.2	5,476	0.7	169	0.1	295	2.1	80	1.0	60	0.1					6,696	0.5
60/70											697	0.1	224	0.1					65	0.1	14	0.1			1,000	0.1
70/80													6	0.0											6	<0.1
80+																										<0.1
MIXED	181	89.2	5	12.2	26	14.3	202	1.2	12,373	5.2	19,934	2.5	14,267	4.5							18	0.1			47,006	3.2
Total	203	<0.1	41	<0.1	182	<0.1	16,878	1.2	239,909	16.5	786,634	54.2	314,368	21.7	14,064	1.0	8,236	0.6	55,405	3.8	13,784	1.0	414	<0.1	1,450,117	
Size ≥ 56/60	22	10.8	36	87.8	156	85.7	16,676	98.8	227,536	94.8	766,003	97.4	299,871	95.4	14,064	100.0	8,236	100.0	55,340	99.9	13,752	99.8	414	100.0	1,402,105	96.7
Size ≥ 60/70	22	10.8	36	87.8	156	85.7	16,676	98.8	227,536	94.8	766,700	97.5	300,095	95.5	14,064	100.0	8,236	100.0	55,405	100.0	13,766	99.9	414	100.0	1,403,105	96.8

Table 9. North Carolina vessel and shrimp trawl configuration by area and year, 2010-2011.

Year	Trawl Type	Area Fished	Total Shrimp	Trips	Average Shrimp	Vessels	Vessel Length		Total Headrope Length		Single Rig		Double-Barrel Rig		Four-Barrel Rig	
							Average	Mode	Average	Mode						
			lbs	#	(lbs/trip)	#	ft	ft	ft	ft	#	%	#	%	#	%
2010	Otter	Pamlico Sound	3,837,201	1,656	2,317	220	53	36	128	180	31	14%	71	32%	118	54%
2011	Otter	Pamlico Sound	3,633,502	1,502	2,419	201	49	36	117	70	37	18%	71	35%	93	46%
2010	Otter	Neuse, Pamlico, Bay Rivers	114,871	377	305	58	31	20	55	80	22	38%	33	57%	3	5%
2011	Otter	Neuse, Pamlico, Bay Rivers	104,743	446	235	49	30	19	52	30	21	43%	25	51%	3	6%
2010	Otter	Bogue/Core/ Newport/North River	110,046	553	199	67	29	22	47	15	30	45%	35	52%	2	3%
2011	Otter	Bogue/Core/ Newport/North River	34,584	166	208	43	28	21	46	15	21	49%	22	51%	0	0%
2010	Otter	Southern	216,110	1,394	155	103	22	17	38	35	92	89%	7	7%	4	4%
2011	Otter	Southern	114,799	945	121	65	23	19	39	30	55	85%	9	14%	1	2%
2010	Otter	Ocean	1,253,754	1,623	772	116	51	55	120	160	23	20%	38	33%	55	47%
2011	Otter	Ocean	1,091,810	1,333	819	92	51	55	120	200	22	24%	26	28%	44	48%
2010	Skimmer	Pamlico Sound	*	*	*	2	24		20		0	0%	2	100%	0	0%
2011	Skimmer	Pamlico Sound	699	4	175	4	34	34	46		0	0%	4	100%	0	0%
2010	Skimmer	Neuse, Pamlico, Bay Rivers	14,771	73	202	7	28	25	27	28	0	0%	7	100%	0	0%
2011	Skimmer	Neuse, Pamlico, Bay Rivers	17,191	73	235	4	22		21		0	0%	4	100%	0	0%
2010	Skimmer	Bogue/Core/ Newport/North River	132,458	607	218	37	28	25	29	20	0	0%	37	100%	0	0%
2011	Skimmer	Bogue/Core/ Newport/North River	14,470	94	154	12	29	28	32	24	0	0%	12	100%	0	0%
2010	Skimmer	Southern	137,408	439	313	26	30	17	40	48	0	0%	26	100%	0	0%
2011	Skimmer	Southern	23,215	156	149	17	33	38	42	48	0	0%	17	100%	0	0%

***** *Confidential, 3 or less participants, vessels, or dealers*

† It is unlawful to take shrimp with trawls which have a combined headrope of greater than 90 feet in internal coastal waters except:

(1) Pamlico Sound;

(2) Pamlico River downstream of a line from a point 35° 18.5882'N – 76° 28.9625'W at Pamlico Point; running northerly to a point 35° 22.3741'N - 6°28.6905'W at Willow Point;

(3) Neuse River northeast of a line from a point 34° 58.2000'N – 76° 40.5167'W at Winthrop Point on the eastern shore of the entrance to Adam's Creek running northerly to a point 35° 01.0744' N – 76°42.1550' W at Windmill Point at the entrance of Greens Creek at Oriental.

Table 10. Percent reductions in shrimp and finfish of the most promising Experimental BRDs tested in Pamlico Sound, NC 2015-2016. (*Federal Fish Excluder)

Experimental BRD Type	Species Group	n	Average Catch (kg)		Percent Change	P value
			Control	Experimental		
4-inch TED, 2 FFE*, 1 7/8" tailbag (2015)	Shrimp	26	94.4	95.8	-1.54	0.337
	Finfish	26	135.0	67.3	38.33	0.000
3-inch TED, 2 FFE*, 1 3/4" tailbag (2016)	Shrimp	30	27.0	25.7	4.85	0.224
	Finfish	30	115.0	63.6	44.9	<0.001
4-inch TED, 2 FFE*, 1 3/4" tailbag (2016)	Shrimp	8	27.7	23.3	6.32	<0.001
	Finfish	8	167.0	76.0	51.9	<0.001
4-inch TED, Virgil Potter, 1 3/4" tailbag (2016)	Shrimp	22	31.3	29.5	7.25	0.011
	Finfish	22	172.0	96.1	45	<0.001

Table 11. North Carolina commercial harvest (lbs.) of Spot by gear, 1994-2015.

Year	Estuarine Gill Net	Long Haul	Ocean Gill Net	Other	Total Landings
1994	577,804	949,982	764,797	644,728	2,937,311
1995	647,264	1,151,037	969,099	239,444	3,006,845
1996	470,911	911,688	623,907	283,494	2,290,000
1997	383,535	1,369,184	458,363	416,843	2,627,925
1998	387,574	993,413	742,489	273,504	2,396,979
1999	662,377	688,392	629,984	281,422	2,262,175
2000	623,467	1,073,867	847,595	284,889	2,829,818
2001	592,443	1,151,253	1,026,260	323,915	3,093,872
2002	721,619	705,695	550,328	206,390	2,184,032
2003	691,036	714,174	480,065	158,111	2,043,387
2004	765,341	771,748	581,062	199,017	2,317,169
2005	753,048	573,724	229,099	158,614	1,714,485
2006	369,325	604,538	214,610	176,271	1,364,743
2007	190,410	396,109	221,037	71,526	879,082
2008	278,349	311,765	107,803	38,567	736,484
2009	349,410	317,899	267,436	71,755	1,006,500
2010	158,982	274,747	76,028	62,559	572,315
2011	427,084	207,675	235,533	66,678	936,970
2012	142,538	267,023	67,393	12,721	489,676
2013	239,289	238,813	261,221	29,270	768,592
2014	368,812	98,792	252,885	45,735	766,224
2015	179,812	51,109	138,802	7,635	377,358
Mean	453,656	628,301	442,991	184,231	1,709,179

Table 12. North Carolina commercial trips that landed Spot by gear, 1994-2015.

Year	Estuarine Gill Net	Long Haul	Ocean Gill Net	Other	Total Trips
1994	4,920	618	2,158	3,201	10,897
1995	6,420	572	2,073	2,403	11,468
1996	6,775	704	2,292	2,563	12,334
1997	8,120	580	2,376	2,686	13,762
1998	6,742	491	2,099	2,023	11,355
1999	7,543	362	2,005	2,472	12,382
2000	8,287	373	1,955	2,614	13,229
2001	7,565	415	2,063	1,869	11,912
2002	8,848	317	1,373	2,590	13,128
2003	7,729	366	1,677	1,224	10,996
2004	7,134	395	1,532	1,512	10,573
2005	7,492	325	947	871	9,635
2006	6,150	402	1,037	1,023	8,612
2007	4,914	333	1,203	1,149	7,599
2008	4,956	319	801	1,019	7,095
2009	6,289	345	989	1,265	8,888
2010	3,297	352	594	530	4,773
2011	3,977	318	786	421	5,502
2012	2,767	159	545	643	4,114
2013	4,841	216	1,045	1,282	7,384
2014	4,800	183	1,572	1,035	7,590
2015	2,749	31	1,071	498	4,349
Mean	6,014	372	1,463	1,586	9,435

Table 13. North Carolina recreational harvest of Spot 1994-2015 including number of directed trips, landings in number and pounds, and number of discards.

Year	Directed Trips	Harvest Number	Harvest (lbs.)	PSE (lbs.)	Discard Number
1994	303,314	5,929,269	1,842,360	9.5	1,363,884
1995	211,843	3,329,981	1,247,995	9.5	1,035,361
1996	122,717	2,007,071	710,087	9.1	924,204
1997	95,349	1,440,661	722,869	13.8	450,663
1998	99,399	2,865,190	1,249,542	15	650,157
1999	82,112	1,308,167	646,663	13.5	633,112
2000	170,920	1,924,108	893,834	15.9	481,995
2001	221,729	3,650,711	1,773,671	9.5	1,143,695
2002	182,511	2,586,313	984,899	10.7	671,669
2003	241,434	3,796,556	1,714,159	10.1	1,132,992
2004	332,865	3,825,768	1,749,843	12	1,257,887
2005	279,386	3,012,872	1,102,398	17.2	1,334,559
2006	306,654	2,978,506	1,059,852	24.8	2,588,647
2007	205,693	3,078,346	982,463	16.9	1,197,005
2008	207,614	1,843,343	670,511	19.4	1,322,408
2009	94,339	1,056,346	363,998	17.9	1,222,053
2010	140,910	834,561	260,341	13.8	871,054
2011	138,779	1,207,335	410,317	16.8	1,000,566
2012	106,735	784,272	230,250	24	759,081
2013	146,180	1,464,592	460,928	16.8	1,314,199
2014	186,685	2,111,880	704,445	21.8	890,831
2015	159,780	1,081,083	395,268	29.1	708,122
Mean	183,498	2,368,951	917,122		1,043,370

Table 14. North Carolina commercial harvest (lbs.) of Atlantic Croaker by gear, 1994-2015.

YEAR	ESTUARINE GILL NET	OCEAN SINK GILL NET	FLOUNDER TRAWL	FLYNET	HAUL SEINE	OTHER	Grand Total
1994	93,172	1,373,566	109,399	2,869,275	103,573	66,768	4,615,754
1995	151,519	1,923,282	70,676	3,650,520	162,890	62,397	6,021,284
1996	183,373	4,102,497	71,846	4,615,359	358,764	629,997	9,961,834
1997	81,238	2,810,345	225,337	6,944,964	61,423	588,360	10,711,667
1998	159,212	5,608,831	1,081,913	3,964,733	25,270	25,937	10,865,897
1999	101,445	3,903,184	466,319	5,656,496	7,159	50,903	10,185,507
2000	94,826	3,805,749	660,116	5,481,846	67,146	12,945	10,122,627
2001	140,116	5,230,828	470,800	6,025,709	99,776	50,195	12,017,424
2002	130,055	4,209,753	448,727	5,362,031	31,545	7,042	10,189,153
2003	89,234	4,114,734	688,888	9,476,207	51,480	8,653	14,429,197
2004	82,587	3,970,134	461,163	7,432,523	34,643	11,952	11,993,003
2005	66,982	4,440,748	130,448	7,223,644	32,114	9,356	11,903,292
2006	61,167	2,756,604	39,526	7,499,038	35,964	4,255	10,396,554
2007	28,384	2,057,705	246,428	4,939,253	17,999	11,528	7,301,296
2008	67,405	2,180,372	202,939	3,326,199	11,789	3,063	5,791,766
2009	52,582	2,000,817	187,291	3,847,541	33,251	13,945	6,135,437
2010	171,825	3,037,799	112,504	3,807,850	171,746	10,435	7,312,159
2011	45,923	4,437,331	22,970	459,381	80,810	7,771	5,054,186
2012	77,023	2,668,307	27,864	314,244	6,794	12,383	3,106,615
2013	35,256	1,518,730	365,921	3,414	2,780	2,536	1,928,223
2014	36,099	1,229,889	251,639	1,076,700	15,747	19,835	2,629,909
2015	39,916	1,619,651	55,189	102,551	164	1,595	1,819,066
Mean	90,425	3,136,403	290,814	4,276,340	64,219	73,266	7,931,448

Table 15. North Carolina commercial trips that landed Atlantic Croaker by gear, 1994-2015.

YEAR	ESTUARINE GILL NET	OCEAN SINK GILL NET	FLOUNDER TRAWL	FLYNET	HAUL SEINE	OTHER	Grand Total
1994	7,906	2,730	66	148	455	3,044	14,349
1995	11,054	3,131	61	166	459	3,394	18,265
1996	8,222	3,899	107	163	497	2,530	15,418
1997	8,881	3,507	73	304	296	2,153	15,214
1998	5,486	3,520	343	188	192	933	10,662
1999	7,999	2,863	192	175	98	1,653	12,980
2000	7,891	2,081	152	137	216	1,334	11,811
2001	7,983	2,565	104	147	234	1,922	12,955
2002	5,874	1,715	75	147	169	835	8,815
2003	4,862	1,540	60	179	153	567	7,361
2004	5,341	1,360	66	173	161	777	7,878
2005	4,488	1,246	31	166	125	454	6,510
2006	3,971	1,230	25	170	213	291	5,900
2007	4,216	1,082	56	116	131	346	5,947
2008	4,484	1,078	34	105	109	294	6,104
2009	5,474	1,019	47	162	165	321	7,188
2010	5,249	1,119	16	125	239	526	7,274
2011	2,622	1,729	5	25	199	258	4,838
2012	3,440	1,409	13	14	59	381	5,316
2013	3,737	1,439	18	1	73	361	5,629
2014	4,204	1,603	23	28	110	378	6,346
2015	2,575	1,563	18	8	7	227	4,398
Mean	5,725	1,974	72	129	198	1,045	9,144

Table 16. North Carolina recreational harvest of Atlantic Croaker 1994-2015 including number of directed trips, landings in number and pounds, and number of discards.

Year	Directed Trips	Harvest Number	Harvest (lbs.)	PSE	Discard Number
1994	679,123	1,179,735	351,230	6.9	3,110,528
1995	462,683	850,606	326,135	10.4	1,172,716
1996	447,907	662,240	346,501	10.9	1,218,799
1997	396,140	661,116	309,457	15.6	1,443,568
1998	343,675	387,427	161,117	11.2	1,060,928
1999	372,719	442,185	212,991	12.1	1,368,478
2000	473,684	391,056	201,306	13.0	1,569,385
2001	447,251	635,552	355,009	14.4	1,256,807
2002	300,282	408,944	242,184	16.9	925,806
2003	465,690	490,399	317,606	17.7	1,552,315
2004	477,713	511,418	306,029	18.0	1,656,049
2005	437,693	326,777	168,797	22.4	1,401,413
2006	652,232	556,024	222,286	21.1	2,578,819
2007	452,234	461,162	131,185	18.8	1,608,120
2008	453,309	317,940	132,731	17.1	1,419,019
2009	491,224	368,990	131,742	16.5	1,912,670
2010	475,261	478,156	241,993	12.4	1,598,139
2011	419,854	246,676	99,298	13.2	1,798,230
2012	386,205	288,813	105,530	11.9	1,255,216
2013	536,818	411,882	141,880	13.6	1,984,701
2014	575,810	541,657	227,949	14.6	2,713,787
2015	570,259	463,867	187,590	13.0	2,532,950
Mean	468,989	503,756	223,661		1,688,111

Figures

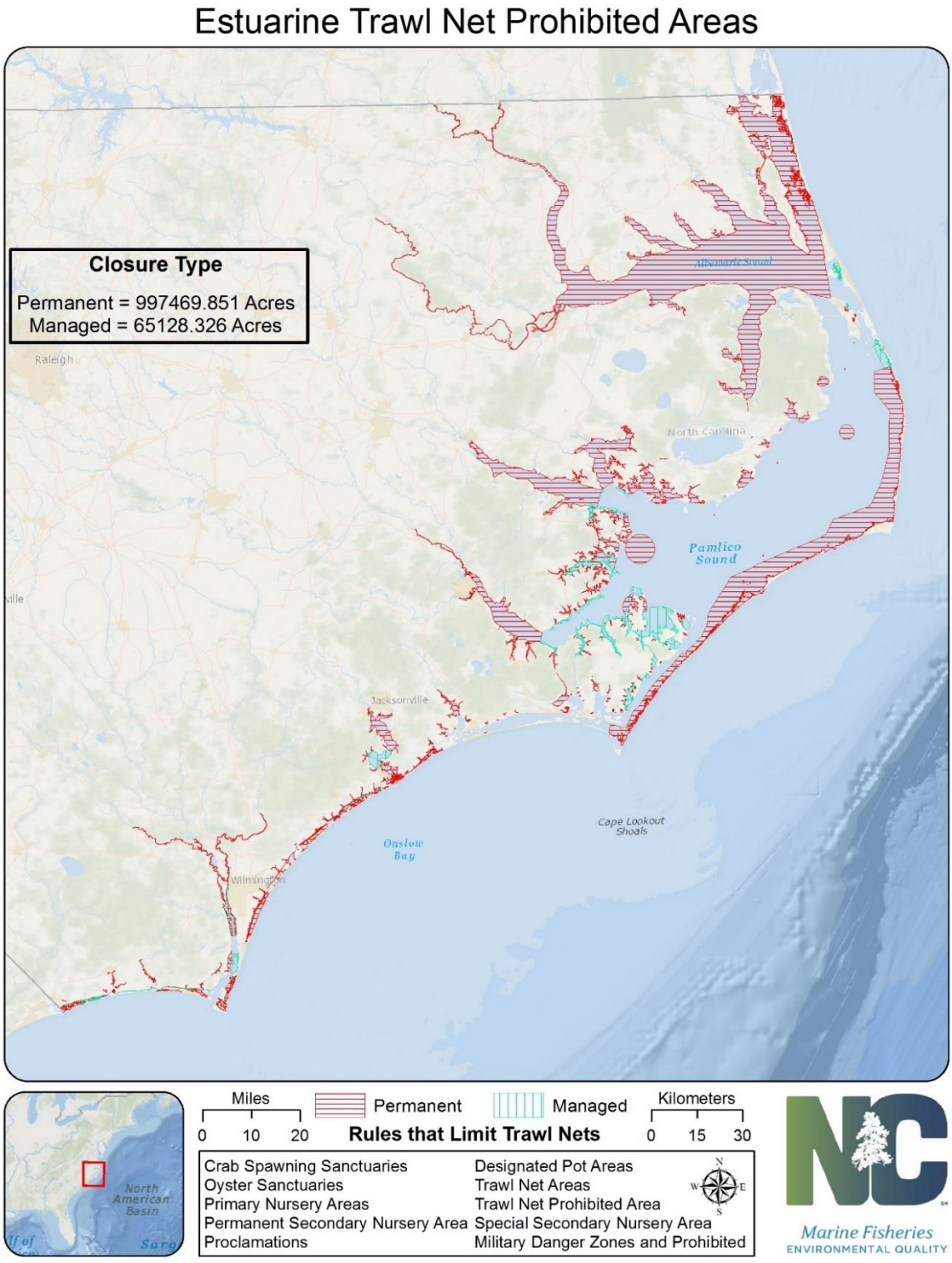

Figure 1. Estuarine Trawl Prohibited Areas

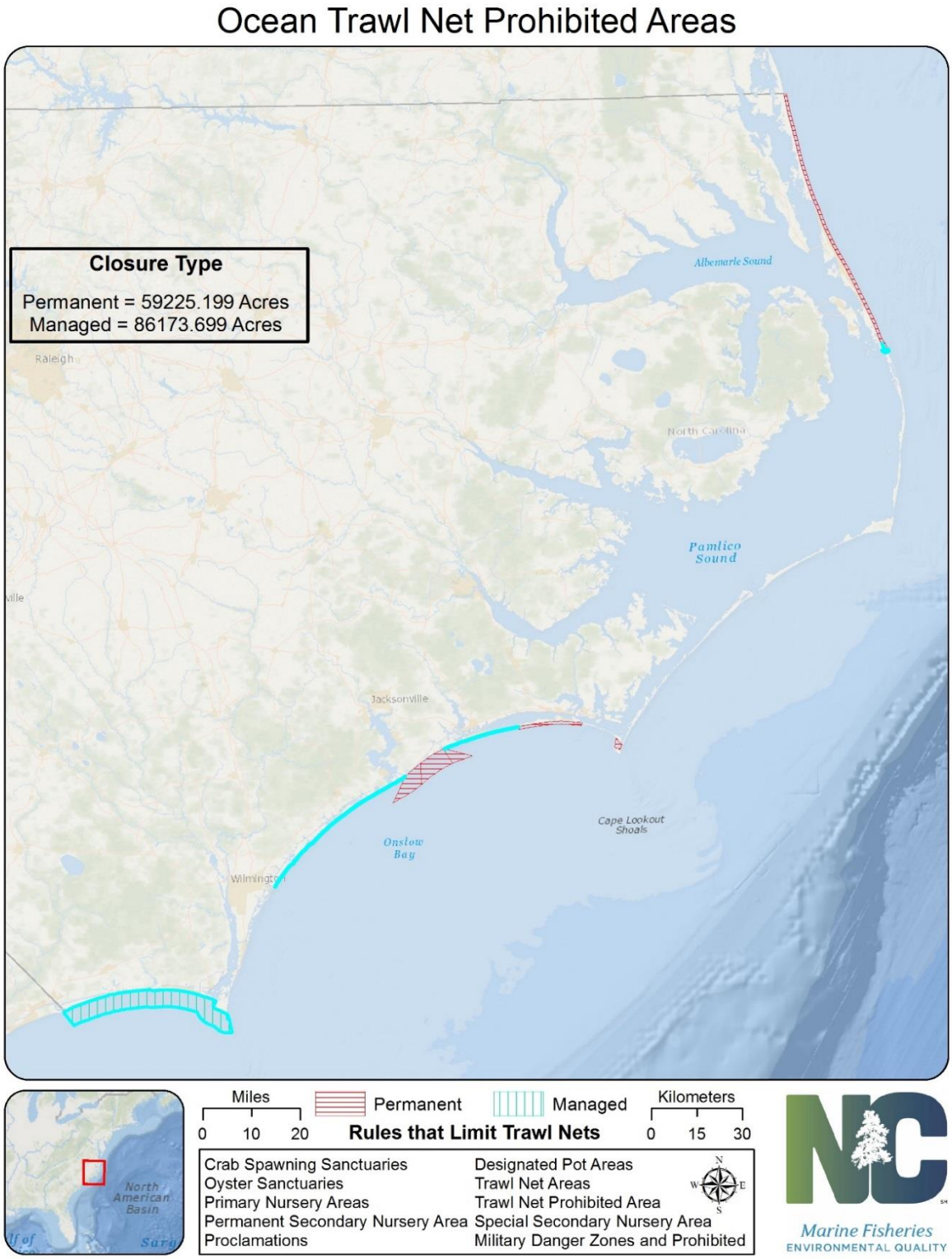

Figure 2. Ocean Trawl Net Prohibited Areas

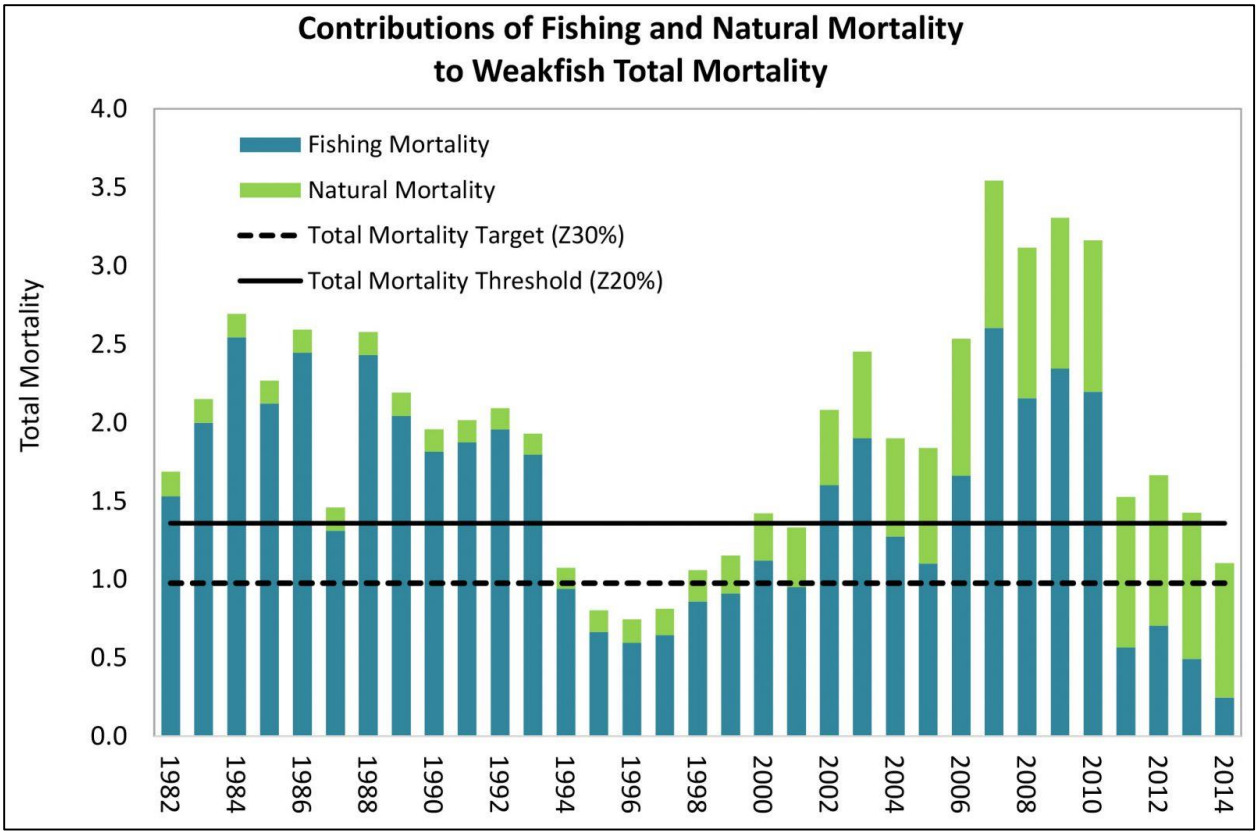

Figure 3. Fishing (F) and natural (M) mortality estimated from the 2016 Weakfish Stock Assessment (2016), by year, from 1982 – 2014. Total mortality (Z) overfishing target of 30% (dashed line) and threshold of 20% (solid line).

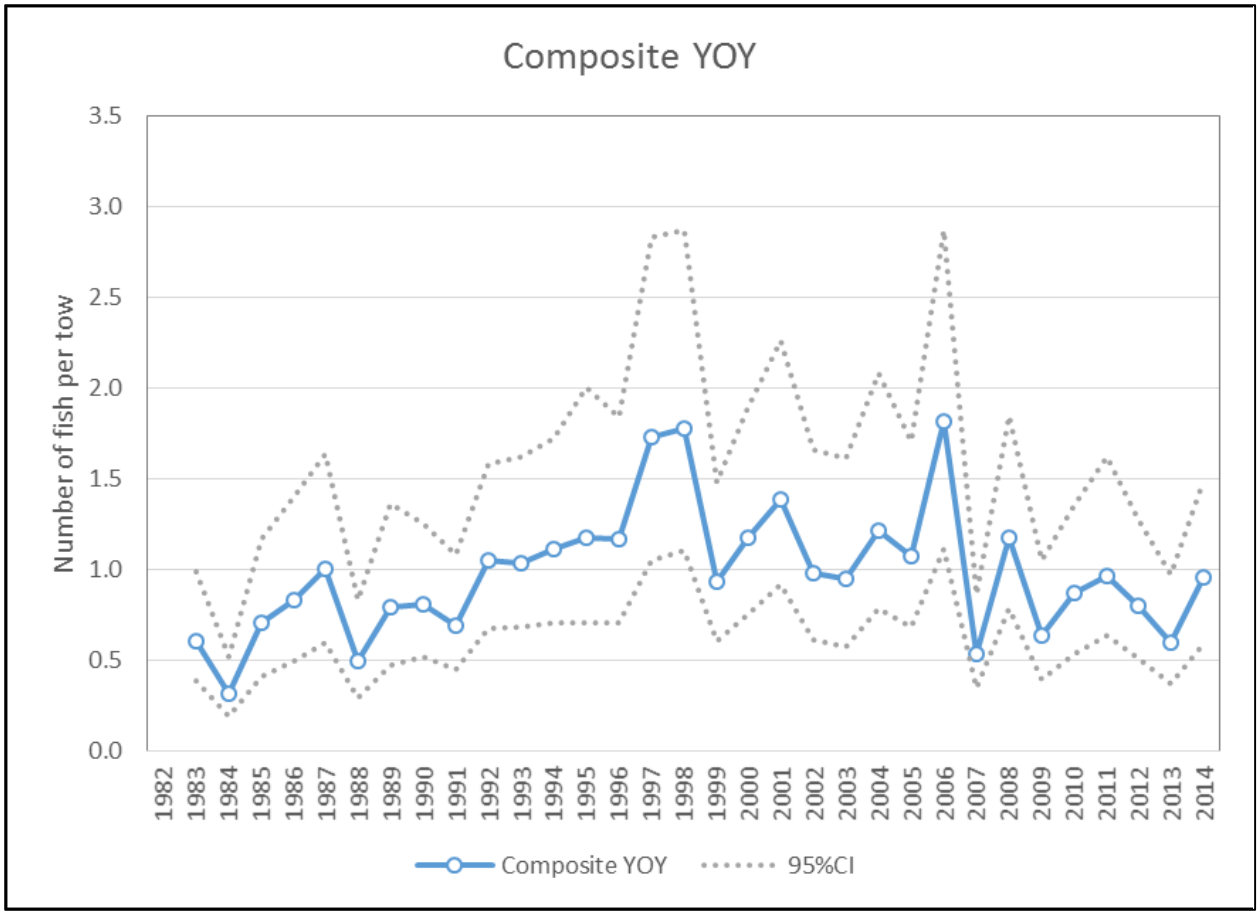

Figure 4. Composite of Atlantic States young-of-year index with 95% confidence intervals from 1993 – 2014. Taken from the 2016 Weakfish Stock Assessment (ASMFC 2016).

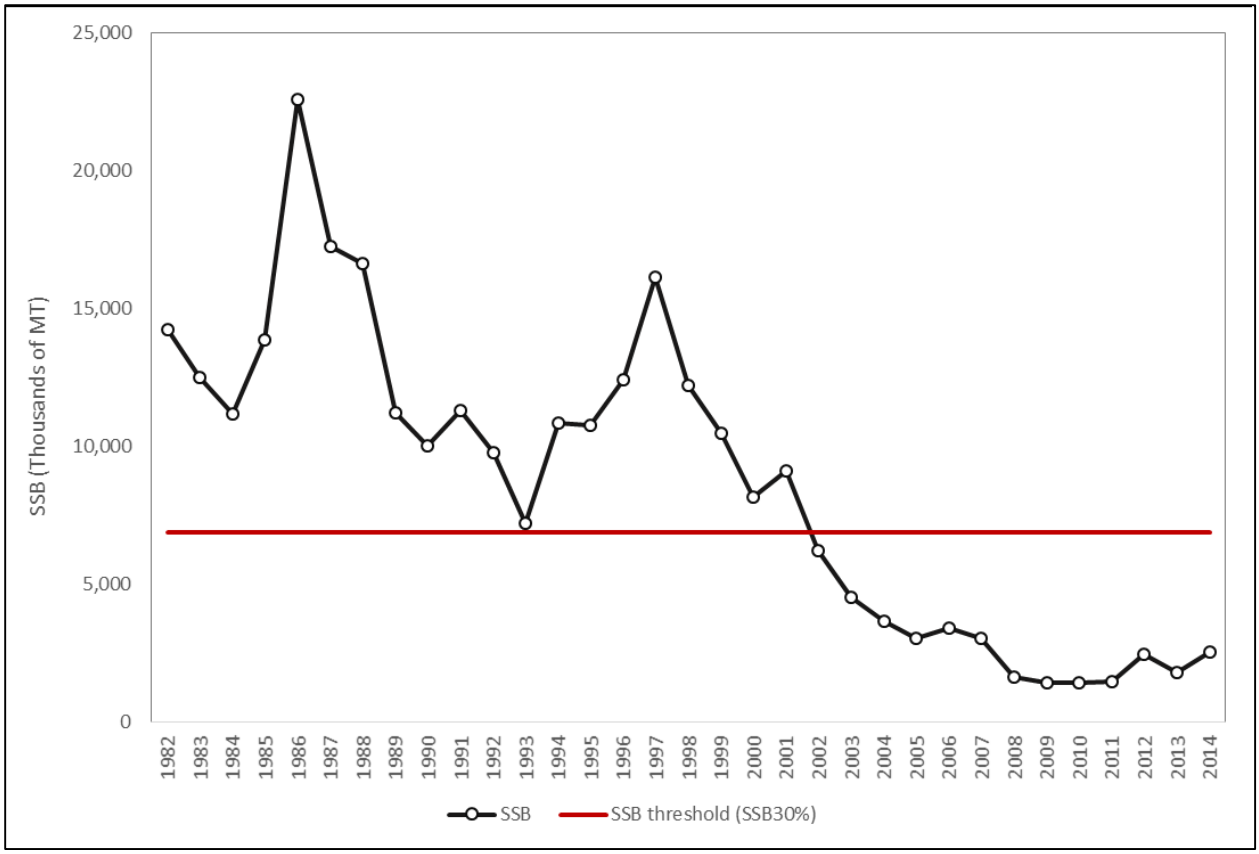

Figure 5. Spawning Stock Biomass (SSB) and the SSB threshold of 30% un-fished stock estimated from the 2016 Weakfish Stock Assessment (ASMFC 2016).

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

January 20, 2017

MEMORANDUM **Cobia 2-17**

TO: Marine Fisheries Commission

FROM: Steve Poland, Fisheries Management Section

SUBJECT: 2017 Cobia Management Options

Preliminary landings in the South Atlantic cobia fishery for 2016 indicate that the Annual Catch Limit set by the South Atlantic Fishery Management Council was exceeded, which resulted in National Marine Fisheries Service closing the cobia season in federal waters for recreational fishing on January 24, 2017. This closure complies with the requirements set forth in the Federal Magnuson-Stevenson Act for measures to be implemented to constrain harvest for the following fishing season.

In 2016, the federal season for cobia harvest was closed on June 20 due to projections that the total coastwide landings would meet the allowable catch limit on that date. The peak of the fishery for cobia in northern North Carolina and Virginia has historically occurred after this date causing participants to be shut out before the fishery starts. In an effort to extend the fishing season, the Marine Fisheries Commission implemented size, bag, and vessel limits as well as a three-days-a-week fishing period for private vessels and asked the National Marine Fisheries Service to consider these management measures in their season closure decision. Based on recalculations of the landings projections, North Carolina closed its cobia fishery in state waters on Sept. 30, 2016.

In anticipation of a shortened federal season for 2017, division staff began analyzing various management options including size limits, vessel limits, and in-season closure for projected landings reductions. Staff will present results to the commission for their consideration once all 2016 Marine Recreational Information Program landings are available.

Staff does not have a specific harvest recommendation at this time, and is seeking guidance from the commission regarding recreational management measures for 2017 with the following considerations:

- Providing equitable opportunity to access the cobia resource for all components of North Carolina's recreational fishery (charter/for-hire, private vessel, manmade);

- Minimum size limits larger than 36 inches fork length could result in greater levels of harvest, as larger fish weigh more and there are safety considerations with larger fish; and

- The Atlantic stock of cobia is a coastwide public resource. Although other states may have historically harvested a smaller proportion of the resource, it is still an important component of the recreational fishery for all user groups.

The North Carolina Division of Marine Fisheries does recommend that the Marine Fisheries Commission act in the best interest of the stock and constrain harvest in state waters to comply with the Atlantic Cobia Annual Catch Limit.

Cobia Management
February 2017

Background

Federal Management

Cobia have been managed federally since 1983 under the Coastal Migratory Pelagics Fishery Management Plan. The original plan established a minimum size limit of 33-inches fork length with a subsequent amendment establishing a two-fish bag limit (1990) for recreational fisherman and two-fish commercial possession limit. Until 2012, cobia was managed jointly by the Gulf of Mexico and South Atlantic Fishery Management Councils as a single stock with no established Annual Catch Limits or sector allocations. Amendment 18 to the CMP FMP modified the management of cobia to include:

- Two stocks separated at the Gulf of Mexico and South Atlantic jurisdictional boundary in the Florida Keys
- Annual Catch Limit established for each stock: 1,571,399 pounds whole weight for the Atlantic stock
- Sector allocations for the Atlantic stock were established for commercial (8%) and recreational (92%) fisheries

The stock boundary for the Atlantic and Gulf cobia stocks was updated in the 2013 stock assessment based on tagging and genetics information reviewed during the assessment process. The boundary was moved from the jurisdictional boundary of the South Atlantic and Gulf Fishery Management Councils (Key West) to the Florida/Georgia line. The east coast of Florida was allocated 900,000 pounds whole weight from the Gulf stock based on average landings from the previous 15 years. The Atlantic stock (Georgia – New York) Annual Catch Limit was set to 690,000 pounds whole weight with a sector allocation of 630,000 pounds weight for the recreational sector and 60,000 pounds weight for the commercial sector for the 2015 season. At the conclusion of the 2015 season 1,554,395 pounds of cobia were estimated to have been harvested from the recreational sector with North Carolina accounting for 630,373 pounds of that harvest.

The overage of the Annual Catch Limit triggered accountability measures as required by the Magnuson-Stevens Act to restrain harvest to the Annual Catch Limit for the following season. Unlike many other species managed by the South Atlantic Fishery Management Council, measures for cobia do not allow for in-season recreational closures so harvest is restrained by projecting landings the following season and either closing the season when the Annual Catch Limit is projected to be met. For the 2016 season, the projected closure date was June 20th.

State Management

2016

In an effort to extend the Cobia season in state waters past the June 20th federal waters closure while constraining harvest of Cobia to the Annual Catch Limit, the Marine Fisheries Commission adopted new bag limits, size limits, and sector fishing times for the 2016 season. Management measures included:

- 37-inch fork length
- 1 per person with no more than 2 per vessel per day on private vessels

- 1 per person with no more than 4 per vessel per day on for-hire vessels
- 1 per person per day for manmade and shore-based fishery
- Private vessels may only fish on Monday, Wednesday and Friday
- Recreational season for Cobia closed on September 30th

Total preliminary estimated landings of Cobia in 2016 for North Carolina were 320,685 pounds.

Management Options for 2017 season

NOAA Fisheries announced that recreational harvest of Atlantic Cobia in federal waters closed on January 24th, 2016 and will remain closed until January 1st, 2018. During the 2016 season, the total Annual Catch Limit for Atlantic Cobia was exceeded triggering a closure for the 2017 season under the accountability measures. NOAA Fisheries acknowledged that states will most likely keep their season open in their waters and issued a full season closure to account for the projected landings from the states. If the total Annual Catch Limit is again exceeded during the 2017 season, the likelihood of a federal season in 2018 is minimal.

The North Carolina Division of Marine Fisheries recommends that the Marine Fisheries Commission act in the best interest of the stock and constrain harvest in state waters to comply with the Atlantic Cobia Annual Catch Limit. The SAFMC passed Framework Amendment 4 to the Coastal Migratory Pelagics FMP in an effort to reduce harvest of Cobia in the South Atlantic following the 2015 season and is awaiting final rule-making and implementation. Framework amendment 4 sets the following restrictions for the recreational Atlantic Cobia fishery from Georgia to New York:

- 36-inch minimum fork length
- One fish per person per day
- No more than six fish per vessel per day

Division staff analyzed harvest trends in the recreational fishery over the previous five seasons and developed a suite of management options, with stakeholder input, to present to the Marine Fisheries Commission for their consideration. Landings in the Cobia fishery occur over a short amount of time with over 85percent of the harvest taking place within a two-month period (Table 1 & Figure 1).

Options for consideration are presented in Table 2. Percent reductions from the five-year average of North Carolina harvest and the associated projected landings at that percent reduction are presented for the charter/for-hire and the private vessel sectors. Assumptions for the presented analysis include the reduction from the federal closure, and the 36-inch minimum fork length and 1 fish per person per day measure soon to be adopted in Framework Amendment 4. Landings from shore-based and manmade modes are not presented but are included in the five-year average.

Tables and Figures

Table 1. Weekly cumulative (pounds and percent) five-year average landings by sector (Charter, Manmade, and Private Boat) and combined for cobia in North Carolina. Includes landings from state and Federal Waters.

	Charter		Manmade		Private Boat		All Modes Combined	
Date Range	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent
04/15-04/21					3,311	1.2	3,311	0.9
04/22-04/28					3,311	1.2	3,311	0.9
04/29-05/05	**11**	**0.0**			**3,311**	**1.2**	**3,322**	**0.9**
05/06-05/12	662	1.2			12,167	4.3	12,829	3.5
05/13-05/19	**5,210**	**9.7**			**26,443**	**9.3**	**31,653**	**8.6**
05/20-05/26	7,208	13.4			108,740	38.1	115,948	31.4
05/27-06/02	30,035	55.8			189,782	66.4	219,817	59.5
06/03-06/09	31,641	58.8	4,032	8.1	221,869	77.7	255,929	69.3
06/10-06/16	36,818	68.4	11,625	23.3	237,637	83.2	281,430	76.2
06/17-06/23	38,635	71.8	23,443	46.9	252,000	88.2	304,701	82.5
06/24-06/30	40,857	76.0	24,668	49.4	263,366	92.2	319,023	86.4
07/01-07/07	42,159	78.4	24,668	49.4	268,565	94.0	325,525	88.1
07/08-07/14	43,953	81.7	28,915	57.9	270,355	94.7	331,657	89.8
07/15-07/21	44,451	82.6	32,399	64.9	272,865	95.5	336,756	91.2
07/22-07/28	45,537	84.7	33,597	67.3	273,557	95.8	339,252	91.8
07/29-08/04	**46,772**	**87.0**	**35,568**	**71.2**	**279,176**	**97.7**	**347,289**	**94.0**
08/05-08/11	47,613	88.5	35,568	71.2	281,084	98.4	350,038	94.8
08/12-08/18	49,259	91.6	35,568	71.2	281,084	98.4	351,684	95.2
08/19-08/25	50,867	94.6	38,949	78.0	282,292	98.8	356,529	96.5
08/26-09/01	**51,268**	**95.3**	**46,818**	**93.7**	**283,573**	**99.3**	**362,932**	**98.3**
09/02-09/08	51,734	96.2	48,067	96.2	283,573	99.3	364,147	98.6
09/09-09/15	52,010	96.7	48,067	96.2	284,408	99.6	365,258	98.9
09/16-09/22	53,737	99.9	49,948	100.0	284,534	99.6	368,239	99.7
09/23-09/29	53,737	99.9			284,534	99.6	368,239	99.7
09/30-10/06	53,737	99.9			284,534	99.6	368,239	99.7
10/07-10/13	53,790	100.0			285,630	100.0	369,389	100.0

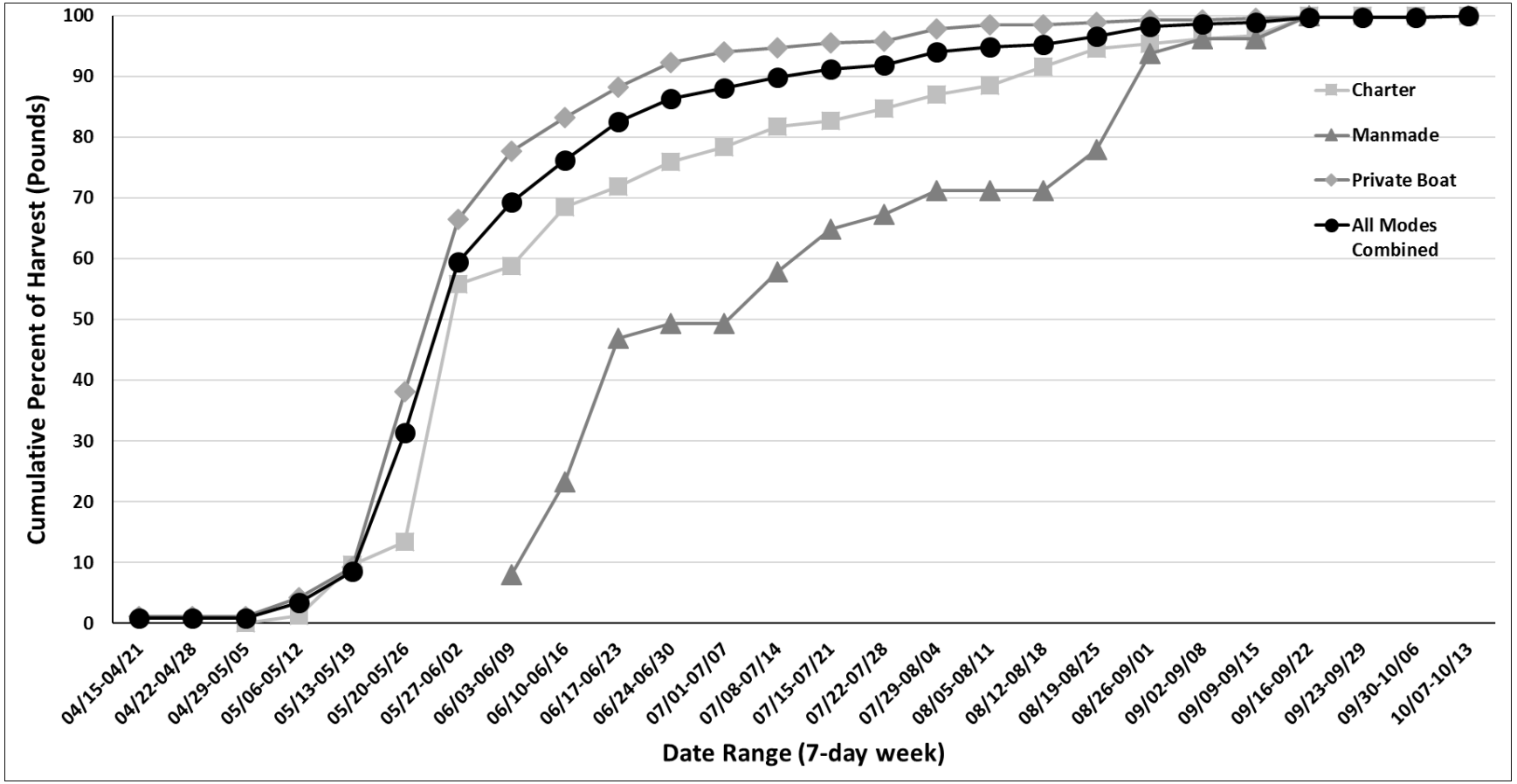

Figure 1. Percent cumulative harvest (pounds) of Cobia in North Carolina by mode (Charter, Manmade, and Private Boat) and combined. Includes landings from state and Federal Waters.

Table 2. Season and vessel limit options with associated percent reductions and projected landings (pounds) for the 2017 North Carolina Cobia season. Analysis assumes a 36-inch fork length limit, a 1 fish/person bag limit for all modes, including manmade/shore-based and no federal season.

Management Options	Vessel Limit							
	4		3		2		1	
	% Reduction	Projected Landings	% Reduction	Projected Landings	% Reduction	Projected Landings	% Reduction	Projected Landings
Charter - no closure	-2.5%	44,443	-3.8%	39,873	-5.7%	32,863	-8.6%	22,047
Charter vessel season of May 1 - August 31	-3.1%	42,423	-4.5%	37,332	-6.5%	29,948	-9.4%	19,080
Charter vessel season of May 15 - August 31	-3.3%	41,772	-4.6%	36,793	-6.6%	29,521	-9.5%	18,866
Charter vessels May 1 - July 31, then 1 fish/vessel for August	-4.0%	38,947	-5.4%	33,856	-7.4%	26,520	-10.2%	16,186
Private - no closure	-14.6%	231,664	-18.5%	217,178	-25.7%	190,541	-41.6%	131,858
Private vessel season of May 1 - August 31	-14.9%	230,447	-18.9%	215,961	-26.1%	189,325	-41.9%	130,704
Private vessel season of May 15 - August 31	-14.9%	230,447	-18.9%	215,961	-26.1%	189,325	-41.9%	130,704
Private vessels at May 1 - July 31, then 1 fish/vessel for August	-17.0%	222,954	-20.9%	208,468	-28.1%	181,832	-44.0%	123,210

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

January 27, 2017

MEMORANDUM **FMP 02-17**

TO: Marine Fisheries Commission

FROM: Catherine Blum, Fishery Management Plan and Rulemaking Coordinator

SUBJECT: Fishery Management Plan Update

This memo provides an overview on the status of the North Carolina fishery management plans for the February 2017 commission meeting. We have provided a single handout showing where the active plans are in the process. No action is required by the commission.

At the commission's August 2016 meeting, the rulemaking process was approved to begin for the implementing rules of the draft Hard Clam Fishery Management Plan Amendment 2 and Oyster Fishery Management Plan Amendment 4. The proposed rules were published in the *North Carolina Register* and a public comment period was held. The amendments and rules are scheduled for final approval at the February 2017 commission meeting. Additional details are provided in the rulemaking update in the briefing materials.

A plan not yet included in the formal steps in the handout is the review of the Blue Crab Fishery Management Plan. The process is underway to appoint an advisory committee to assist the division in the development of the Blue Crab Fishery Management Plan. In the meantime, the division's plan development team is reviewing the available data in preparation for the review of the plan.

Also in preparation for the formal steps in the fishery management plan process, work is continuing on the coastwide stock assessment of southern flounder. An in-person data workshop was held Aug. 15-17, 2016 in Raleigh. The stock assessment workgroup is continuing to work remotely and meet by conference call. The stock assessment is expected to be completed in the second half of 2017, after which the next review of the plan will commence.

NORTH CAROLINA FISHERY MANAGEMENT PLANS

February 2017

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON C. DAVIS
Director

January 27, 2017

MEMORANDUM **Rules 02-17**

TO: Marine Fisheries Commission

FROM: Catherine Blum, Fishery Management Plan and Rulemaking Coordinator

SUBJECT: Rulemaking Update

This memo describes the rulemaking materials for the February 2017 commission meeting. There are four informational items, followed by two of the commission's proposed rules that show minor conforming changes added since publication in the *North Carolina Register*. These rules, in addition to the other 13 rules in the 2016/2017 package, as well as amendments to two fishery management plans are scheduled to be voted on by the commission for final adoption. Each item is summarized below:

2016/2017 Rulemaking Cycle

This section includes a table that shows the steps of the process for the commission's 2016/2017 annual rulemaking cycle. The dates in the table are adjusted to accommodate the delay in starting the package due to reconsideration of an issue from the Oyster and Hard Clam fishery management plans. Instead of the usual intended effective date of April 1 of a given year for the rules to be complete, staff will make every effort to find efficiencies at the end of the process so the rules can become effective either May 1 or June 1, 2017.

Review of Hearing and Public Comment

At its August 2016 business meeting, the commission gave approval to begin the rulemaking process for 15 proposed rules. The rules were published in the Oct. 3 issue of the *North Carolina Register*. The public comment period for the proposed rules ran from Oct. 18 through Dec. 2. A public hearing was held Oct. 26 at 6 p.m. at the division's Central District Office located at 5285 Highway 70 West in Morehead City; a brief summary is included in the materials. No one from the public attended the hearing and there were no public comments received at any point in the process.

Final approval of the rules and the amendments to the Oyster and Hard Clam fishery management plans is scheduled to occur at the commission's February 2017 meeting. The meeting agenda lists each subject with its associated rules. A copy of Oct. 3 news release summarizing the proposed rules and an excerpt of the *North Carolina Register* publication containing the text of the proposed rules are also included in the materials.

Conforming Changes to Proposed Rules Since Publication

Two of the commission's proposed rules show minor conforming changes added since publication in the *North Carolina Register* and are included in the briefing materials. These rules are 15A NCAC 03K .0110, Public Health and Control of Oysters, Clams, Scallops, and Mussels (see page two of the rule), and 03O .0503 Permit Conditions; Specific (see page three of the rule.) The conforming changes are shaded for emphasis and reflect a recent change in a Department of Environmental Quality policy regarding the inclusion of subsequent amendments and editions of federal regulations adopted by reference in rules. The policy now allows for subsequent amendments and editions to be included, alleviating the burden of amending a rule in the future simply due to a federal regulation being amended. The conforming changes are not considered substantial; therefore, the rules are not required to be re-published in the *North Carolina Register*. When the commission votes on final adoption of these two rules, the vote will be based on the versions "with changes" as shown in the briefing materials.

Final Approval of Rules and Fishery Management Plan Amendments

The commission is scheduled to vote on final adoption of the Hard Clam Fishery Management Plan Amendment 2 and the Oyster Fishery Management Plan Amendment 4 and the associated implementing rules. The commission is also scheduled to vote on final adoption of rules for seven other subjects. The conforming changes described above are the only changes or new information the division is aware of for the 2016/2017 rule package, including the two fishery management plans.

Staff recommends the commission consider approving the rules as presented and giving final approval of the fishery management plans.

North Carolina Marine Fisheries Commission
2016-2017 Annual Rulemaking Cycle

February 2017

Time of Year	Action
April 2016	Last opportunity for a new issue to be presented to Division of Marine of Fisheries Rules Advisory Team
May 2016	Second review by Division of Marine Fisheries Rules Advisory Team
May-July 2016	Fiscal analysis of rules prepared by Division of Marine Fisheries staff and approved by Office of State Budget and Management
August 2016	Marine Fisheries Commission considers approval of Notice of Text for Rulemaking
October 2016	Publication of proposed rules in the North Carolina Register
October 2016	Public hearing held *
(January 2017)	(Last opportunity for a new issue to be presented to Division of Marine Fisheries Rules Advisory Team for next annual cycle)
(February 2017)	(Second review by Division of Marine Fisheries Rules Advisory Team)
February 2017	Marine Fisheries Commission considers approval of permanent rules
April 2017	Rules reviewed by Office of Administrative Hearings Rules Review Commission
April 15, 2017	Commercial license sales begin
April/May 2017	New rulebook drafted and sent to vendor for publication
May 1, 2017	Earliest possible effective date of rules
May or June 1, 2017	Actual effective date of new rules
May or June 1, 2017	Rulebook available online and for distribution

* Wednesday, Oct. 26, 2016, 6 p.m.
Division of Marine Fisheries
5285 Highway 70 West
Morehead City, NC 28557

MARINE FISHERIES COMMISSION
SUMMARY OF PUBLIC HEARING FOR PROPOSED RULES
DIVISION OF MARINE FISHERIES
MOREHEAD CITY CENTRAL DISTRICT OFFICE
MOREHEAD CITY, NORTH CAROLINA
OCT. 26, 2016, 6 PM

Marine Fisheries Commission:	Sammy Corbett
Division of Marine Fisheries Staff:	Catherine Blum, Nancy Fish, Michele Turner
Public:	None
Media:	None

Commission Chairman Sammy Corbett opened the public hearing for Marine Fisheries Commission proposed rules at 6 p.m. No one from the public or media was in attendance. Seeing no one to provide comments on the proposed rules, Chairman Corbett closed the hearing at 6:15 p.m.

/cb

Pat McCrory, Governor

Donald R. van der Vaart, Secretary

Environmental Quality

Release: Immediate	Contact: Patricia Smith
Date: Oct. 3, 2016	Phone: 252-726-7021

Fisheries Commission accepting comment on proposed rules

MOREHEAD CITY – The North Carolina Marine Fisheries Commission is accepting public comment on a number of proposed rule changes, including six to implement amendments to the Oyster and Hard Clam fishery management plans.

Oral comments may be submitted at a public hearing at 6 p.m. Oct. 26 at the Division of Marine Fisheries' Central District Office, 5285 Highway 70 West, Morehead City.

Written comments may be submitted until 5 p.m. Dec. 2 to Catherine Blum, Rulemaking Coordinator, N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557. Comments may also be sent by email to Catherine.Blum@ncdenr.gov or faxed to 252-726-0254.

Proposed rule changes to implement the Oyster Fishery Management Plan Amendment 4 and Hard Clam Fishery Management Plan Amendment 2 would amend:

- 15A NCAC 03K .0201 to reduce the daily commercial possession limit for oysters from 50 bushels to 20 bushels to align it with current management.
- 15A NCAC 03K .0202 to reduce the culling tolerance for oysters from 10 percent to five percent.
- 15A NCAC 03K .0302 to remove the clam mechanical harvest area on public bottom in Pamlico Sound that is no longer opened to harvest.
- 15A NCAC 03O .0114 to add convictions of theft on shellfish leases and franchises to the types of violations that could result in license suspension and revocation.
- 15A NCAC 03O .0201 to clarify how production and marketing rates are calculated for shellfish bottom leases, franchises and water column leases, including calculations for an extension period; expand the maximum potential initial lease area from five acres to 10 acres in all waters.
- 15A NCAC 03O .0208 to specify criteria that allow a single extension period for shellfish leases of no more than two years per contract period in case of a natural event that would prevent the lease holder from making production and marketing requirements.

Other proposed rule changes would amend:

- 15A NCAC 03J .0104, 15A NCAC 03L .0102, 15A NCAC 03O .0501 and 15A NCAC 03O .0503, to establish a Permit for Weekend Trawling for Live Shrimp.
- 15A NCAC 03O .0503 to relocate a 2003 requirement for a permit for dealers transacting in spiny dogfish from proclamation into rule.
- 15A NCAC 03O .0114 to increase penalties for gear larceny.
- 15A NCAC 03R .0103 to correct a coordinate in a primary nursery area boundary for Wade Creek in Carteret County.
- 15A NCAC 03O .0501 to clarify license requirements for leaseholder designees.
- 15A NCAC 03M .0522 to re-establish a rule delegating proclamation authority to the fisheries director to specify time, area, means and methods, season, size, and quantity of spotted seatrout harvested in North Carolina, allowing for continued management under the North Carolina Spotted Seatrout Fishery Management Plan due to an Atlantic States Marine Fisheries Commission plan to remove spotted seatrout from its managed species.
- 15A NCAC 03H .0103 and 15A NCAC 03K .0110 to modify the fisheries director's proclamation authority for the protection of public health.

- 15A NCAC 03P .0101 to align the method of commencement of proceedings to suspend or revoke a fishing license, permit, or certificate with other similar administrative proceedings by the division and commission.

For more information on the proposed rules, go to http://portal.ncdenr.org/web/mf/mfc-proposed-rules-links or contact Catherine Blum at 252-808-8014 or Catherine.Blum@ncdenr.gov.

The Marine Fisheries Commission is scheduled to give final approval of the proposed rules and the amendments to the Oyster and Hard Clam fishery management plants at its February meeting. The rules have an intended effective date of May 1, 2017.

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NORTH CAROLINA REGISTER

VOLUME 31 • ISSUE 07 • Pages 515 - 729

October 3, 2016

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Contact List for Rulemaking Questions or Concerns

For questions or concerns regarding the Administrative Procedure Act or any of its components, consult with the agencies below. The bolded headings are typical issues which the given agency can address, but are not inclusive.

Rule Notices, Filings, Register, Deadlines, Copies of Proposed Rules, etc.

Office of Administrative Hearings
Rules Division
1711 New Hope Church Road (919) 431-3000
Raleigh, North Carolina 27609 (919) 431-3104 FAX

contact:	Molly Masich, Codifier of Rules	molly.masich@oah.nc.gov	(919) 431-3071
	Dana Vojtko, Publications Coordinator	dana.vojtko@oah.nc.gov	(919) 431-3075
	Lindsay Woy, Editorial Assistant	lindsay.woy@oah.nc.gov	(919) 431-3078
	Kelly Bailey, Editorial Assistant	kelly.bailey@oah.nc.gov	(919) 431-3083

Rule Review and Legal Issues

Rules Review Commission
1711 New Hope Church Road (919) 431-3000
Raleigh, North Carolina 27609 (919) 431-3104 FAX

contact:	Abigail Hammond, Commission Counsel	abigail.hammond@oah.nc.gov	(919) 431-3076
	Amber Cronk May, Commission Counsel	amber.may@oah.nc.gov	(919) 431-3074
	Amanda Reeder, Commission Counsel	amanda.reeder@oah.nc.gov	(919) 431-3079
	Jason Thomas, Commission Counsel	jason.thomas@oah.nc.gov	(919) 431-3081
	Alexander Burgos, Paralegal	alexander.burgos@oah.nc.gov	(919) 431-3080
	Julie Brincefield, Administrative Assistant	julie.brincefield@oah.nc.gov	(919) 431-3073

Fiscal Notes & Economic Analysis and Governor's Review

Office of State Budget and Management
116 West Jones Street (919) 807-4700
Raleigh, North Carolina 27603-8005 (919) 733-0640 FAX

Contact:	Anca Grozav, Economic Analyst	osbmruleanalysis@osbm.nc.gov	(919)807-4740
	Carrie Hollis, Economic Analyst	osbmruleanalysis@osbm.nc.gov	(919) 807-4757

NC Association of County Commissioners
215 North Dawson Street (919) 715-2893
Raleigh, North Carolina 27603
contact: Amy Bason amy.bason@ncacc.org

NC League of Municipalities (919) 715-4000
215 North Dawson Street
Raleigh, North Carolina 27603
contact: Sarah Collins scollins@nclm.org

Legislative Process Concerning Rule-making

545 Legislative Office Building
300 North Salisbury Street (919) 733-2578
Raleigh, North Carolina 27611 (919) 715-5460 FAX

Karen Cochrane-Brown, Director/Legislative Analysis Division		karen.cochrane-brown@ncleg.net
Jeff Hudson, Staff Attorney		Jeffrey.hudson@ncleg.net

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NORTH CAROLINA REGISTER
Publication Schedule for January 2016 – December 2016

FILING DEADLINES			NOTICE OF TEXT		PERMANENT RULE			TEMPORARY RULES
Volume & issue number	Issue date	Last day for filing	Earliest date for public hearing	End of required comment Period	Deadline to submit to RRC for review at next meeting	Earliest Eff. Date of Permanent Rule	Delayed Eff. Date of Permanent Rule 31st legislative day of the session beginning:	270th day from publication in the Register
30:13	01/04/16	12/08/15	01/19/16	03/04/16	03/21/16	05/01/16	01/2017	09/30/16
30:14	01/15/16	12/21/15	01/30/16	03/15/16	03/21/16	05/01/16	01/2017	10/11/16
30:15	02/01/16	01/08/16	02/16/16	04/01/16	04/20/16	06/01/16	01/2017	10/28/16
30:16	02/15/16	01/25/16	03/01/16	04/15/16	04/20/16	06/01/16	01/2017	11/11/16
30:17	03/01/16	02/09/16	03/16/16	05/02/16	05/20/16	07/01/16	01/2017	11/26/16
30:18	03/15/16	02/23/16	03/30/16	05/16/16	05/20/16	07/01/16	01/2017	12/10/16
30:19	04/01/16	03/10/16	04/16/16	05/31/16	06/20/16	08/01/16	01/2017	12/27/16
30:20	04/15/16	03/24/16	04/30/16	06/14/16	06/20/16	08/01/16	01/2017	01/10/17
30:21	05/02/16	04/11/16	05/17/16	07/01/16	07/20/16	09/01/16	01/2017	01/27/17
30:22	05/16/16	04/25/16	05/31/16	07/15/16	07/20/16	09/01/16	01/2017	02/10/17
30:23	06/01/16	05/10/16	06/16/16	08/01/16	08/22/16	10/01/16	01/2017	02/26/17
30:24	06/15/16	05/24/16	06/30/16	08/15/16	08/22/16	10/01/16	01/2017	03/12/17
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31:02	07/15/16	06/23/16	07/30/16	09/13/16	09/20/16	11/01/16	01/2017	04/11/17
31:03	08/01/16	07/11/16	08/16/16	09/30/16	10/20/16	12/01/16	01/2017	04/28/17
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31:05	09/01/16	08/11/16	09/16/16	10/31/16	11/21/16	01/01/17	01/2017	05/29/17
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31:07	10/03/16	09/12/16	10/18/16	12/02/16	12/20/16	02/01/17	05/2018	06/30/17
31:08	10/17/16	09/26/16	11/01/16	12/16/16	12/20/16	02/01/17	05/2018	07/14/17
31:09	11/01/16	10/11/16	11/16/16	01/03/17	01/20/17	03/01/17	05/2018	07/29/17
31:10	11/15/16	10/24/16	11/30/16	01/17/17	01/20/17	03/01/17	05/2018	08/12/17
31:11	12/01/16	11/07/16	12/16/16	01/30/17	02/20/17	04/01/17	05/2018	08/28/17
31:12	12/15/16	11/22/16	12/30/16	02/13/17	02/20/17	04/01/17	05/2018	09/11/17

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EXPLANATION OF THE PUBLICATION SCHEDULE

This Publication Schedule is prepared by the Office of Administrative Hearings as a public service and the computation of time periods are not to be deemed binding or controlling. Time is computed according to 26 NCAC 2C .0302 and the Rules of Civil Procedure, Rule 6.

GENERAL

The North Carolina Register shall be published twice a month and contains the following information submitted for publication by a state agency:

(1) temporary rules;
(2) text of proposed rules;
(3) text of permanent rules approved by the Rules Review Commission;
(4) emergency rules
(5) Executive Orders of the Governor;
(6) final decision letters from the U.S. Attorney General concerning changes in laws affecting voting in a jurisdiction subject of Section 5 of the Voting Rights Act of 1965, as required by G.S. 120-30.9H; and
(7) other information the Codifier of Rules determines to be helpful to the public.

COMPUTING TIME: In computing time in the schedule, the day of publication of the North Carolina Register is not included. The last day of the period so computed is included, unless it is a Saturday, Sunday, or State holiday, in which event the period runs until the preceding day which is not a Saturday, Sunday, or State holiday.

FILING DEADLINES

ISSUE DATE: The Register is published on the first and fifteen of each month if the first or fifteenth of the month is not a Saturday, Sunday, or State holiday for employees mandated by the State Personnel Commission. If the first or fifteenth of any month is a Saturday, Sunday, or a holiday for State employees, the North Carolina Register issue for that day will be published on the day of that month after the first or fifteenth that is not a Saturday, Sunday, or holiday for State employees.

LAST DAY FOR FILING: The last day for filing for any issue is 15 days before the issue date excluding Saturdays, Sundays, and holidays for State employees.

NOTICE OF TEXT

EARLIEST DATE FOR PUBLIC HEARING: The hearing date shall be at least 15 days after the date a notice of the hearing is published.

END OF REQUIRED COMMENT PERIOD An agency shall accept comments on the text of a proposed rule for at least 60 days after the text is published or until the date of any public hearings held on the proposed rule, whichever is longer.

DEADLINE TO SUBMIT TO THE RULES REVIEW COMMISSION: The Commission shall review a rule submitted to it on or before the twentieth of a month by the last day of the next month.

FIRST LEGISLATIVE DAY OF THE NEXT REGULAR SESSION OF THE GENERAL ASSEMBLY: This date is the first legislative day of the next regular session of the General Assembly following approval of the rule by the Rules Review Commission. See G.S. 150B-21.3, Effective date

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shall not affect any private right of action by any party that may be affected by the contamination.

Authority G.S. 143-215.3(a)(1); 143B-282; 143-215.84; 143-215.104AA.

* * * * * * * * * * * * * * * * * * * *

***Notice** is hereby given in accordance with G.S. 150B-21.2 that the Marine Fisheries Commission intends to adopt the rule cited as 15A NCAC 03M .0522 and amend the rules cited as 15A NCAC 03H .0103; 03J .0104; 03K .0110, .0201, .0202, .0302; 03L .0102, 03O .0114, .0201, .0208, .0501, .0503; 03P .0101 and 03R .0103.*

Link to agency website pursuant to G.S. 150B-19.1(c): *http://portal.ncdenr.org/web/mf/mfc-proposed-rules-links*

Proposed Effective Date: *May 1, 2017*

Public Hearing:
Date: *October 26, 2016*
Time: *6:00 p.m.*
Location: *Division of Marine Fisheries, 5285 Highway 70 West, Morehead City, NC 28557*

Reason for Proposed Action:

15A NCAC 03H .0103 PROCLAMATIONS, GENERAL

Proposed amendments add a variable condition for the protection of public health to the list of variable conditions for the use of the Fisheries Director's proclamation authority that is set forth in other rules of the Marine Fisheries Commission. This more comprehensively addresses the authority of the Marine Fisheries Commission following the adoption of Session Law 2011-145 that transferred the Shellfish Sanitation and Recreational Water Quality section of the Division of Environmental Health to the Division of Marine Fisheries.

15A NCAC 03J .0104 TRAWL NETS

In accordance with the N.C. Shrimp Fishery Management Plan Amendment 1, proposed amendments provide an exception for a holder of a Permit for Weekend Trawling for Live Shrimp to use trawl nets in Internal Coastal Waters during weekends as specified in 15A NCAC 03O .0503. Additional amendments modify existing dates to account for leap years.

15A NCAC 03K .0110 PUBLIC HEALTH AND CONTROL OF OYSTERS, CLAMS, SCALLOPS, AND MUSSELS

In accordance with the National Shellfish Sanitation Program Guide for Control of Molluscan Shellfish, Section II: Model Ordinance and to protect public health, proposed amendments provide the authority for the Division of Marine Fisheries to set sanitary harvest and handling practices for harvesters and enforce issues relating to the contamination of shellfish (oysters, clams, scallops, and mussels) during harvest.

15A NCAC 03K .0201 OYSTER HARVEST MANAGEMENT

In accordance with the N.C. Oyster Fishery Management Plan Amendment 4, proposed amendments reduce the daily commercial possession limit for oysters from 50 bushels to 20 bushels to align it with current management. Additional proposed amendments make the rule consistent with other rules containing proclamation authority.

15A NCAC 03K .0202 CULLING REQUIREMENTS FOR OYSTERS

In accordance with the N.C. Oyster Fishery Management Plan Amendment 4, proposed amendments reduce the culling tolerance from 10 percent to five percent for the possession of accumulated dead shell, oyster cultch material, a shell length less than that specified by proclamation, or in any combination for oysters possessed from public bottom.

15A NCAC 03K .0302 MECHANICAL HARVEST OF CLAMS FROM PUBLIC BOTTOM

In accordance with the N.C. Hard Clam Fishery Management Plan Amendment 2, proposed amendments remove the clam mechanical harvest area on public bottom in Pamlico Sound that is no longer opened to harvest. Additional proposed amendments make the rule consistent with other rules containing proclamation authority.

15A NCAC 03L .0102 WEEKEND SHRIMPING PROHIBITED

In accordance with the N.C. Shrimp Fishery Management Plan Amendment 1, proposed amendments provide an exception for a holder of a Permit for Weekend Trawling for Live Shrimp to take shrimp during weekends as specified in 15A NCAC 03O .0503.

15A NCAC 03M .0522 SPOTTED SEATROUT

This rule is proposed for adoption to establish a rule of the Marine Fisheries Commission for the management of spotted seatrout, independent of the authority for interjurisdictional management under the Atlantic States Marine Fisheries Commission. The rule delegates proclamation authority to the Fisheries Director to specify time, area, means and methods, season, size, and quantity of spotted seatrout harvested in North Carolina. Current management measures will remain in place in accordance with the N.C. Spotted Seatrout Fishery Management Plan. The proposed rule adoption will only change the mechanism by which those same measures are implemented.

15A NCAC 03O .0114 SUSPENSION, REVOCATION, AND REISSUANCE OF LICENSES

In accordance with the N.C. Hard Clam Fishery Management Plan Amendment 2 and the N.C. Oyster Fishery Management Plan Amendment 4, proposed amendments add convictions of theft on shellfish leases and franchises to the rule which subjects licensees with convictions to license suspension and revocation. This puts in place stricter penalties as a deterrent to theft on shellfish leases and franchises. Additionally, proposed amendments provide for an appropriate penalty against a licensee for convictions of G.S. 14-72 Larceny of property; receiving stolen goods or possessing stolen goods when related to fishing gear or G.S. 113-268 Injuring, destroying, stealing or stealing from nets, seines, buoys, pots, etc. to serve as a deterrent to theft of fishing gear, vandalism to fishing gear, and theft of fish

from fishing gear. These penalties would be consistent with penalties under other similar marine fisheries laws.

15A NCAC 03O .0201 STANDARDS AND REQUIREMENTS FOR SHELLFISH BOTTOM LEASES AND FRANCHISES AND WATER COLUMN LEASES

In accordance with the N.C. Hard Clam Fishery Management Plan Amendment 2 and the N.C. Oyster Fishery Management Plan Amendment 4, proposed amendments clarify how the production and marketing rates are calculated for shellfish bottom leases and franchises and water column leases, including calculations for an extension period. Proposed amendments also expand the maximum proposed initial lease area from five to 10 acres in all waters. Additional proposed amendments reorganize the rule for improved clarity.

15A NCAC 03O .0208 TERMINATION OF SHELLFISH BOTTOM LEASES AND FRANCHISES AND WATER COLUMN LEASES

In accordance with the N.C. Hard Clam Fishery Management Plan Amendment 2 and the N.C. Oyster Fishery Management Plan Amendment 4, proposed amendments specify criteria that allow a single extension period for shellfish leases of no more than two years per contract period to meet production and marketing requirements. Additional proposed amendments reorganize the rule for improved clarity.

15A NCAC 03O .0501 PROCEDURES AND REQUIREMENTS TO OBTAIN PERMITS

In accordance with the N.C. Shrimp Fishery Management Plan Amendment 1, proposed amendments require a holder of a Permit for Weekend Trawling for Live Shrimp to hold a valid Standard or Retired Standard Commercial Fishing License and clarify the responsible party for an assigned license and also for a corporation. Additionally, proposed amendments clarify the requirement to hold a Standard or Retired Standard Commercial Fishing License with a Shellfish Endorsement to obtain a Permit to Use Mechanical Methods for Shellfish on Shellfish Leases or Franchises. Additional proposed amendments provide an exemption from license requirements for certain designees of the holder of a Permit to Use Mechanical Methods for Shellfish on Shellfish Leases or Franchises in accordance with G.S. 113-169.2.

15A NCAC 03O .0503 PERMIT CONDITIONS; SPECIFIC

In accordance with the N.C. Shrimp Fishery Management Plan Amendment 1, proposed amendments establish the Permit for Weekend Trawling for Live Shrimp and set specific conditions of the permit. Additionally, proposed amendments relocate a 2003 requirement for a permit for dealers transacting in spiny dogfish from proclamation into rule. Spiny dogfish are monitored under a quota and dealers are required to report daily landings during the open season. Placing the permit requirement in rule has no real impact on holders of the permit as the reporting requirements, application process, and cost of the permit will not change. Seasonal openings as well as trip limits will continue to be stipulated in proclamation due to the variable nature of the provisions for the fishery.

15A NCAC 03P .0101 LICENSE, PERMIT, OR CERTIFICATE DENIAL: REQUEST FOR REVIEW

Proposed amendments align the method of commencement of proceedings to suspend or revoke a fishing license, permit, or certificate with other similar administrative proceedings by the Division of Marine Fisheries and Marine Fisheries Commission. This would require affected stakeholders to submit information in writing to the division instead of having an informal meeting with division staff.

15A NCAC 03R .0103 PRIMARY NURSERY AREAS

Proposed amendments correct a coordinate error for the Wade Creek primary nursery area made when the coordinate format changed in 2004.

Comments may be submitted to: *Catherine Blum, P.O. Box 769, Morehead City, NC 28557, phone (252) 808-8014, fax (252) 726-0254, email catherine.blum@ncdenr.gov*

Comment period ends: *December 2, 2016*

Procedure for Subjecting a Proposed Rule to Legislative Review: If an objection is not resolved prior to the adoption of the rule, a person may also submit written objections to the Rules Review Commission after the adoption of the Rule. If the Rules Review Commission receives written and signed objections after the adoption of the Rule in accordance with G.S. 150B-21.3(b2) from 10 or more persons clearly requesting review by the legislature and the Rules Review Commission approves the rule, the rule will become effective as provided in G.S. 150B-21.3(b1). The Commission will receive written objections until 5:00 p.m. on the day following the day the Commission approves the rule. The Commission will receive those objections by mail, delivery service, hand delivery, or facsimile transmission. If you have any further questions concerning the submission of objections to the Commission, please call a Commission staff attorney at 919-431-3000.

Fiscal impact (check all that apply).

☒ **State funds affected** *(15A NCAC 03K .0201, .0202, .0302; 03O .0114, .0201, .0208, .0501, .0503)*

☐ **Environmental permitting of DOT affected**
Analysis submitted to Board of Transportation

☐ **Local funds affected**

☐ **Substantial economic impact (≥$1,000,000)**

☒ **Approved by OSBM** *(15A NCAC 03K .0201, .0202, .0302; 03O .0114, .0201, .0208, .0501, .0503)*

☒ **No fiscal note required by G.S. 150B-21.4** *(15A NCAC 03H .0103, 03J .0104, 03K .0110, 03L .0102, 03M .0522; 03P .0101; 03R .0103)*

CHAPTER 03 – MARINE FISHERIES

SUBCHAPTER 03H - SCOPE OF MANAGEMENT

SECTION .0100 - SCOPE OF MANAGEMENT

15A NCAC 03H .0103 PROCLAMATIONS, GENERAL

(a) It is unlawful to violate the provisions of any proclamation issued by the authority of Marine Fisheries Commission ~~Rule.~~rule.

(b) ~~Unless~~ If specific variable conditions are not set forth in a rule ~~granting~~ of the Marine Fisheries Commission that grants proclamation authority to the Fisheries Director, possible variable conditions ~~triggering the use of the Fisheries Director's proclamation authority~~ may include any of the following:

(1) compliance with changes mandated by the Fisheries Reform Act and its amendments;
(2) biological impacts;
(3) environmental conditions;
(4) compliance with Fishery Management Plans;
(5) user conflicts;
(6) bycatch issues; ~~and~~
(7) variable spatial ~~distributions.~~distributions; and
(8) protection of public health related to the public health programs that fall under the authority of the Marine Fisheries Commission.

Authority G.S. 113-134; 113-135; 113-182; 113-221.1; 113-221.2; 113-221.3; 143B-289.52.

SUBCHAPTER 03J - NETS, POTS, DREDGES, AND OTHER FISHING DEVICES

SECTION .0100 - NET RULES, GENERAL

15A NCAC 03J .0104 TRAWL NETS

(a) It is unlawful to possess aboard a vessel while using a trawl in ~~internal waters~~ Internal Coastal Waters more than 500 pounds of finfish from December 1 through ~~February 28,~~ March 1, and 1,000 pounds of finfish from March ~~1~~ 2 through November 30.

(b) It is unlawful to use trawl nets:

(1) ~~In internal coastal waters,~~ in Internal Coastal Waters, from 9:00 p.m. on Friday through 5:00 p.m. on Sunday, ~~except that in the areas listed in Subparagraph (b)(5) of this Rule, trawling is prohibited from December 1 through February 28 from one hour after sunset on Friday to one hour before sunrise on Monday;~~except:
(A) from December 1 through March 1 from one hour after sunset on Friday to one hour before sunrise on Monday in the areas listed in Subparagraph (b)(5) of this Rule; and
(B) for a holder of a Permit for Weekend Trawling for Live Shrimp in accordance with 15A NCAC 03O .0503;
(2) ~~For~~ for the taking of oysters;
(3) ~~In~~ in Albemarle Sound, Currituck Sound, and their tributaries, west of a line beginning on the south shore of Long Point at a point 36° 02.4910' N – 75° 44.2140' W; running southerly to the north shore on Roanoke Island to a point 35° 56.3302' N – 75° 43.1409' W; running northwesterly to Caroon Point to a point 35° 57.2255' N – 75° 48.3324' W;
(4) ~~In~~ in the areas described in 15A NCAC 03R .0106, except that the Fisheries Director may, by proclamation, open the area designated in Item (1) of 15A NCAC 03R .0106 to peeler crab trawling;
(5) ~~From~~ from December 1 through ~~February 28~~ March 1 from one hour after sunset to one hour before sunrise in the following areas:
(A) In Pungo River, north of a line beginning on Currituck Point at a point 35° 24.5833' N – 76° 32.3166' W; running southwesterly to Wades Point to a point 35° 23.3062' N – 76° 34.5135' W;
(B) In Pamlico River, west of a line beginning on Wades Point at a point 35° 23.3062' N – 76° 34.5135' W; running southwesterly to Fulford Point to a point 35° 19.8667' N – 76° 35.9333' W;
(C) In Bay River, west of a line beginning on Bay Point at a point 35° 11.0858' N – 76° 31.6155' W; running southerly to Maw Point to a point 35° 09.0214' N – 76° 32.2593' W;
(D) In Neuse River, west of a line beginning on the Minnesott side of the Neuse River Ferry at a point 34° 57.9116' N – 76° 48.2240' W; running southerly to the Cherry Branch side of the Neuse River Ferry to a point 34° 56.3658' N – 76° 48.7110' W; and
(E) In New River, all waters upstream of the N.C. Highway 172 Bridge when opened by proclamation; and
(6) ~~In~~ in designated pot areas opened to the use of pots by 15A NCAC 03J .0301(a)(2) and described in 15A NCAC 03R .0107(a)(5), (a)(6), (a)(7), (a)(8) and (a)(9) within an area bound by the shoreline to the depth of six feet.

(c) Minimum mesh sizes for shrimp and crab trawls are ~~presented~~ provided in 15A NCAC 03L .0103 and .0202.

(d) The Fisheries Director may, with prior consent of the Marine Fisheries Commission, by proclamation, require bycatch reduction devices or codend modifications in trawl nets to reduce the catch of finfish that do not meet size limits or are unmarketable as individual foodfish by reason of size.

(e) It is unlawful to use shrimp trawls for recreational purposes unless the trawl is marked by attaching to the codend (tailbag), one floating buoy, any shade of hot pink in color, which shall be of solid foam or other solid buoyant material no less than five inches in diameter and no less than five inches in length. The owner shall always be identified on the buoy by using an engraved buoy or by attaching engraved metal or plastic tags to the buoy. Such identification shall include owner's last name and initials and if a vessel is used, one of the following:

(1) gear owner's current motor boat registration number; or
(2) owner's U.S. vessel documentation name.

(f) It is unlawful to use shrimp trawls for the taking of blue crabs in ~~internal waters,~~ Internal Coastal Waters, except that it shall be permissible to take or possess blue crabs incidental to shrimp trawling in accordance with the following limitations:

(1) ~~For~~ for individuals using shrimp trawls authorized by a Recreational Commercial Gear License, 50 blue ~~crabs,~~ crabs per day, not to exceed 100 blue crabs if two or more Recreational Commercial Gear License holders are on ~~board.~~board a vessel; and
(2) ~~For~~ for commercial operations, crabs may be taken incidental to lawful shrimp trawl operations provided that the weight of the crabs shall not exceed the greater of:
(A) 50 percent of the total weight of the combined crab and shrimp catch; or
(B) 300 pounds.

(g) The Fisheries Director may, by proclamation, close any area to trawling for specific time periods in order to secure compliance with this Rule.

Authority G.S. 113-134; 113-173; 113-182; 113-221.1; 143B-289.52.

SUBCHAPER 03K - OYSTERS, CLAMS, SCALLOPS AND MUSSELS

SECTION .0100 - SHELLFISH, GENERAL

15A NCAC 03K .0110 PUBLIC HEALTH AND CONTROL OF OYSTERS, CLAMS, SCALLOPS, AND MUSSELS

~~(a) To protect public health, the Fisheries Director may, by proclamation, impose any or all of the following restrictions on oysters, clams, scallops, and mussels to ensure the sale or distribution of shellfish from approved areas or shellstock dealers as defined in Rule 15A NCAC 18A .0301 and to ensure that shellfish have not been adulterated or mislabeled during cultivation, harvesting, processing, storage and transport, in compliance with the National Shellfish Sanitation Program Guide for Control of Molluscan Shellfish, Section II: Model Ordinance:~~

(a) The National Shellfish Sanitation Program Guide for Control of Molluscan Shellfish, Section II: Model Ordinance (Model Ordinance) includes minimum requirements for the sale or distribution of shellfish from approved areas or shellstock dealers, as defined in 15A NCAC 18A .0301, and to ensure that shellfish have not been adulterated or mislabeled during:

(1) cultivation;
(2) harvesting;
(3) processing;
(4) storage; and
(5) transport.

(b) To protect public health and to address variable conditions of the Model Ordinance, the Fisheries Director may, by proclamation, impose requirements as set forth in Paragraph (c) of this Rule on any of the following:

(1) oysters;
(2) clams;
(3) scallops;
(4) mussels;
(5) areas used to store shellfish;
(6) means and methods to take shellfish;
(7) vessels used to take shellfish; and
(8) shellstock conveyances as defined in 15A NCAC 18A .0301.

(c) Proclamations issued under this Rule may impose any of the following requirements:

(1) specify time and temperature controls;
(2) specify sanitation requirements to prevent a food safety hazard, as defined in 15A NCAC 18A .0301, or cross-contamination or adulteration of shellfish;
~~(2)~~(3) specify sanitation control procedures as specified in 21 Code of Federal Regulations (CFR) Part 123.11;
~~(3)~~(4) specify Hazard Analysis Critical Control Point (HACCP) requirements as specified in 21 CFR Part:
(A) 123.3 Definitions;
(B) 123.6 HACCP Plan;
(C) 123.7 Corrective Actions;
(D) 123.8 Verification;
(E) 123.9 Records; and
(F) 123.28 Source Controls;
~~(4)~~(5) specify tagging and labeling requirements;
~~(5)~~(6) implement the National Shellfish Sanitation Program's training requirements for shellfish harvesters and certified shellfish dealers;
~~(6)~~(7) require sales records and collection and submission of information to provide a mechanism for shellfish product to be traced back to the water body of origin; and
~~(7)~~(8) require implicated product recall and specify recall procedures.

21 CFR 123.3 (2015), 123.6-9 (1997), 123.11 (2015), and 123.28 (1997) are hereby incorporated by reference. A copy of the reference materials can be found at http://www.ecfr.gov/cgi-bin/text-idx?SID=f4cdd666e75f54ccda1d9938f4edd9ab&mc=true&tpl=/ecfrbrowse/Title21/21tab_02.tpl, free of charge. A copy of the CFR in effect on the date of this Rule can be found at http://portal.ncdenr.org/web/mf/rules-and-regulations, free of charge.

~~(b)~~(d) Proclamations issued under this Rule shall suspend appropriate rules or portions of rules under the authority of the Marine Fisheries Commission as specified in the proclamation. The provisions of 15A NCAC 03I .0102 terminating suspension of a rule pending the next Marine Fisheries Commission meeting and requiring review by the Marine Fisheries Commission at the next meeting shall not apply to proclamations issued under this Rule.

Authority G.S. 113-134; 113-182; 113-201; 113-221.1; 113-221.2; 143B-289.52.

SECTION .0200 - OYSTERS

15A NCAC 03K .0201 OYSTER HARVEST MANAGEMENT

(a) It is unlawful to take or possess oysters from public ~~bottoms~~ bottom except from October 15 through March 31.

(b) The Fisheries Director may, by proclamation, ~~close and open the season within the time period stated herein or close and open any of the various waters to the taking of oysters depending on the need to protect small oysters and their habitat, the amount of saleable oysters available for harvest, the number of days harvest is prevented due to unsatisfactory bacteriological samples and weather conditions, and the need to prevent loss of oysters due to parasitic infections and thereby reduce the transmission of parasites to uninfected oysters or other variable conditions and may~~ impose any ~~or all~~ of the following restrictions on the taking of ~~commercial and recreational oyster harvest:~~oysters:

(1) ~~Specify days of the week harvesting will be allowed;~~specify time;

(2) ~~Specify areas;~~ specify area;

(3) ~~Specify~~ specify means and ~~methods which may be employed in the taking;~~methods;

(4) ~~Specify time period;~~specify season within the period set forth in Paragraph (a) of this Rule;

~~(5) Specify the quantity, but shall not exceed possession of more than 50 bushels in a commercial fishing operation; and~~

~~(6) Specify the minimum size limit by shell length, but not less than 2 1/2 inches.~~

(5) specify size, but the minimum size specified shall not be less than three inches, except the minimum size specified shall not be less than two and one-half inches to prevent loss of oysters due to predators, pests, or infectious oyster diseases; and

(6) specify quantity, but shall not exceed possession of more than 20 standard U.S. bushels in a commercial fishing operation per day.

Authority G.S. 113-134; 113-182; 113-201; 113-221.1; 143B-289.52.

15A NCAC 03K .0202 CULLING REQUIREMENTS FOR OYSTERS

(a) It is unlawful to possess oysters which have accumulated dead shell, accumulated oyster cultch material, a shell length less than that specified by ~~proclamation,~~ proclamation issued under the authority of Rule .0201 of this Section, or any combination thereof that exceeds a ~~10 percent~~ five-percent tolerance limit by volume. In determining whether the tolerance limit is exceeded, the Fisheries Director and his agents may grade all, or any portion, or any combination of portions of the entire quantity being graded, and in cases of violations, may seize and return to public bottom or otherwise dispose of the oysters as authorized by law.

(b) All oysters shall be culled ~~by the catcher~~ where harvested and all oysters of less than legal size, accumulated dead ~~shell~~ shell, and cultch ~~material,~~ material shall be immediately returned to the bottom from which taken.

(c) This Rule shall not apply to oysters imported from out-of-state solely for shucking by shucking and packing plants currently permitted by the ~~Shellfish Sanitation Section of the Division of Environmental Health.~~Division of Marine Fisheries.

Authority G.S. 113-134; 113-182; 143B-289.52

15A NCAC 03K .0302 MECHANICAL HARVEST OF CLAMS FROM PUBLIC BOTTOM

(a) It is unlawful to take, buy, sell, or possess any clams taken by mechanical methods from public bottom unless the season is open.

(b) ~~except that the~~ The Fisheries Director may, by proclamation, open and close the season at any time in the Atlantic Ocean and only ~~between~~ from December 1 through March 31 in Internal Coastal Waters.~~internal waters for the use of mechanical clam harvesting gear. The Fisheries Director is further empowered to impose any or all of the following restrictions:~~

~~(1) specify number of days;~~

~~(2) specify areas;~~

~~(3) specify time period; (4) specify quantity or size; and~~

~~(5) specify means/methods. Any proclamation specifying means or methods must be approved by the Marine Fisheries Commission prior to issuance.~~

~~(b)~~(c) The Fisheries Director may, by proclamation, open to the taking of clams by mechanical methods from public bottom during open seasons only areas that have been opened at any time from January 1979 through September 1988 in:

(1) Newport, North, White Oak, and New rivers;

(2) Core and Bogue sounds;

(3) the Intracoastal Waterway north of "BC" Marker at Topsail Beach; and

(4) the Atlantic Ocean.

~~in Core and Bogue Sounds, Newport, North, White Oak and New Rivers and the Intracoastal Waterway north of "BC" Marker at Topsail Beach which have been opened at any time from January, 1979, through September, 1988, to the harvest of clams by mechanical methods. The Fisheries Director may, by proclamation, open the Atlantic Ocean and the area or any portion of the area in Pamlico Sound bounded by a line beginning on Portsmouth Island at a point 35° 01.5000' N - 76° 06.0000' W; running northerly to a point 35° 06.0000' N - 76° 06.0000' W; running westerly to a point 35° 06.0000' N - 76° 10.0000' W; running southerly to a point 35° 01.5000' N - 76° 10.0000' W; running easterly to the point of beginning to the harvest of clams by mechanical methods.~~ Other areas opened for purposes as set out in 15A NCAC 03K .0301(b) shall open only for those purposes. A list of areas as described in this Paragraph is available upon request at the Division of Marine Fisheries, 3441 Arendell Street, P.O. Box 769, Morehead City, NC 28557.

(d) The Fisheries Director may, by proclamation, impose any or all of the following additional restrictions for the taking of clams by mechanical methods from public bottom during open seasons:

(1) specify time;

(2) specify means and methods;

(3) specify size; and

(4) specify quantity.

Authority G.S. 113-134; 113-182; 113-221.1; 143B-289.52.

SUBCHAPTER 03L – SHRIMPS, CRAB, AND LOBSTER

SECTION .0100 - SHRIMP

15A NCAC 03L .0102 WEEKEND SHRIMPING PROHIBITED

It is unlawful to take shrimp by any method from 9:00 ~~P.M.~~ p.m. on Friday through 5:00 ~~P.M.~~ p.m. on Sunday, except:

(1) in the Atlantic Ocean; ~~or~~

(2) with the use of fixed and channel nets, hand seines, shrimp pots and cast ~~nets.~~nets; and

(3) for a holder of a Permit for Weekend Trawling for Live Shrimp in accordance with 15A NCAC 03O .0503.

Authority G.S. 113-134; 113-182; 143B-289.52.

SUBCHAPTER 03M - FINFISH

SECTION .0500 - OTHER FINFISH

15A NCAC 03M .0522 SPOTTED SEATROUT

The Fisheries Director may, by proclamation, impose any of the following requirements on the taking of spotted seatrout:

(1) specify time;

(2) specify area;

(3) specify means and methods;

(4) specify season;

(5) specify size; and

(6) specify quantity.

Authority G.S. 113-134; 113-182; 113-221.1; 143B-289.52.

SUBCHAPTER 03O - LICENSES, LEASES, FRANCHISES AND PERMITS

SECTION .0100 - LICENSES

15A NCAC 03O .0114 SUSPENSION, REVOCATION, AND REISSUANCE OF LICENSES

(a) All commercial and recreational licenses issued under Article 14A, Article 14B, and Article 25A of Chapter 113 are subject to suspension and revocation.

(b) A conviction resulting from being charged by an inspector under G.S. 14-32, ~~14-33~~ 14-33, 14-72, or 14-399 shall be deemed a conviction for license suspension or revocation purposes.

(c) Upon receipt of notice of a licensee's conviction as specified in G.S. 113-171 or a conviction as specified in Paragraph (b) of this Rule, the Fisheries Director shall determine whether it is a first, ~~a~~ second, ~~a third~~ third, ~~or a fourth~~ fourth, or subsequent conviction. Where several convictions result from a single transaction or occurrence, the convictions shall be treated as a single conviction so far as suspension or revocation of the licenses of a licensee is concerned. For a second conviction, the Fisheries Director shall suspend all licenses issued to the licensee for a period of 30 days; for a third conviction, the Fisheries Director shall suspend all licenses issued to the licensee for a period of 90 days; for a fourth or subsequent conviction, the Fisheries Director shall revoke all licenses issued to the licensee, except:

(1) ~~For~~ for a felony conviction under G.S. 14-399, the Fisheries Director shall suspend all licenses issued to the licensee for a period of one year;

(2) ~~For~~ for a first conviction under G.S. 113-187(d)(1), the Fisheries Director shall suspend all licenses issued to the licensee for a period of one year; for a second or subsequent conviction under G.S. 113-187(d)(1), the Fisheries Director shall revoke all licenses issued to the licensee;

(3) ~~For~~ for a conviction under G.S. 14-72, 113-208, 113-209, 113-268, or 113-269, the Fisheries Director shall revoke all licenses issued to the licensee; and

(4) ~~For~~ for a conviction under G.S. 14-32 or 14-33, when the offense was committed against a marine fisheries ~~inspector~~ inspector, the Fisheries Director shall revoke all licenses issued to the licensee; the former licensee shall not be eligible to apply for reinstatement of a revoked license or for any additional license authorized in Article 14A, Article 14B and Article 25A of Chapter 113 for a period of two years.

(d) After the Fisheries Director determines a conviction requires a suspension or revocation of the licenses of a licensee, the Fisheries Director shall cause the licensee to be served with written notice of suspension or revocation. The written notice may be served upon any responsible individual affiliated with the corporation, partnership, or association where the licensee is not an individual. The notice of suspension or revocation shall be served by an inspector or other agent of the Department or by certified mail, must state the ground upon which it is based, and takes effect immediately upon service. The agent of the Fisheries Director making service shall then or subsequently, as may be feasible under the circumstances, collect all license certificates and plates and other forms or records relating to the license as directed by the Fisheries Director.

(e) Where a license has been suspended, the former licensee shall not be eligible to apply for reissuance of license or for any additional license authorized in Article 14A, Article 14B and Article 25A of Chapter 113 during the suspension period. Licenses shall be returned to the licensee by the Fisheries Director or the Director's agents at the end of a period of suspension.

(f) Where a license has been revoked, the former licensee shall not be eligible to apply for reinstatement of a revoked license or for any additional license authorized in Article 14A, Article 14B and Article 25A of Chapter 113 for a period of one year, except as provided in ~~Paragraph~~ Subparagraph (c)(4) of this Rule. For a request for reinstatement following revocation, the eligible former licensee shall satisfy the Fisheries Director that the licensee will strive in the future to conduct the operations for which the license is sought in accord with all applicable laws and rules by sending a request for reinstatement in writing to the Fisheries Director, Division of Marine Fisheries, 3441 Arendell Street, P.O. Box 769, Morehead City, ~~North Carolina~~ NC 28557. Upon the application

of an eligible former licensee after revocation, the Fisheries Director may issue one license sought but not another, as deemed necessary to prevent the hazard of recurring violations of the law.
(g) A licensee shall not willfully evade the service prescribed in this Rule.

Authority G.S. 113-168.1; 113-171; S.L. 2010-145.

SECTION .0200 - LEASES AND FRANCHISES

15A NCAC 03O .0201 STANDARDS AND REQUIREMENTS FOR SHELLFISH BOTTOM LEASES AND FRANCHISES AND WATER COLUMN LEASES

(a) All areas of the public ~~bottoms~~ bottom underlying ~~coastal fishing waters~~ Coastal Fishing Waters shall meet the following ~~standards~~ standards and requirements, in addition to the standards in G.S. 113-202 in order to be deemed suitable for leasing for shellfish cultivation purposes:

(1) ~~The~~ the proposed lease area ~~must~~ shall not contain a ~~natural shellfish bed which is defined as~~ "natural shellfish bed", as defined in G.S. 113-201.1 or have 10 bushels or more of shellfish per ~~acre.~~acre;

(2) ~~The~~ the proposed lease area ~~must~~ shall not be closer than 100 feet to a developed shoreline, except no minimum setback is required when the area to be leased borders the applicant's property or the property of ~~riparian owners~~ "riparian owners", as defined in G.S. 113-201.1 who have consented in a notarized ~~statement. In~~ statement, or is in an area bordered by undeveloped ~~shoreline, no minimum setback is required.~~shoreline; and

(3) ~~The~~ the proposed lease area shall not be less than one-half acre and shall not exceed ~~five~~ 10 acres for all ~~areas except those areas open to the mechanical harvest of oysters where proposed lease area shall not exceed 10 acres.~~areas.

~~This Subparagraph shall not be applied to reduce any holdings as of July 1, 1983.~~

~~(b) Persons holding five or more acres under shellfish lease or franchise shall meet the standards established in Paragraph (c) of this Rule prior to acceptance of applications for additional shellfish lease acreage.~~

(b) To be deemed suitable for leasing for aquaculture purposes, water columns superjacent to leased bottom shall meet the standards in G.S. 113-202.1 and water columns superjacent to franchises recognized pursuant to G.S. 113-206 shall meet the standards in G.S. 113-202.2.

(c) ~~Franchises~~ To avoid termination, franchises recognized pursuant to G.S. 113-206 and shellfish bottom leases shall meet the following ~~standards in addition to the standards in G.S. 113-202. In order to avoid termination, franchises and shellfish bottom leases shall:~~requirements, in addition to the standards in G.S. 113-202:

(1) ~~Produce~~ produce and market 10 bushels of shellfish per acre per year; and

(2) ~~Plant~~ plant 25 bushels of seed shellfish per acre per year or 50 bushels of cultch per acre per year, or a combination of cultch and seed shellfish where the percentage of required cultch planted and the percentage of required seed shellfish planted totals at least 100 percent.

(d) To avoid termination, water column leases shall:

(1) produce and market 40 bushels of shellfish per acre per year; or

(2) plant 100 bushels of cultch or seed shellfish per acre per year.

~~(d)~~(e) The following standards shall be applied to determine compliance with ~~Subparagraphs (1) and (2) of Paragraph (c)~~ Paragraphs (c) and (d) of this Rule:

(1) Only shellfish marketed, planted, or produced ~~or marketed according to the definitions~~ as defined in 15A NCAC 03I .0101 as the fishing activities "shellfish marketing from leases and franchises", "shellfish planting effort on leases and franchises", or "shellfish production on leases and franchises" shall be submitted on ~~production/utilization~~ reporting forms as set forth in Rule .0207 of this Section for ~~shellfish~~ leases and franchises.

(2) If more than one ~~shellfish~~ lease or franchise is used in the production of shellfish, one of the leases or franchises used in the production of the shellfish ~~must~~ shall be designated as the producing lease or franchise for those shellfish. Each bushel of shellfish may be produced by only one ~~shellfish~~ lease or franchise. Shellfish transplanted between leases or franchises may be credited as planting effort on only one lease or franchise.

(3) Production and marketing information and planting effort information shall be compiled and averaged separately to assess compliance with the ~~standards.~~requirements. The lease or franchise ~~must~~ shall meet both the production requirement and the planting effort requirement within the dates set forth in G.S. 113-202.1 and 202.2 to be ~~judged~~ deemed in compliance ~~with these standards.~~for shellfish bottom leases. The lease or franchise shall meet either the production requirement or the planting effort requirement within the dates set forth in G.S. 113-202.1 and 202.2 to be deemed in compliance for water column leases.

(4) All bushel measurements shall be in standard U.S. bushels.

~~(4)~~(5) In determining production and marketing averages and planting effort averages for information not reported in bushel measurements, the following conversion factors shall be used:

(A) 300 oysters, 400 clams, or 400 scallops equal one bushel; and

(B) 40 pounds of scallop shell, 60 pounds of oyster shell, 75 pounds of clam ~~shell and~~ shell, or 90 pounds of fossil stone equal one bushel.

(5) In the event that a portion of an existing lease or franchise is obtained by a new owner, the production history for the portion obtained shall be a percentage of the originating lease or franchise production equal to the percentage of the area of lease or franchise site obtained to the area of the originating lease or franchise.

(6) Production and marketing rate averages shall be computed irrespective of transfer of the lease or franchise. The production and marketing rates shall be averaged:averaged for the following situations using the time periods described:

(A) for an initial bottom lease or franchise, over the consecutive full calendar years remaining on the bottom lease or franchise contract after December 31 following the second anniversary of the initial bottom leases and franchises.lease or franchise;

(B) for a renewal bottom lease or franchise, over the consecutive full calendar years beginning January 1 of the final year of the previous bottom lease or franchise term and ending December 31 of the final year of the current bottom lease contract for renewal leases.or franchise contract;

(C) for a water column lease, over the first five year five-year period for an initial water column leases lease and over the most recent five year five-year period thereafter for a renewal water column leases.lease; or

(D) for a bottom lease or franchise issued an extension period under Rule .0208 of this Section, over the most recent five-year period.

Production and marketing rate averages shall be computed irrespective of transfer of the shellfish lease or franchise.

(7) All bushel measurements shall be in U.S. Standard Bushels.

(7) In the event that a portion of an existing lease or franchise is obtained by a new owner, the production history for the portion obtained shall be a percentage of the originating lease or franchise production equal to the percentage of the area of lease or franchise site obtained to the area of the originating lease or franchise.

(f) Persons holding five or more acres under all shellfish bottom leases and franchises combined shall meet the requirements established in Paragraph (c) of this Rule prior to the Division of Marine Fisheries accepting applications for additional shellfish lease acreage.

(e) Water columns superjacent to leased bottoms shall meet the standards in G.S. 113-202.1 in order to be deemed suitable for leasing for aquaculture purposes.

(f) Water columns superjacent to franchises recognized pursuant to G.S. 113-206 shall meet the standards in G.S. 113-202.2 in order to be deemed suitable for leasing for aquaculture purposes.

(g) Water column leases must produce and market 40 bushels of shellfish per acre per year to meet the minimum commercial production requirement or plant 100 bushels of cultch or seed shellfish per acre per year to meet commercial production by planting effort. The standards for determining production and marketing averages and planting effort averages shall be the same for water column leases as for bottom leases and franchises set forth in Paragraph (d) of this Rule except that either the produce and market requirement or the planting requirement must be met.

Authority G.S. 113-134; 113-201; 113-202; 113-202.1; 113-202.2; 113-206; 143B-289.52.

15A NCAC 03O .0208 TERMINATION OF SHELLFISH BOTTOM LEASES AND FRANCHISES AND WATER COLUMN LEASES

(a) Procedures for termination of shellfish leaseholds are provided in G.S. 113-202. The Secretary's decision to terminate a leasehold may be appealed by initiating a contested case as outlined in G.S. 150B-23.

(a)(b) In addition to Consistent with the grounds for termination established by G.S. 113-202, the Secretary shall begin action to terminate leases and franchises for failure to produce and market shellfish or for failure to maintain a planting effort of cultch or seed shellfish in accordance with 15A NCAC 03O .0201substantial breach of compliance with the provisions of rules of the Marine Fisheries Commission governing use of the leasehold includes the following, except as provided in Paragraph (c) of this Rule:

(1) failure to meet shellfish production and marketing requirements for bottom leases or franchises in accordance with Rule .0201 of this Section;

(2) failure to maintain a planting effort of cultch or seed shellfish for bottom leases or franchises in accordance with Rule .0201 of this Section;

(3) failure either to meet shellfish production and marketing requirements or to maintain a planting effort of cultch or seed shellfish for water column leases in accordance with Rule .0201 of this Section;

(4) the Fisheries Director has cause to believe the holder of private shellfish bottom or franchise rights has encroached or usurped the legal rights of the public to access public trust resources in navigable waters, in accordance with G.S. 113-205 and Rule .0204 of this Section; or

(5) the Attorney General initiates action for the purpose of vacating or annulling letters patent granted by the State, in accordance with G.S. 146-63.

(b) Action to terminate a shellfish franchise shall begin when there is reason to believe that the patentee, or those claiming under him, have done or omitted an act in violation of the terms and conditions on which the letters patent were granted, or have by

~~any other means forfeited the interest acquired under the same. The Division shall investigate all such rights issued in perpetuity to determine whether the Secretary should request that the Attorney General initiate an action pursuant to G.S. 146-63 to vacate or annul the letters patent granted by the state.~~

~~(c) Action to terminate a shellfish lease or franchise shall begin when the Fisheries Director has cause to believe the holder of private shellfish rights has encroached or usurped the legal rights of the public to access public trust resources in navigable waters.~~

(c) Consistent with G.S. 113-202(l1) and 113-201(b), a leaseholder that failed to meet requirements in G.S. 113-202, 15A NCAC 03O .0201 or this Rule may be granted a single extension period of no more than two years per contract period upon sufficient showing of hardship by written notice to the Fisheries Director prior to the expiration of the lease term that one of the following occurrences caused or will cause the leaseholder to fail to meet lease requirements:

(1) death, illness, or incapacity of the leaseholder or his "immediate family", as defined in G.S. 113-168 that prevented or will prevent the leaseholder from working the lease;

(2) damage to the lease from hurricanes, tropical storms, or other severe weather events recognized by the National Weather Service;

(3) shellfish mortality caused by disease, natural predators, or parasites; or

(4) damage to the lease from a manmade disaster that triggers a state emergency declaration or federal emergency declaration.

(d) In the case of hardship as described in Subparagraph (c)(1) of this Rule, the notice shall state the name of the leaseholder or immediate family member, and either the date of death, or the date and nature of the illness or incapacity. The Fisheries Director may require a doctor's verification of the illness or incapacity. Written notice and any supporting documentation shall be addressed to the Director of the Division of Marine Fisheries, 3441 Arendell Street, P.O. Box 769, Morehead City, NC 28557.

(e) Requirements for transfer of beneficial ownership of all or any portion of or interest in a leasehold are provided in G.S. 113-202(k).

~~(d) In the event action to terminate a lease is begun, the owner shall be notified by registered mail and given a period of 30 days in which to correct the situation. Petitions to review the Secretary's decision must be filed with the Office of Administrative Hearings as outlined in 15A NCAC 03P .0102. (e) The Secretary's decision to terminate a lease may be appealed by initiating a contested case as outlined in 15A NCAC 03P .0102.~~

Authority G.S. 113-134; 113-201; 113-202; 113-202.1; 113-202.2; 113-205; 143B-289.52.

SECTION .0500 - PERMITS

15A NCAC 03O .0501 PROCEDURES AND REQUIREMENTS TO OBTAIN PERMITS

(a) To obtain any Marine Fisheries permit, the following information is required for proper application from the applicant, a responsible party, or person holding a power of attorney:

(1) ~~Full~~ full name, physical address, mailing address, date of birth, and signature of the applicant on the ~~application. If~~ application and if the applicant is not appearing before a license agent or the designated Division contact, the applicant's signature on the application shall be notarized;

(2) ~~Current~~ current picture identification of applicant, responsible party, or person holding a power of attorney. Acceptable forms of picture identification are driver's license, North Carolina Identification card issued by the North Carolina Division of Motor Vehicles, military identification card, resident alien card (green card), or ~~passport;~~ passport, or if applying by mail, a copy thereof;

(3) ~~Full~~ full names and dates of birth of designees of the applicant who will be acting under the requested permit where that type permit requires listing of designees;

(4) ~~Certification~~ certification that the applicant and his designees do not have four or more marine or estuarine resource convictions during the previous three years;

(5) ~~For~~ for permit applications from business entities:

(A) ~~Business Name;~~ business name;

(B) ~~Type of Business Entity: Corporation,~~ type of business entity: corporation, partnership, or sole proprietorship;

(C) ~~Name,~~ name, address, and phone number of responsible party and other identifying information required by this Subchapter or rules related to a specific permit;

(D) ~~For~~ for a corporation, current articles of incorporation and a current list of corporate officers when applying for a permit in a corporate name;

(E) ~~For~~ for a partnership, if the partnership is established by a written partnership agreement, a current copy of such agreement shall be provided when applying for a permit; and

(F) ~~For~~ for business entities, other than corporations, copies of current assumed name statements if filed and copies of current business privilege tax certificates, if applicable; and

(6) ~~Additional~~ additional information as required for specific permits.

(b) A permittee shall hold a valid Standard or Retired Standard Commercial Fishing License in order to hold a:

(1) Pound Net Permit;

(2) Permit to Waive the Requirement to Use Turtle Excluder Devices in the Atlantic Ocean; ~~or~~

(3) Atlantic Ocean Striped Bass Commercial Gear ~~Permit.~~Permit; or

(4) Permit for Weekend Trawling for Live Shrimp.

(A) An individual who is assigned a Standard Commercial Fishing License is the individual required to hold a Permit for Weekend Trawling for Live Shrimp.

(B) The master designated on the single vessel corporation Standard Commercial Fishing License is the individual required to hold the Permit for Weekend Trawling for Live Shrimp.

(c) ~~A~~ When mechanical methods to take shellfish are used, a permittee and his designees shall hold a valid Standard or Retired Standard Commercial Fishing License with a Shellfish Endorsement ~~or a Shellfish License~~ in order for a permittee to hold a:

(1) Permit to Transplant Prohibited (Polluted) Shellfish;

(2) Permit to Transplant Oysters from Seed Oyster Management Areas;

(3) Permit to Use Mechanical Methods for Shellfish on Shellfish Leases or ~~Franchises;~~Franchises, except as provided in G.S. 113-169.2;

(4) Permit to Harvest Rangia Clams from Prohibited (Polluted) Areas; or

(5) Depuration Permit.

(d) When mechanical methods to take shellfish are not used, a permittee and his designees shall hold a valid Standard or Retired Standard Commercial Fishing License with a Shellfish Endorsement or a Shellfish License in order for a permittee to hold a:

(1) Permit to Transplant Prohibited (Polluted) Shellfish;

(2) Permit to Transplant Oysters from Seed Oyster Management Areas;

(3) Permit to Harvest Rangia Clams from Prohibited (Polluted) Areas; or

(4) Depuration Permit.

~~(d)~~(e) A permittee shall hold a valid:

(1) Fish Dealer License in the proper category in order to hold Dealer Permits for Monitoring Fisheries Under a Quota/Allocation for that category; and

(2) Standard Commercial Fishing License with a Shellfish Endorsement, Retired Standard Commercial Fishing License with a Shellfish Endorsement or a Shellfish License in order to harvest clams or oysters for depuration.

~~(e)~~(f) Aquaculture Operations/Collection Permits:

(1) A permittee shall hold a valid Aquaculture Operation Permit issued by the Fisheries Director to hold an Aquaculture Collection Permit.

(2) The permittee or designees shall hold appropriate licenses from the Division of Marine Fisheries for the species harvested and the gear used under the Aquaculture Collection Permit.

~~(f)~~(g) Atlantic Ocean Striped Bass Commercial Gear Permit:

(1) Upon application for an Atlantic Ocean Striped Bass Commercial Gear Permit, a person shall declare one of the following gears for an initial permit and at intervals of three consecutive license years thereafter:

(A) gill net;

(B) trawl; or

(C) beach seine.

For the purpose of this Rule, a "beach seine" is defined as a swipe net constructed of multi-filament or multi-fiber webbing fished from the ocean beach that is deployed from a vessel launched from the ocean beach where the fishing operation takes place. Gear declarations shall be binding on the permittee for three consecutive license years without regard to subsequent annual permit issuance.

(2) A person is not eligible for more than one Atlantic Ocean Striped Bass Commercial Gear Permit regardless of the number of Standard Commercial Fishing Licenses, Retired Standard Commercial Fishing Licenses or assignments held by the person.

~~(g)~~(h) Applications submitted without complete and required information shall not be processed until all required information has been submitted. Incomplete applications shall be returned to the applicant with deficiency in the application so noted.

~~(h)~~(i) A permit shall be issued only after the application has been deemed complete by the Division of Marine Fisheries and the applicant certifies to abide by the permit general and specific conditions established under 15A NCAC 03J .0501, .0505, 03K .0103, .0104, .0107, .0111, .0401, 03O .0502, and .0503 as applicable to the requested permit.

~~(i)~~(j) The Fisheries Director, or his agent may evaluate the following in determining whether to issue, modify, or renew a permit:

(1) ~~Potential~~ potential threats to public health or marine and estuarine resources regulated by the Marine Fisheries Commission;

(2) ~~Applicant's~~ applicant's demonstration of a valid justification for the permit and a showing of responsibility as determined by the Fisheries Director; and

(3) ~~Applicant's~~ applicant's history of habitual fisheries violations evidenced by eight or more violations in 10 years.

~~(j)~~(k) The Division of Marine Fisheries shall notify the applicant in writing of the denial or modification of any permit request and the reasons therefor. The applicant may submit further information, or reasons why the permit should not be denied or modified.

~~(k)~~(l) Permits are valid from the date of issuance through the expiration date printed on the permit. Unless otherwise established by rule, the Fisheries Director may establish the issuance timeframe for specific types and categories of permits based on season, calendar year, or other period based upon the nature of the activity permitted, the duration of the activity, compliance with federal or state fishery management plans or

implementing rules, conflicts with other fisheries or gear usage, or seasons for the species involved. The expiration date shall be specified on the permit.

~~(l)~~(m) For permit renewals, the permittee's signature on the application shall certify all information as true and accurate. Notarization of signature on renewal applications shall not be required.

~~(m)~~(n) For initial or renewal permits, processing time for permits may be up to 30 days unless otherwise specified in this Chapter.

~~(n)~~(o) It is unlawful for a permit holder to fail to notify the Division of Marine Fisheries within 30 days of a change of name or address, in accordance with G.S. 113-169.2.

~~(o)~~(p) It is unlawful for a permit holder to fail to notify the Division of Marine Fisheries of a change of designee prior to use of the permit by that designee.

~~(p)~~(q) Permit applications are available at all Division Offices.

Authority G.S. 113-134; 113-169.1; 113-169.2; 113-169.3; 113-182; 113-210; 143B-289.52.

15A NCAC 03O .0503 PERMIT CONDITIONS; SPECIFIC

(a) Horseshoe Crab Biomedical Use Permit:

(1) It is unlawful to use horseshoe crabs for biomedical purposes without first obtaining a permit.

(2) It is unlawful for persons who have been issued a Horseshoe Crab Biomedical Use Permit to fail to submit a report on the use of horseshoe crabs to the Division of Marine Fisheries due on February 1 of each year. Such reports shall be filed on forms provided by the Division and shall include a monthly account of the number of crabs harvested, statement of percent mortality up to the point of release, and a certification that harvested horseshoe crabs are solely used by the biomedical facility and not for other purposes.

(3) It is unlawful for persons who have been issued a Horseshoe Crab Biomedical Use Permit to fail to comply with the Atlantic States Marine Fisheries Commission Interstate Fishery Management Plan for Horseshoe Crab. The Atlantic States Marine Fisheries Commission Interstate Fishery Management Plan for Horseshoe Crab is incorporated by reference including subsequent amendments and editions. Copies of this plan are available via the Internet from the Atlantic States Marine Fisheries Commission at http://www.asmfc.org/fisheries-management/program-overview and at the Division of Marine Fisheries, ~~P.O. Box 769, 3441 Arendell St.,~~ 3441 Arendell Street, P.O. Box 769, Morehead City, ~~North Carolina~~ NC 28557 at no cost.

(b) Dealers Permits for Monitoring Fisheries under a Quota/Allocation:

(1) During the commercial season opened by proclamation or rule for the fishery for which a Dealers Permit for Monitoring Fisheries under a Quota/Allocation permit is issued, it is unlawful for the fish dealers issued such permit to fail to:

(A) fax or send via electronic mail by noon daily, on forms provided by the Division, the previous day's landings for the permitted fishery to the dealer contact designated on the permit. Landings for Fridays or Saturdays shall be submitted on the following Monday. If the dealer is unable to fax or electronic mail the required information, the permittee shall call in the previous day's landings to the dealer contact designated on the permit, but shall maintain a log furnished by the Division;

(B) submit the required log to the Division upon request or no later than five days after the close of the season for the fishery permitted;

(C) maintain faxes and other related documentation in accordance with 15A NCAC 03I .0114;

(D) contact the dealer contact designated on the permit daily regardless of whether or not a transaction for the fishery for which a dealer is permitted occurred; and

(E) record the permanent dealer identification number on the bill of lading or receipt for each transaction or shipment from the permitted fishery.

(2) Striped Bass Dealer Permit:

(A) It is unlawful for a fish dealer to possess, buy, sell, or offer for sale striped bass taken from the following areas without first obtaining a Striped Bass Dealer Permit validated for the applicable harvest area:

(i) Atlantic Ocean;

(ii) Albemarle Sound Management Area as designated in 15A NCAC 03R .0201; and

(iii) the Joint and Coastal Fishing Waters of the Central/Southern Management Area as designated in 15A NCAC 03R .0201.

(B) No permittee shall possess, buy, sell, or offer for sale striped bass taken from the harvest areas opened by proclamation without having a North

Carolina Division of Marine Fisheries issued valid tag for the applicable area affixed through the mouth and gill cover, or, in the case of striped bass imported from other states, a similar tag that is issued for striped bass in the state of origin. North Carolina Division of Marine Fisheries striped bass tags shall not be bought, sold, offered for sale, or transferred. Tags shall be obtained at the North Carolina Division of Marine Fisheries Offices. The Division of Marine Fisheries shall specify the quantity of tags to be issued based on historical striped bass landings. It is unlawful for the permittee to fail to surrender unused tags to the Division upon request.

(3) Albemarle Sound Management Area for River Herring Dealer Permit: It is unlawful to possess, buy, sell, or offer for sale river herring taken from the ~~following area~~ Albemarle Sound Management Area for River Herring as defined in 15A NCAC 03R .0202 without first obtaining an Albemarle Sound Management Area for River Herring Dealer ~~Permit: Albemarle Sound Management Area for River Herring as defined in 15A NCAC 03R .0202.~~ Permit.

(4) Atlantic Ocean Flounder Dealer Permit:

(A) It is unlawful for a fish dealer to allow vessels holding a valid License to Land Flounder from the Atlantic Ocean to land more than 100 pounds of flounder from a single transaction at their licensed location during the open season without first obtaining an Atlantic Ocean Flounder Dealer Permit. The licensed location shall be specified on the Atlantic Ocean Flounder Dealer Permit and only one location per permit shall be allowed.

(B) It is unlawful for a fish dealer to possess, buy, sell, or offer for sale more than 100 pounds of flounder from a single transaction from the Atlantic Ocean without first obtaining an Atlantic Ocean Flounder Dealer Permit.

(5) Black Sea Bass North of Cape Hatteras Dealer ~~Permit.~~Permit: It is unlawful for a fish dealer to purchase or possess more than 100 pounds of black sea bass taken from the Atlantic Ocean north of Cape Hatteras (35° 15.0321' N) per day per commercial fishing operation during the open season unless the dealer has a Black Sea Bass North of Cape Hatteras Dealer Permit.

(6) Spiny Dogfish Dealer Permit: It is unlawful for a fish dealer to purchase or possess more than 100 pounds of spiny dogfish per day per commercial fishing operation unless the dealer has a Spiny Dogfish Dealer Permit.

(c) Blue Crab Shedding Permit: It is unlawful to possess more than 50 blue crabs in a shedding operation without first obtaining a Blue Crab Shedding Permit from the Division of Marine Fisheries.

(d) Permit to Waive the Requirement to Use Turtle Excluder Devices in the Atlantic Ocean:

(1) It is unlawful to trawl for shrimp in the Atlantic Ocean without Turtle Excluder Devices installed in trawls within one nautical mile of the shore from Browns Inlet (34° 35.7000' N latitude) to Rich's Inlet (34° 17.6000' N latitude) without a valid Permit to Waive the Requirement to Use Turtle Excluder Devices in the Atlantic Ocean when allowed by proclamation from April 1 through November 30.

(2) It is unlawful to tow for more than 55 minutes from April 1 through October 31 and 75 minutes from November 1 through November 30 in the area described in Subparagraph (d)(1) of this Rule when working under this permit. Tow time begins when the doors enter the water and ends when the doors exit the water.

(3) It is unlawful to fail to empty the contents of each net at the end of each tow.

(4) It is unlawful to refuse to take observers upon request by the Division of Marine Fisheries or the National ~~Marine Fisheries Service.~~Oceanic and Atmospheric Administration Fisheries.

(5) It is unlawful to fail to report any sea turtle captured. Reports shall be made within 24 hours of the capture to the Marine Patrol Communications Center by phone. All turtles taken incidental to trawling shall be handled and resuscitated in accordance with requirements specified in 50 ~~CFR~~ Code of Federal Regulations (CFR) 223.206. ~~This federal rule is incorporated by reference including subsequent amendments and editions. Copies of this rule are available via the Code of Federal Regulations posted on the Internet at http://www.gpoaccess.gov/cfr/index.html and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost.~~ 50 CFR 223.206 (2002) is hereby incorporated by reference. A copy of the reference materials can be found at http://www.ecfr.gov/cgi-bin/text-idx?SID=9088932317c242b91d6a87a47b6bda54&mc=true&tpl=/ecfrbrowse/Title50/50tab_02.tpl, free of charge. A copy of the CFR in effect on the date of this Rule can be found at http://portal.ncdenr.org/web/mf/rules-and-regulations, free of charge.

(e) Pound Net Set ~~Permits.~~Permit: Rule 15A NCAC 03J .0505 sets forth the specific conditions for pound net set permits.

(f) Aquaculture ~~Operations/Collection Permits:~~ Operation Permit and Aquaculture Collection Permit:

(1) It is unlawful to conduct aquaculture operations utilizing marine and estuarine resources without first securing an Aquaculture Operation Permit from the Fisheries Director.

(2) It is unlawful:

(A) to take marine and estuarine resources from Coastal Fishing Waters for aquaculture purposes without first obtaining an Aquaculture Collection Permit from the Fisheries ~~Director.~~Director;

(B) to sell, or use for any purpose not related to North Carolina aquaculture, marine and estuarine resources taken under an Aquaculture Collection ~~Permit.~~ Permit; and

(C) to fail to submit to the Fisheries Director an annual report due on December 1 of each year on the form provided by the Division the amount and disposition of marine and estuarine resources collected under authority of ~~this permit.~~ an Aquaculture Collection Permit.

(3) Lawfully permitted shellfish relaying activities authorized by 15A NCAC 03K .0103 and .0104 are exempt from requirements to have an Aquaculture Operation Permit or Aquaculture Collection Permit issued by the Fisheries Director.

(4) Aquaculture ~~Operations/Collection~~ Operation Permits and Aquaculture Collection Permits shall be issued or renewed on a calendar year basis.

(5) It is unlawful to fail to provide the Division of Marine Fisheries with a listing of all designees acting under an Aquaculture Collection Permit at the time of application.

(g) Scientific or Educational Activity Permit:

(1) It is unlawful for institutions or agencies seeking exemptions from license, rule, proclamation, or statutory requirements to collect, hold, culture, or exhibit for scientific or educational purposes any marine or estuarine species without first obtaining a Scientific or Educational Activity Permit.

(2) The Scientific or Educational Activity Permit shall only be issued for scientific or educational purposes and for collection methods and possession allowances approved by the Division of Marine Fisheries.

(3) The Scientific or Educational Activity Permit shall only be issued for approved activities conducted by or under the direction of Scientific or Educational institutions as defined in Rule 15A NCAC 03I .0101.

(4) It is unlawful for the responsible party issued a Scientific or Educational Activity Permit to fail to submit a report on collections and, if authorized, sales to the Division of Marine Fisheries due on December 1 of each year unless otherwise specified on the permit. The reports shall be filed on forms provided by the Division. Scientific or Educational Activity permits shall be issued on a calendar year basis.

(5) It is unlawful to sell marine or estuarine species taken under a Scientific or Educational Activity Permit without:

(A) the required license(s) for such sale;

(B) authorization stated on the permit for such sale; and

(C) providing the information required in Rule 15A NCAC 03I .0114 if the sale is to a licensed fish dealer.

(6) It is unlawful to fail to provide the Division of Marine Fisheries a listing of all designees acting under a Scientific or Educational Activity Permit at the time of application.

(7) The permittee or designees utilizing the permit shall call the Division of Marine Fisheries Communications Center at 800-682-2632 or 252-726-7021 not later than 24 hours prior to use of the permit, specifying activities and location.

(h) Under Dock Oyster Culture Permit:

(1) It is unlawful to cultivate oysters in containers under docks for personal consumption without first obtaining an Under Dock Oyster Culture Permit.

(2) An Under Dock Oyster Culture Permit shall be issued only in accordance with provisions set forth in G.S. 113-210(c).

(3) The applicant shall complete and submit an examination, with a minimum of 70 percent correct answers, based on an educational package provided by the Division of Marine Fisheries pursuant to G.S. 113-210(j). The examination demonstrates the applicant's knowledge of:

(A) the application process;

(B) permit criteria;

(C) basic oyster biology and culture techniques;

(D) shellfish harvest area closures due to pollution;

(E) safe handling practices;

(F) permit conditions; and

(G) permit revocation criteria.

(4) Action by an Under Dock Oyster Culture Permit holder to encroach on or usurp the legal rights of the public to access public trust resources in Coastal Fishing Waters shall result in permit revocation.

(i) Atlantic Ocean Striped Bass Commercial Gear Permit:

(1) It is unlawful to take striped bass from the Atlantic Ocean in a commercial fishing operation without first obtaining an Atlantic Ocean Striped Bass Commercial Gear Permit.

(2) It is unlawful to use a single Standard Commercial Fishing License, including assignments, to obtain more than one Atlantic Ocean Striped Bass Commercial Gear Permit during a license year.

(j) Coastal Recreational Fishing License Exemption Permit:

(1) It is unlawful for the responsible party seeking exemption from recreational fishing license requirements for eligible individuals to conduct an organized fishing event held in Joint or Coastal Fishing Waters without first obtaining a Coastal Recreational Fishing License Exemption Permit.

(2) The Coastal Recreational Fishing License Exemption Permit shall only be issued for recreational fishing activity conducted solely for the participation and benefit of one of the following groups of eligible individuals:

(A) individuals with physical or mental limitations;

(B) members of the United States Armed Forces and their dependents, upon presentation of a valid military identification card, for military appreciation;

(C) individuals receiving instruction on recreational fishing techniques and conservation practices from employees of state or federal marine or estuarine resource management agencies, or instructors affiliated with educational institutions; and

(D) disadvantaged youths.

For purposes of this Paragraph, educational institutions include high schools and other secondary educational institutions.

(3) The Coastal Recreational Fishing License Exemption Permit is valid for the date(s), time, and physical location of the organized fishing event for which the exemption is granted and the time period shall not exceed one year from the date of issuance.

(4) The Coastal Recreational Fishing License Exemption Permit shall only be issued when all of the following, in addition to the information required in 15A NCAC 03O .0501, is submitted to the Fisheries Director in writing a minimum of 30 days prior to the event:

(A) the name, date(s), time, and physical location of the event;

(B) documentation that substantiates local, state, or federal involvement in the organized fishing event, if applicable;

(C) the cost or requirements, if any, for an individual to participate in the event; and

(D) an estimate of the number of participants.

(k) Permit for Weekend Trawling for Live Shrimp:

(1) It is unlawful to take shrimp with trawls from 9:00 p.m. on Friday through 12:00 p.m. (noon) on Saturday without first obtaining a Permit for Weekend Trawling for Live Shrimp.

(2) It is unlawful for a holder of a Permit for Weekend Trawling for Live Shrimp to use trawls from 12:01 p.m. on Saturday through 4:59 p.m. on Sunday.

(3) It is unlawful for a permit holder during the timeframe specified in Subparagraph (k)(1) of this Rule to:

(A) use trawl nets to take live shrimp except from areas open to the harvest of shrimp with trawls;

(B) take shrimp with trawls that have a combined headrope length of greater than 40 feet in Internal Coastal Waters;

(C) possess more than one gallon of dead shrimp (heads on) per trip;

(D) fail to have a functioning live bait tank or a combination of multiple functioning live bait tanks with aerator(s) and/or circulating water, with a minimum combined tank capacity of 50 gallons; and

(E) fail to call the Division of Marine Fisheries Communications Center at 800-682-2632 or 252-726-7021 prior to each weekend use of the permit, specifying activities and location.

Authority G.S. 113-134; 113-169.1; 113-169.3; 113-182; 113-210; 143B-289.52

SUBCHAPTER 03P - HEARING PROCEDURES

SECTION .0100 - HEARING PROCEDURES

15A NCAC 03P .0101 LICENSE, PERMIT, OR CERTIFICATE DENIAL: REQUEST FOR REVIEW

~~(a) If the Division decides to deny or limit a renewal of a license or permit for an activity of a continuing nature, the license sought to be renewed shall continue in effect as provided in G.S. 150B-3.~~

(a) For the purpose of this Rule and in accordance with G.S. 150B-2, "license" includes "permit" as well as "certification" and "certificate of compliance".

(b) Except in cases where G.S. 113-171 is applicable, before the Division may commence proceedings for suspension, revocation, annulment, withdrawal, recall, cancellation, or amendment of a ~~license or permit,~~ license, notice shall be given to the license ~~or permit~~ holder ~~notifying him~~ that:

(1) the license holder has a right through filing a request for a contested case hearing in the Office of Administrative Hearings to a hearing before an administrative law judge and a final agency decision by the Marine Fisheries Commission; and

~~(1)~~(2) ~~He~~ the license holder may request an opportunity to show compliance with all lawful requirements for retention of the license ~~in an informal meeting with Division personnel responsible for the initiation of the action to revoke the license; and~~ by submitting a statement in writing to the personnel designated in the notice for the initiation of the action.

~~(2) He has a right through filing a request for a contested case hearing in the Office of Administrative Hearings to a hearing before an administrative law judge and a final agency decision by the Marine Fisheries Commission.~~

(c) Any ~~requests~~ statements submitted by the license holder ~~for an informal meeting or administrative hearings shall be made to the person designated in the notice.~~to show compliance with all lawful requirements for retention of the license shall be postmarked within 15 days of receipt of the notice for the initiation of the action. Statements and any supporting documentation shall be addressed to the personnel designated in the notice and mailed to the Division of Marine Fisheries, 3441 Arendell Street, P.O. Box 769, Morehead City, NC 28557.

(d) Upon receipt of a statement and any supporting documentation from the license holder, the Division shall review the statement and within 15 days, notify the license holder in writing with the Division's determination of whether the license holder demonstrated compliance with all lawful requirements for retention of the license. In making this determination, the Division may consider criteria including, but not limited to material changes made enabling the license holder to conduct the operations for which the license is held in accord with all applicable laws and rules, and processing errors made by the Division.

~~(d)~~(e) The Division may order summary suspension of a license ~~or permit~~ if it finds that the public health, safety, or welfare requires emergency action. Upon such ~~determination~~ determination, the Fisheries Director shall issue an order giving the reasons for the emergency action. The effective date of the order shall be the date specified on the order or the date of service of a certified copy of the order at the last known address of the license ~~or permit holder~~ holder, whichever is later.

~~(e) When a license is summarily suspended and a request is made for an informal meeting or a hearing, the proceeding shall be promptly commenced and determined.~~

Authority G.S. 113-134; 113-171; 113-221.2; 150B-3; 150B-23.

SUBCHAPTER 03R - DESCRIPTIVE BOUNDARIES

SECTION .0100 - DESCRIPTIVE BOUNDARIES

15A NCAC 03R .0103 PRIMARY NURSERY AREAS

The primary nursery areas referenced in 15A NCAC 03N .0104 are delineated in the following coastal water areas:

(1) In the Roanoke Sound Area:

(a) Shallowbag Bay:

(i) Dough Creek - northeast of a line beginning on the west shore at a point 35° 54.5396' N - 75° 39.9681' W; running northeasterly to the east shore to a point 35° 54.4615' N - 75° 40.1598' W; and west of a line that crosses a canal on the east side of Dough Creek beginning on the north shore at a point 35° 54.7103' N - 75° 40.0951' W; running southerly to the south shore to a point 35° 54.6847' N - 75° 40.0882' W; and

(ii) Scarborough Creek - south of a line beginning on the west shore at a point 35° 53.9801' N - 75° 39.5985' W; running northeasterly to the east shore to a point 35° 54.0372' N - 75° 39.5558' W; and

(b) Broad Creek - all waters north of a line beginning on the west shore at a point 35° 51.9287' N - 75° 38.3377' W; running northeasterly to the east shore to a point 35° 52.0115' N - 75° 38.1792' W; and west and south of a line beginning on the north shore at a point 35° 53.3655' N - 75° 38.0254' W; running southeasterly to the south shore to a point 35° 53.3474' N - 75° 37.9430' W;

(2) In the Northern Pamlico Sound Area:

(a) Long Shoal River:

(i) Long Shoal River - northwest of a line beginning on the north shore at a point 35° 38.0175' N - 75° 52.9270' W; running southwesterly to the south shore to a point 35° 37.8369' N - 75° 53.1060' W;

(ii) Deep Creek - southeast of a line beginning on the north shore at a point 35° 37.7346' N - 75° 52.1383' W; running southwesterly to the south shore to a point 35° 37.6673' N - 75° 52.2997' W;

(iii) Broad Creek - west of a line beginning on the north shore at a point 35° 35.9820' N - 75° 53.6789' W; running southerly to the south shore

to a point 35° 35.7093' N - 75° 53.7335' W;

(iv) Muddy Creek - east of a line beginning on the north shore at a point 35° 36.4566' N - 75° 52.1460' W; running southerly to the south shore to a point 35° 36.2828' N - 75° 52.1640' W;

(v) Pains Bay - north of a line beginning on the west shore at a point 35° 35.4517' N - 75° 49.1414' W; running easterly to the east shore to a point 35° 35.4261' N - 75° 48.8029' W;

(vi) Otter Creek - southwest of a line beginning on the west shore at a point 35° 33.2597' N - 75° 55.2129' W; running easterly to the east shore to a point 35° 33.1995' N - 75° 54.8949' W; and

(vii) Clark Creek - northeast of a line beginning on the north shore at a point 35° 35.7776' N - 75° 51.4652' W; running southeasterly to the south shore to a point 35° 35.7128' N - 75° 51.4188' W;

(b) Far Creek - west of a line beginning on the north shore at a point 35° 30.9782' N - 75° 57.7611' W; running southerly to Gibbs Point to a point 35° 30.1375' N - 75° 57.8108' W;

(c) Middletown Creek - west of a line beginning on the north shore at a point 35° 28.4868' N - 75° 59.8186' W; running southwesterly to the south shore to a point 35° 28.1919' N - 76° 00.0216' W;

(d) Wysocking Bay:

(i) Lone Tree Creek - east of a line beginning on the north shore at a point 35° 25.6048' N - 76° 02.3577' W; running southeasterly to the south shore to a point 35° 25.1189' N - 76° 02.0499' W;

(ii) Wysocking Bay - north of a line beginning on the west shore at a point 35° 25.7793' N - 76° 03.5773' W; running northeasterly to the east shore to a point 35° 25.9585' N - 76° 02.9055' W;

(iii) Douglas Bay - northwest of a line beginning on Mackey Point at a point 35° 25.2627' N - 76° 03.1702' W; running southwesterly to the south shore to a point 35° 24.8225' N - 76° 03.6353' W; and

(iv) Tributaries west of Brown Island - west of a line beginning on Brown Island at a point 35° 24.3606' N - 76° 04.4557' W; running southerly to the north shore of Brown Island to a point 35° 24.2081' N - 76° 04.4622' W; and northwest of a line beginning on the south shore of Brown Island at a point 35° 23.8255' N - 76° 04.4761' W; running southwesterly to a point 35° 23.6543' N - 76° 04.8630' W;

(e) East Bluff Bay - Harbor Creek east of a line beginning on the north shore at a point 35° 21.5762' N - 76° 07.8755' W; running southerly to a point 35° 21.4640' N - 76° 07.8750' W; running easterly to the south shore to a point 35° 21.4332' N - 76° 07.7211' W;

(f) Cunning Harbor tributaries - north of a line beginning on the west shore at a point 35° 20.7567' N - 76° 12.6379' W; running easterly to the east shore to a point 35° 20.7281' N - 76° 12.2292' W;

(g) Juniper Bay:

(i) Upper Juniper Bay - north of a line beginning on the west shore at a point 35° 23.1687' N - 76° 15.1921' W; running easterly to the east shore to a point 35° 23.1640' N - 76° 14.9892' W;

(ii) Rattlesnake Creek - west of a line beginning on the north shore at a point 35° 22.9453' N - 76° 15.2748' W, running southerly to the south shore to a point 35° 22.8638' N - 76° 15.3461' W;

(iii) Buck Creek - north of a line beginning on the west shore at a point 35° 21.5220' N - 76° 13.8865' W; running southeasterly to the east shore to a point 35° 21.3593' N - 76° 13.7039' W;

(iv) Laurel Creek - east of a line beginning on the north shore at a point 35° 20.6693' N - 76° 13.3177' W; running southerly to the south shore

to a point 35° 20.6082' N - 76° 13.3305' W; and

(v) Old Haulover - west of a line beginning on the north shore at a point 35° 22.0186' N - 76° 15.6736' W; running southerly to the south shore to a point 35° 21.9708' N - 76° 15.6825' W;

(h) Swanquarter Bay:

(i) Upper Swanquarter Bay - north of a line beginning on the west shore at a point 35° 23.5651' N - 76° 20.6715' W; running easterly to the east shore to a point 35° 23.6988' N - 76° 20.0025' W;

(ii) Oyster Creek - east of a line beginning on the north shore at a point 35° 23.1214' N - 76° 19.0026' W; running southeasterly to the south shore to a point 35° 23.0117' N - 76° 18.9591' W; and

(iii) Caffee Bay:

(A) Unnamed tributary - north of a line beginning on the west shore at a point 35° 22.1604' N - 76° 18.9140' W; running easterly to the east shore to a point 35° 22.1063' N - 76° 18.7500' W;

(B) Unnamed tributary - north of a line beginning on the west shore at a point 35° 22.1573' N - 76° 18.5101' W; running easterly to the east shore to a point 35° 22.1079' N - 76° 18.1562' W; and

(C) Upper Caffee Bay (Haulover) - east of a line beginning on the north shore at a point 35° 21.8499' N - 76° 17.5199' W; running southerly to the south shore to a point 35° 21.5451' N - 76° 17.4966' W;

(i) Rose Bay:

(i) Rose Bay - north of a line beginning on the west shore at a point 35° 26.6543' N - 76° 25.3992' W; running easterly to Channel Marker "6"; running northeasterly to Watch Point to a point 35° 26.8515' N - 76° 25.0055' W;

(ii) Island Point Creek - west of a line beginning on the north shore at a point 35° 26.0413' N - 76° 25.0452' W; running southeasterly to the south shore to a point 35° 25.9295' N - 76° 24.9882' W;

(iii) Tooley Creek - west of a line beginning on the north shore at a point 35° 25.4937' N - 76° 25.5324' W; running southerly to the south shore to a point 35° 25.1819' N - 76° 25.5776' W;

(iv) Broad Creek - east of a line beginning on the north shore at a point 35° 24.4620' N - 76° 23.3398' W; running southwesterly to the south shore to a point 35° 24.2352' N - 76° 23.5158' W;

(v) Lightwood Snag Bay - northwest of a line beginning on the north shore at a point 35° 24.3340' N - 76° 25.9680' W; running southwesterly to a point 35° 24.2610' N - 76° 26.1800' W; running southwesterly to a point on the shore 35° 23.9270' N - 76° 26.3300' W;

(vi) Deep Bay:

(A) Old Haulover - north of a line beginning on the west shore at a point 35° 23.2140' N - 76° 22.8560' W; running easterly to the east shore to a point 35° 23.2124' N - 76° 22.7340' W; and

(B) Drum Cove (Stinking Creek) - south of a line beginning on the west shore at a point 35° 22.5212' N - 76° 24.7321' W; running southeasterly to the east shore to a point

35° 22.4282' N - 76° 24.5147' W; and

(vii) Eastern tributaries (Cedar Hammock and Long Creek) - east of a line beginning on the north shore at a point 35° 24.9119' N - 76° 23.1587' W; running southerly to the south shore to a point 35° 24.6700' N - 76° 23.2171' W;

(j) Spencer Bay:

(i) Germantown Bay:

(A) Ditch Creek - northwest of a line beginning on the north shore at a point 35° 24.1874' N - 76° 27.8527' W; running southwesterly to the south shore to a point 35° 24.0937' N - 76° 27.9348' W;

(B) Jenette Creek - northwest of a line beginning on the north shore at a point 35° 24.5054' N - 76° 27.6258' W; running southwesterly to the south shore to a point 35° 24.4642' N - 76° 27.6659' W;

(C) Headwaters of Germantown Bay - north of a line beginning on the west shore at a point 35° 24.8345' N - 76° 27.2605' W; running southeasterly to the east shore to a point 35° 24.6210' N - 76° 26.9221' W; and

(D) Swan Creek - southeast of a line beginning on the north shore at a point 35° 24.4783' N - 76° 27.1513' W; running southwesterly to the south shore to a point 35° 24.3899' N - 76° 27.2809' W;

(ii) Unnamed tributary - west of a line beginning on the north shore at a point 35° 22.9741' N - 76° 28.3469' W; running southerly to the south shore to a point 35° 22.8158' N - 76° 28.3280' W;

(iii) Unnamed tributary - west of a line beginning on the north shore at a point 35° 23.1375' N - 76° 28.5681' W; running southerly to the south shore to a point 35° 23.0209' N - 76° 28.5060' W;

(iv) Unnamed tributary - southwest of a line beginning on the north shore at a point 35° 23.3775' N - 76° 28.7332' W; running southeasterly to the south shore to a point 35° 23.3297' N - 76° 28.5608' W;

(v) Unnamed tributaries - northwest of a line beginning on the north shore at a point 35° 23.7207' N - 76° 28.6590' W; running southwesterly to the south shore to a point 35° 23.4738' N - 76° 28.7763' W;

(vi) Upper Spencer Bay - northwest of a line beginning on the north shore at a point 35° 24.3129' N - 76° 28.5300' W; running southwesterly to the south shore to a point 35° 23.9681' N - 76° 28.7671' W; and

(vii) Spencer Creek - east of a line beginning on the north shore at a point 35° 23.9990' N - 76° 27.3702' W; running southerly to the south shore to a point 35° 23.8598' N - 76° 27.4037' W;

(k) Long Creek - north of a line beginning on the west shore at a point 35° 22.4678' N - 76° 28.7868' W; running southeasterly to the east shore to a point 35° 22.3810' N - 76° 28.7064' W;

(l) Willow Creek - east of a line beginning on the north shore at a point 35° 23.1370' N - 76° 29.8829' W; running southeasterly to the south shore to a point 35° 22.9353' N - 76° 29.7215' W;

(m) Abels Bay - north and east of a line beginning on the west shore at a point 35° 24.1072' N - 76° 30.3848' W; running southeasterly to the east shore to a point 35° 23.9898' N - 76° 30.1178' W; thence running southerly

to the south shore to a point 35° 23.6947' N - 76° 30.1900' W; and

(n) Crooked Creek - north of a line beginning on the west shore at a point 35° 24.4138' N - 76° 32.2124' W; running easterly to the east shore to a point 35° 24.3842' N - 76° 32.0419' W;

(3) In the Pungo River Area:

(a) Fortescue Creek:

(i) Headwaters of Fortescue Creek - southeast of a line beginning on the south shore at a point 35° 25.5379' N - 76° 30.6923' W; running easterly to the north shore to a point 35° 25.5008' N - 76° 30.5537' W;

(ii) Warner Creek - north of a line beginning on the west shore at a point 35° 26.2778' N - 76° 31.5463' W; running easterly to the east shore to a point 35° 26.3215' N - 76° 31.4522' W;

(iii) Island Creek - north of a line beginning on the west shore at a point 35° 26.1342' N - 76° 32.3883' W; running easterly to the east shore to a point 35° 26.1203' N - 76° 32.2603' W;

(iv) Dixon Creek - south of a line beginning on the west shore at a point 35° 25.5766' N - 76° 31.8489' W; running easterly to the east shore to a point 35° 25.5865' N - 76° 31.6960' W;

(v) Pasture Creek - north of a line beginning on the west shore at a point 35° 25.9437' N - 76° 31.8468' W; running southwesterly to the east shore to a point 35° 25.9918' N - 76° 31.7224' W;

(vi) Cox, Snell, and Seer Creeks - northeast of a line beginning on the west shore at a point 35° 26.0496' N - 76° 31.2087' W; running southeasterly to the east shore to a point 35° 25.8497' N - 76° 30.8828' W;

(vii) Unnamed tributary on the north side of Fortescue Creek - northeast of a line beginning on the west shore at a point 35° 25.7722' N - 76° 30.7825' W; running southeasterly to the east shore to a point 35° 25.7374' N - 76° 30.7102' W; and

(viii) Runway Creek - northeast of a line beginning on the west shore at a point 35° 25.6547' N - 76° 30.6637' W; running easterly to the east shore to a point 35° 25.6113' N - 76° 30.5714' W;

(b) Slade Creek:

(i) Upper Slade Creek - south of a line beginning on the north shore at a point 35° 27.9168' N - 76° 30.5189' W; running westerly to the south shore to a point 35° 27.9532' N - 76° 30.7140' W;

(ii) Jarvis Creek - northeast of a line beginning on the west shore at a point 35° 28.2450' N - 76° 30.8921' W; running southeasterly to the east shore to a point 35° 28.2240' N - 76° 30.8200' W;

(iii) Jones Creek - south of a line beginning on the west shore at a point 35° 28.0077' N - 76° 30.9337' W; running southeasterly to the east shore to a point 35° 27.9430' N - 76° 30.8938' W;

(iv) Becky Creek - north of a line beginning on the west shore at a point 35° 28.6081' N - 76° 31.6886' W; running northeasterly to the east shore to a point 35° 28.6297' N - 76° 31.6073' W;

(v) Neal Creek - north of a line beginning on the west shore at a point 35° 28.7797' N - 76° 31.8657' W; running northeasterly to the east shore to a point 35° 28.8084' N - 76° 31.7727' W;

(vi) Wood Creek - north of a line beginning on the west shore at a point 35° 28.5788' N - 76° 32.4163' W; running northeasterly to the east shore to a point 35° 28.6464' N - 76° 32.3339' W;

(vii) Spellman Creek - north of a line beginning on the east shore at a point 35° 28.2233' N - 76° 32.6827' W; running southwesterly to the west

shore to a point 35° 28.2567' N - 76° 32.6533' W;

(viii) Speer Creek - east of a line beginning on the north shore at a point 35° 27.9680' N - 76° 32.3593' W; running southerly to the south shore to a point 35° 27.9216' N - 76° 32.3862' W;

(ix) Church Creek and Speer Gut - east of a line beginning on the north shore at a point 35° 27.5910' N - 76° 32.7412' W; running southwesterly to the south shore to a point 35° 27.5282' N - 76° 32.8227' W; and

(x) Allison and Foreman Creek - south of a line beginning on Parmalee Point at a point 35° 27.2812' N - 76° 33.0634' W; running southwesterly to the west shore to a point 35° 27.2418' N - 76° 33.1451' W;

(c) Flax Pond - west of a line beginning the north shore at a point 35° 32.0297' N - 76° 33.0389' W; running southwesterly to the south shore to a point 35° 31.9212' N - 76° 33.2061' W; and

(d) Battalina and Tooleys creeks - northwest of a line beginning on the north shore at a point 35° 32.3914' N - 76° 36.1548' W; running southwesterly to the south shore to a point 35° 32.0627' N - 76° 36.3769' W;

(4) In the Pamlico River Area:

(a) North Creek:

(i) North Creek - north of a line beginning on the west shore at a point 35° 25.6764' N - 76° 39.9970' W; running northeasterly to the east shore to a point 35° 25.5870' N - 76° 40.0806' W;

(ii) East Fork:

(A) Northeast of a line beginning on the west shore at a point 35° 25.8000' N - 76° 39.2679' W; running southeasterly to the east shore to a point 35° 25.6914' N - 76° 39.1374' W; and

(B) Unnamed tributary of East Fork - northwest of a line beginning on the north shore at a point 35° 25.6950' N - 76° 39.4337' W; running southwesterly to the south shore to a point 35° 25.6445' N - 76° 39.4698' W;

(iii) Frying Pan Creek - east of a line beginning on the north shore at a point 35° 24.9881' N - 76° 39.5948' W; running southwesterly to Chambers Point to a point 35° 24.8508' N - 76° 39.6811' W; and

(iv) Little Ease Creek - west of a line beginning on the north shore at a point 35° 25.1463' N - 76° 40.3490' W; running southwesterly to Cousin Point to a point 35° 25.0075' N - 76° 40.4159' W;

(b) Goose Creek:

(i) Hatter Creek - west of a line beginning on the north shore at a point 35° 19.9593' N - 76° 37.5992' W; running southerly to the south shore to a point 35° 19.9000' N - 76° 37.5904' W;

(ii) Upper Spring Creek:

(A) Headwaters of Upper Spring Creek - east of a line beginning on the north shore at a point 35° 16.3636' N - 76° 36.0568' W; running southeasterly to the south shore to a point 35° 16.1857' N - 76° 36.0111' W; and

(B) Unnamed tributary - north of a line beginning on the west shore at a point 35° 16.8386' N - 76° 36.4447' W; running easterly to the east shore to a point 35° 16.8222' N - 76° 36.3811' W;

(iii) Eastham Creek - east of a line beginning on the north shore at a point 35° 17.7423'

N - 76° 36.5164' W; running southeasterly to the south shore to a point 35° 17.5444' N - 76° 36.3963' W;

(iv) Mud Gut - northeast of a line beginning on the north shore at a point 35° 17.8754' N - 76° 36.7704' W; running southeasterly to the south shore to a point 35°17.8166' N - 76° 36.7468' W;

(v) Wilkerson Creek - east of a line beginning on the north shore at a point 35° 18.4096' N - 76° 36.7479' W; running southwesterly to the south shore to a point 35° 18.3542' N - 76° 36.7741' W; and

(vi) Dixon Creek - east of a line beginning on the north shore at a point 35° 18.8893' N - 76° 36.5973' W; running southerly to the south shore to a point 35° 18.5887' N - 76° 36.7142' W; and

(c) Oyster Creek - Middle Prong:

(i) Oyster Creek:

(A) West of a line, beginning on the north shore at a point 35° 19.4780' N - 76° 34.0131' W; running southerly to the south shore to a point 35° 19.3796' N - 76° 34.0021' W; and

(B) Duck Creek - south of a line beginning on the west shore at a point 35° 19.0959' N - 76° 33.2998' W; running northeasterly to the east shore to a point 35° 19.1553' N - 76° 33.2027' W;

(ii) James Creek - southwest of a line beginning on the north shore at a point 35° 18.6045' N - 76° 32.3233' W; running southeasterly to James Creek Point at a point 35° 18.4805' N - 76° 32.0240' W;

(iii) Middle Prong - south of a line beginning on the west shore at a point 35° 17.8888' N - 76° 31.9379' W; running southerly to the east shore to a point 35° 17.7323' N - 76° 31.9052' W; and

(iv) Clark Creek:

(A) Headwaters of Clark Creek (including Mouse Harbor Ditch) - southeast of a line beginning on the west shore at a point 35° 18.1028' N - 76° 31.1661' W; running northeasterly to the east shore to a point 35° 18.1907' N - 76° 31.0610' W; and

(B) Boat Creek - east of a line beginning on the north shore at a point 35° 18.5520' N - 76° 31.2927' W; running southerly to the south shore to a point 35° 18.4189' N - 76° 31.2660' W;

(5) In the Western Pamlico Sound Area:

(a) Mouse Harbor:

(i) Long Creek - north of a line beginning on the west shore at a point 35° 18.4025' N - 76° 29.8139' W; running northeasterly to the east shore to a point 35° 18.4907' N - 76° 29.5652' W;

(ii) Lighthouse Creek - north of a line beginning on the west shore at a point 35° 18.5166' N - 76° 29.2166' W; running southeasterly to the east shore to a point 35° 18.4666' N - 76° 29.1666' W; and

(iii) Cedar Creek and Island creeks - south of a line beginning on the west shore at a point 35° 16.9073' N - 76° 29.8667' W; running southeasterly to the east shore to a point 35° 16.6800' N - 76° 29.4500' W;

(b) Porpoise Creek - west of a line beginning on the north shore at a point 35° 15.7263' N - 76° 29.4897' W; running southeasterly to the south shore to a point 35° 15.6335' N - 76° 29.3346' W;

(c) Middle Bay:

(i) Middle Bay - west of a line beginning on the north shore

at a point 35° 14.6137' N - 76° 30.8086' W; running southeasterly to the south shore to a point 35° 14.0631' N - 76° 30.5176' W; and

(ii) Little Oyster Creek - north of a line beginning on the west shore at a point 35° 14.4745' N - 76° 30.2111' W; running northeasterly to the east shore to a point 35° 14.5825' N - 76° 29.9144' W; and

(d) Jones Bay, west of the IWW:

(i) Little Drum Creek and Little Eve Creek - south of a line beginning on the west shore at a point 35° 12.4380' N - 76° 31.7428' W; running southeasterly to the east shore to a point 35° 12.3499' N - 76° 31.2554' W;

(ii) Ditch Creek - south of a line beginning on the west shore at a point 35° 13.3609' N - 76° 33.6539' W; running southeasterly to the east shore to a point 35° 13.2646' N - 76° 33.1996' W;

(iii) Lambert Creek - west of a line beginning on the north shore at a point 35° 13.8980' N - 76° 34.3078' W; running southeasterly to the south shore to a point 35° 13.8354' N - 76° 34.2665' W;

(iv) Headwaters of Jones Bay, (west of the IWW) - west of a line beginning on the north shore at a point 35° 14.4684' N - 76° 35.4307' W; running southerly to the south shore to a point 35° 14.3947' N - 76° 35.4205' W;

(v) Bills Creek - north of a line beginning on the west shore at a point 35° 14.4162' N - 76° 34.8566' W; running northerly to the east shore to a point 35° 14.4391' N - 76° 34.7248' W;

(vi) Doll Creek - north of a line beginning on the west shore at a point 35° 14.3320' N - 76° 34.2935' W; running southeasterly to the east shore to a point 35° 14.2710' N - 76° 34.0406' W; and

(vii) Drum Creek - north of a line beginning on the west shore at a point 35° 14.1764' N - 76° 33.2632' W; running easterly to the east shore to a point 35° 14.1620' N - 76° 33.0614' W;

(6) In the Bay River Area:

(a) Mason Creek - southeast of a line beginning on the north shore at a point 35° 08.2531' N - 76° 41.4897' W; running southwesterly to the west shore to a point 35° 08.1720' N - 76° 41.6340' W;

(b) Moore Creek - southeast of a line beginning on the north shore at a point 35° 08.9671' N - 76° 40.2017' W; running southeasterly to the south shore to a point 35° 08.8629' N - 76° 40.1598' W;

(c) Small tributaries from Bell Point to Ball Creek:

(i) Tributary west of Bell Point - south of a line beginning on the west shore at a point 35° 09.9536' N - 76° 39.3977' W; running northeasterly to the east shore to a point 35° 09.9970' N - 76° 39.3420' W;

(ii) Little Pasture Creek - south of a line beginning on the west shore at a point 35° 09.8944' N - 76° 39.1483' W; running southeasterly to the east shore to a point 35° 09.8417' N - 76° 39.1130' W; and

(iii) Rice Creek - south of a line beginning on the west shore at a point 35° 09.7616' N - 76° 38.9686' W; running southeasterly to the east shore to a point 35° 09.7378' N - 76° 38.8833' W;

(d) Ball and Cabin creeks - south of a line beginning on the west shore at a point 35° 09.6479' N - 76° 37.9973' W; running southeasterly to the east shore to a point 35° 09.5589' N - 76° 37.5879' W;

(e) Bonner Bay:

(i) Riggs Creek - west of a line beginning on the north shore at a point 35° 09.4050' N - 76° 36.2205' W; running southeasterly to the south shore to a point 35° 09.2298' N - 76° 36.0949' W;

(ii) Spring Creek - west of a line beginning on the north shore at a point 35° 08.5149'

N - 76° 36.0799' W; running southerly to the south shore to a point 35° 08.3575' N - 76° 36.0713' W;

(iii) Bryan and Ives creeks - south of a line beginning on the west shore at a point 35° 08.3632' N - 76° 35.8653' W; running northeasterly to the east shore to a point 35° 08.4109' N - 76° 35.7075' W;

(iv) Long Creek Gut - north of a line beginning on the west shore at a point 35º 09.1993' N - 76º 34.8517' W; running easterly to the east shore to a point 35º 09.1987' N - 76º 34.5373' W;

(v) Dipping Vat Creek - east of a line beginning on the north shore at a point 35° 09.2734' N - 76° 34.3363' W; running southerly to the south shore to a point 35° 09.1212' N - 76° 34.3667' W;

(vi) Long Creek - east of a line beginning on the west shore at a point 35° 08.1404' N - 76° 34.5741' W; running northeasterly to the east shore to a point 35° 08.2078' N - 76° 34.4819' W; and

(vii) Cow Gallus Creek - west of a line beginning on the north shore at a point 35° 08.5125' N - 76° 34.6417' W; running southerly to the south shore to a point 35° 08.4083' N - 76° 34.6131' W;

(f) Rock Hole Bay - northeast of a line beginning on the west shore at a point 35° 11.6478' N - 76° 32.5840' W; running southeasterly to the east shore to a point 35° 11.2664' N - 76° 32.2160' W;

(g) Dump Creek - north of a line beginning on the west shore at a point 35° 11.7105' N - 76° 33.4228' W; running easterly to the east shore to a point 35° 11.7174' N - 76° 33.1807' W;

(h) Tributaries east of IWW at Gales Creek:

(i) Raccoon Creek - east of a line beginning on the north shore at a point 35° 12.9169' N - 76° 35.4930' W; running southeasterly to the south shore to a point 35° 12.6515' N - 76° 35.3368' W; and

(ii) Ditch Creek - east of a line beginning on the north shore at a point 35° 12.4460' N - 76° 35.0707' W; running southeasterly to the south shore to a point 35° 12.3495' N - 76° 34.9917' W;

(i) Tributaries west of IWW at Gales Creek:

(i) Jumpover Creek - west of a line beginning on the north shore at a point 35° 13.2830' N - 76° 35.5843' W; running southerly to the south shore to a point 35° 13.2035' N - 76° 35.5844' W;

(ii) Gales Creek - west of a line beginning on the north shore at a point 35° 12.9653' N - 76° 35.6600' W; running southerly to the south shore to a point 35° 12.8032' N - 76° 35.6366' W; and

(iii) Whealton and Tar creeks - west of a line beginning on the north shore at a point 35° 12.7334' N - 76° 35.5430' W; running southeasterly to the south shore to a point 35° 12.4413' N - 76° 35.3594' W;

(j) Chadwick and No Jacket creeks - north of a line beginning on the west shore at a point 35° 11.9511' N - 76° 35.8899' W; running northeasterly to the east shore to a point 35° 12.0599' N - 76° 35.3973' W;

(k) Bear Creek - west of a line beginning on the north shore at a point 35° 11.7526' N - 76° 36.2721' W; running southwesterly to the south shore to a point 35° 11.5781' N - 76° 36.3366' W;

(l) Little Bear Creek - north of a line beginning on the west shore at a point 35° 11.1000' N - 76° 36.3060' W; running northeasterly to the east shore to a point 35° 11.2742' N - 76° 35.9822' W;

(m) Tributaries to Bay River from Petty Point to Sanders Point:

(i) Oyster Creek - north of a line beginning on the west shore at a point 35° 10.7971' N - 76° 36.7399' W; running northeasterly to the east shore to a point 35° 10.9493' N - 76° 36.4878' W;

(ii) Potter Creek - north of a line beginning on the west shore at a point 35° 10.7259' N - 76° 37.0764' W; running northeasterly to the east shore to a point 35° 10.7778' N - 76° 36.7933' W;

(iii) Barnes and Gascon creeks - north of a line beginning on the west shore at a point 35° 10.6396' N - 76° 37.3137' W; running northeasterly to the east shore to a point 35° 10.6929' N - 76° 37.2087' W;

(iv) Harris Creek - north of a line beginning on the west shore at a point 35° 10.5922' N - 76° 37.5333' W; running northeasterly to the east shore to a point 35° 10.6007' N - 76° 37.5103' W; and

(v) Mesic Creek - north of a line beginning on the west shore at a point 35° 10.5087' N - 76° 37.9520' W; running easterly to the east shore to a point 35° 10.4830' N - 76° 37.8477' W;

(n) In Vandemere Creek:

(i) Cedar Creek - north of a line beginning on the west shore at a point 35° 11.2495' N - 76° 39.5727' W; running northeasterly to the east shore to a point 35° 11.2657' N - 76° 39.5238' W;

(ii) Long Creek - east of a line beginning on the north shore at a point 35° 11.4779' N - 76° 38.7790' W; running southerly to the south shore to a point 35° 11.4220' N - 76° 38.7521' W; and

(iii) Little Vandemere Creek - north of a line beginning on the west shore at a point 35° 12.1449' N - 76° 39.2620' W; running southeasterly to the east shore to a point 35° 12.1182' N - 76° 39.1993' W;

(o) Smith Creek - north of a line beginning on the west shore to a point 35° 10.4058' N - 76° 40.2565' W; running northeasterly to the east shore to a point 35° 10.4703' N - 76° 40.1593' W;

(p) Harper Creek - west of a line beginning on the north shore at a point 35° 09.2767' N - 76° 41.8489' W; running southwesterly to the south shore to a point 35° 09.1449' N - 76° 41.9137' W;

(q) Chapel Creek - north of a line beginning on the west shore at a point 35° 08.9333' N - 76° 42.8382' W; running northeasterly to the east shore to a point 35° 08.9934' N - 76° 42.7694' W; and

(r) Swindell Bay - south of a line beginning on the west shore at a point 35° 08.2580' N - 76° 42.9380' W; running southeasterly to the east shore to a point 35° 08.2083' N - 76° 42.8031' W;

(7) In the Neuse River Area North Shore:

(a) Swan Creek - west of a line beginning on the south shore at a point 35° 06.5470' N - 76° 33.8203' W; running northeasterly to a point 35° 06.4155' N - 76° 33.9479' W; running to the south shore of Swan Island to a point 35° 06.3168' N - 76° 34.0263' W; running northeasterly to a point 35° 06.6705' N - 76° 33.7307' W, running northeasterly to the north shore to a point 35° 06.8183' N - 76° 33.5971' W;

(b) Broad Creek:

(i) Greens Creek - north of a line beginning on the west shore at a point 35° 06.0730' N - 76° 35.5110' W; running southeasterly to the east shore to a point 35° 05.9774' N - 76° 35.3704' W;

(ii) Pittman Creek - north of a line beginning on the west shore at a point 35° 05.8143' N - 76° 36.1475' W; running northeasterly to the east shore to a point 35° 05.8840' N - 76° 36.0144' W;

(iii) Burton Creek - west of a line beginning on the north shore at a point 35° 05.7174' N - 76° 36.4797' W; running southwesterly to the south shore to a point 35° 05.6278' N - 76° 36.5067' W;

(iv) All tributaries on the north shore of Broad Creek - north of a line beginning on the west shore of the western most tributary at a point 35° 05.5350' N - 76° 37.4058' W; running easterly to a point 35° 05.4752' N - 76° 36.9672' W; running to a point 35°

05.4868' N - 76° 36.9163' W; north of a line beginning on the west shore of the eastern most tributary at 35° 05.4415' N - 76° 36.7869' W, running northeasterly to a point 35° 05.4664' N - 76° 36.7540' W;

(v) Brown Creek - northwest of a line beginning on the west shore at a point 35° 05.5310' N - 76° 37.8132' W; running northeasterly to the east shore to a point 35° 05.5737' N - 76° 37.6908' W;

(vi) Broad Creek including Gideon Creek - west of a line beginning on the north shore at a point 35° 05.5310' N - 76° 37.8132' W; running southerly to the south shore to a point 35° 05.3212' N - 76° 37.8398' W;

(vii) Tar Creek - south of a line beginning on the west shore at a point 35° 05.2604' N - 76° 37.5093' W; running easterly to the east shore to a point 35° 05.2728' N - 76° 37.6251' W;

(viii) Tributary east of Tar Creek - south of a line beginning on the west shore at a point 35° 05.3047' N - 76° 37.0316' W; running easterly to the east shore to a point 35° 05.2674' N - 76° 36.8086' W;

(ix) Tributary east of Tar Creek - south of a line beginning on the west shore at a point 35° 05.2674' N - 76° 36.8086' W; running easterly to the east shore to a point 35° 05.2445' N - 76° 36.5416' W;

(x) Parris Creek - south of a line beginning on the west shore at a point 35° 05.2445' N - 76° 36.5416' W; running southeasterly to the east shore to a point 35° 05.2031' N - 76° 36.4573' W;

(xi) Mill Creek - south of a line beginning on the west shore at a point 35° 05.4439' N - 76° 36.0260' W; running northeasterly to the east shore to a point 35° 05.4721' N - 76° 35.8835' W; and

(xii) Cedar Creek - south of a line beginning on the west shore at a point 35° 05.3711' N - 76° 35.6556' W; running southeasterly to the east shore to a point 35° 05.2867' N - 76° 35.5348' W;

(c) Orchard and Old House creeks - north of a line beginning on the west shore at a point 35° 03.3302' N - 76° 38.4478' W; running northeasterly to the east shore to a point 35° 03.6712' N - 76° 37.9040' W;

(d) Pierce Creek - north of a line beginning on the west shore at a point 35° 02.5030' N - 76° 40.0536' W; running northeasterly to the east shore to a point 35° 02.5264' N - 76° 39.9901' W;

(e) Whittaker Creek - north of a line beginning on the west shore at a point 35° 01.7186' N - 76° 41.1309' W; running easterly to the east shore to a point 35° 01.6702' N - 76° 40.9036' W;

(f) Oriental:

(i) Smith and Morris creeks - north of a line beginning on the west shore at a point 35° 02.1553' N - 76° 42.2931' W; running southeasterly to the east shore to a point 35° 02.1097' N - 76° 42.1806' W;

(ii) Unnamed tributary west of Dewey Point - north of a line beginning on the west shore at a point 35° 01.3704' N - 76° 42.4906' W; running northeasterly to the east shore to a point 35° 01.3530' N - 76° 42.4323' W;

(iii) Unnamed tributary on the south shore of Greens Creek - south of a line beginning on the west shore at a point 35° 01.4340' N - 76° 42.7920' W; running southeasterly to the east shore to a point 35° 01.4040' N - 76° 42.7320' W;

(iv) Unnamed tributary on the south shore of Greens Creek - south of a line beginning on the west shore at a point 35° 01.3680' N - 76° 42.4920' W; running southeasterly to the east shore to a point 35° 01.3560' N - 76° 42.4320' W;

(v) Greens Creek - west of a line beginning on the north shore at a point 35° 01.5985' N - 76° 42.9959' W; running

southeasterly to the south shore to a point 35° 01.4759' N - 76° 42.9570' W;

(vi) Kershaw Creek - north of a line beginning on the west shore at a point 35° 01.5985' N - 76° 42.9959' W; running easterly to the east shore to a point 35° 01.6077' N - 76° 42.8459' W; and

(vii) Shop Gut Creek - west of a line beginning on the north shore at a point 35° 01.2720' N - 76° 42.1500' W; running southerly to the south shore to a point 35° 01.1700' N - 76° 42.1380' W;

(g) Dawson Creek:

(i) Unnamed eastern tributary of Dawson Creek - east of a line beginning on the north shore at a point 35° 00.2064' N - 76° 45.2652' W; running southeasterly to the south shore to a point 35° 00.1790' N - 76° 45.2289' W; and

(ii) Unnamed tributary of Dawson Creek (at mouth) - east of a line beginning on the north shore at a point 34° 59.6620' N - 76° 45.1156' W; running southerly to the south shore to a point 34° 59.6326' N - 76° 45.1177' W; and

(h) Beard Creek tributary - southeast of a line beginning on the north shore at a point 35° 00.3176' N - 76° 51.9098' W; running southwesterly to the southwest shore to a point 35° 00.1884' N - 76° 51.9850' W;

(8) In the Neuse River Area South Shore:

(a) Clubfoot Creek - south of a line beginning on the west shore at a point 34° 52.4621' N - 76° 45.9256' W; running easterly to the east shore to a point 34° 52.4661' N - 76° 45.7567' W:

(i) Mitchell Creek - west of a line beginning on the north shore at a point 34° 54.4176' N - 76° 45.7680' W; running southerly to the south shore to a point 34° 54.2610' N - 76° 45.8277' W; and

(ii) Gulden Creek - east of a line beginning on the north shore at a point 34° 54.1760' N - 76° 45.4438' W; running southerly to the south shore to a point 34° 54.0719' N - 76° 45.4888' W;

(b) Adams Creek:

(i) Godfrey Creek - south of a line beginning on the west shore at a point 34° 57.3104' N - 76° 41.1292' W; running easterly to the east shore to a point 34° 57.2655' N - 76° 41.1187' W;

(ii) Delamar Creek - south of a line beginning on the west shore at a point 34° 57.0475' N - 76° 40.7230' W; running southeasterly to the east shore to a point 34° 57.0313' N - 76° 40.7015' W;

(iii) Kellum Creek - west of a line beginning on the north shore at a point 34° 55.5240' N - 76° 39.8072' W; running southeasterly to the south shore to a point 34° 55.4356' N - 76° 39.8201' W;

(iv) Kearney Creek and unnamed tributary - west of a line beginning on the north shore of the north creek at a point 34° 55.1847' N - 76° 39.9686' W; running southerly to the south shore to a point 34° 54.9661' N - 76° 40.0091' W;

(v) Isaac Creek - south of a line beginning on the west shore at a point 34° 54.2457' N - 76° 40.1010' W; running easterly to the east shore to a point 34° 54.2630' N - 76° 40.0088' W;

(vi) Back Creek - southeast of a line beginning on the northeast shore at a point 34° 54.6598' N - 76° 39.5257' W; running southwesterly to the southwest shore to a point 34° 54.5366' N - 76° 39.7075' W;

(vii) Cedar Creek - southeast of a line beginning on the west shore at a point 34° 55.7759' N - 76° 38.6070' W; running easterly to the east shore to a point 34° 55.7751' N - 76° 38.4965' W;

(viii) Jonaquin Creek - northeast of a line beginning on the west shore at a point 34° 56.1192' N - 76° 38.4997' W; running

easterly to the east shore to a point 34° 56.1172' N - 76° 38.4584' W;

(ix) Dumpling Creek - east of a line beginning on the northwest shore at a point 34° 56.9187' N - 76° 39.5559' W; running southeasterly to the southeast shore to a point 34° 56.8421' N - 76° 39.5155' W; and

(x) Sandy Huss Creek - northeast of a line beginning on the west shore at a point 34° 57.2348' N - 76° 39.8457' W; running southeasterly to the east shore to a point 34° 57.1638' N - 76° 39.7169' W;

(c) Garbacon Creek - south of a line beginning on the west shore at a point 34° 59.0044' N - 76° 38.5758' W; running easterly to the east shore to a point 34° 59.0006' N - 76° 38.4845' W;

(d) South River:

(i) Big Creek - southwest of a line beginning on the northwest shore at a point 34° 56.9502' N - 76° 35.3498' W; running southeasterly to the southeast shore to a point 34° 56.8346' N - 76° 35.2091' W; and

(ii) Horton Bay - north of a line beginning on the west shore at a point 34° 59.1936' N - 76° 34.7657' W; running easterly to the east shore to a point 34° 59.2023' N - 76° 34.4586' W;

(e) Brown Creek - south of a line beginning on the west shore at a point 34° 59.8887' N - 76° 33.5707' W; running easterly to the east shore to a point 34° 59.9440' N - 76° 33.4180' W; and

(f) Turnagain Bay:

(i) Abraham Bay - west of a line beginning on the north shore at a point 35° 00.1780' N - 76° 30.7564' W; running southerly to the south shore to a point 34° 59.8338' N - 76° 30.7128' W;

(ii) Broad Creek and Persons Creek - southwest of a line beginning at a point on the north shore 34° 59.1974' N - 76° 30.4118' W; running southeasterly to the south shore to a point 34° 58.9738' N - 76° 30.1168' W;

(iii) Mulberry Point Creek - east of a line beginning on the north shore at a point 35° 00.4736' N - 76° 29.7538' W; running southerly to the south shore to a point 35° 00.3942' N - 76° 29.7082' W;

(iv) Tump Creek - east of a line beginning on the north shore at a point 35° 00.2035' N - 76° 29.5947' W; running southerly to the south shore to a point 35° 00.0500' N - 76° 29.4897' W;

(v) Tributary south of Tump Creek - east of a line beginning on the north shore at a point 34° 59.7784' N - 76° 29.3548' W; running southerly to the south shore to a point 34° 59.6830' N - 76° 29.3303' W;

(vi) Deep Gut - northeast of a line beginning on the north shore at a point 34° 59.6134' N - 76° 29.0376' W; running southeasterly to the south shore to a point 34° 59.4799' N - 76° 28.9362' W; and

(vii) Big Gut - east of a line beginning on the north shore at a point 34° 59.0816' N - 76° 28.7076' W; running southerly to the south shore to a point 34° 58.9300' N - 76° 28.7383' W;

(9) West Bay - Long Bay Area:

(a) Fur Creek and Henrys Creek - southwest of a line beginning on the northwest shore at a point 34° 56.5580' N - 76° 27.7065' W; running southeasterly to the southeast shore to a point 34° 56.3830' N - 76° 27.4563' W; and

(b) Caddugen Creek - south of a line beginning on the west shore at a point 34° 56.5767' N - 76° 23.8711' W; running easterly to the east shore to a point 34° 56.2890' N - 76° 23.6626' W;

(10) Core Sound Area:

(a) Cedar Island Bay - northwest of a line beginning on the northeast shore at a point 34° 59.7770' N - 76° 17.3837' W; running southwesterly to the

southwest shore to a point 34° 59.0100' N - 76° 17.9339' W;

(b) Lewis Creek - north of a line beginning on the west shore at a point 34° 56.8736' N - 76° 16.8740' W; running easterly to the east shore to a point 34° 56.9455' N - 76° 16.8234' W;

(c) Thorofare Bay:

(i) Merkle Hammock Creek - southwest of a line beginning on the northwest shore at a point 34° 55.4796' N - 76° 21.4463' W; running southeasterly to the southeast shore to a point 34° 55.3915' N - 76° 21.1682' W; and

(ii) Barry Bay - west of a line beginning on the north shore at a point 34° 54.6450' N - 76° 20.6127' W; running southerly to the south shore to a point 34° 54.4386' N - 76° 20.4912' W;

(d) Nelson Bay:

(i) Willis Creek and Fulchers Creek - west of a line beginning on the north shore of Willis Creek at a point 34° 51.1006' N - 76° 24.5996' W; running southerly to the south shore of Fulchers Creek to a point 34° 50.2861' N - 76° 24.8708' W; and

(ii) Lewis Creek - west of a line beginning on the north shore at a point 34° 51.9362' N - 76° 24.6322' W; running southerly to the south shore to a point 34° 51.7323' N - 76° 24.6487' W;

(e) Cedar Creek between Sea Level and Atlantic - west of a line beginning on the north shore at a point 34° 52.0126' N - 76° 22.7046' W; running southerly to the south shore to a point 34° 51.9902' N - 76° 22.7190' W;

(f) Oyster Creek, northwest of the Highway 70 Bridge; and

(g) Jarretts Bay Area:

(i) Smyrna Creek - northwest of the Highway 70 Bridge;

(ii) Ditch Cove and adjacent tributary - east of a line beginning on the north shore at a point 34° 48.0167' N - 76° 28.4674' W; running southerly to the south shore to a point 34° 47.6143' N - 76° 28.6473' W;

(iii) Broad Creek - northwest of a line beginning on the west shore at a point 34° 47.7820' N - 76° 29.2724' W; running northeasterly to the east shore to a point 34° 47.9766' N - 76° 28.9729' W;

(iv) Howland Creek - northwest of a line beginning on the northeast shore at a point 34° 47.5129' N - 76° 29.6217' W; running southwesterly to the southwest shore to a point 34° 47.3372' N - 76° 29.8607' W;

(v) Great Creek - southeast of a line beginning on the northeast shore at a point 34° 47.4279' N - 76° 28.9565' W; running southwesterly to the southwest shore to a point 34° 47.1515' N - 76° 29.2077' W;

(vi) Williston Creek - northwest of the Highway 70 Bridge;

(vii) Wade Creek - west of a line beginning on the north shore at a point ~~34° 46.3022' N 76° 30.5443' W;~~ 34° 46.3125' N - 76° 30.2676' W; running southerly to the south shore to a point ~~34° 46.2250' N 76° 30.3864' W;~~ 34° 46.1915' N - 76° 30.3593' W;

(viii) Jump Run - north of a line beginning on the west shore at a point 34° 45.5385' N - 76° 30.3974' W; running easterly to the east shore to a point 34° 45.5468' N - 76° 30.3485' W;

(ix) Middens Creek - west of a line beginning on the north shore at a point 34° 45.5046' N - 76° 30.9710' W; running southerly to the south shore to a point 34° 45.4093' N - 76° 30.9584' W;

(x) Tusk Creek - northwest of a line beginning on the northwest shore at a point 34° 44.8049' N - 76° 30.6248' W; running southerly to the south shore to a point 34° 44.6074' N - 76° 30.7553' W; and

(xi) Creek west of Bells Island - west of a line beginning on the north shore at a point 34° 43.9531' N - 76° 30.4144' W; running southerly to the south shore to a point 34° 43.7825' N - 76° 30.3543' W;

(11) Straits, North River, Newport River Area:

(a) Straits:

(i) Sleepy Creek - north of a line beginning on the west shore at a point 34° 43.3925' N - 76° 31.4912' W; running easterly to the east shore to a point 34° 43.3651' N - 76° 31.3250' W;

(ii) Dicks Creek - north of a line beginning on the west shore at a point 34° 43.3858' N - 76° 32.9125' W; running southeasterly to the east shore to a point 34° 43.3912' N - 76° 32.8605' W; and

(iii) Whitehurst Creek - north of a line beginning on the west shore at a point 34° 43.5118' N - 76° 33.3392' W; running northeasterly to the east shore to a point 34° 43.5561' N - 76° 33.1869' W;

(b) North River, north of Highway 70 Bridge:

(i) Ward Creek - north of Highway 70 Bridge:

(A) North Leopard Creek - southeast of a line beginning on the southwest shore at a point 34° 45.9573' N - 76° 34.4208' W; running northeasterly to the northeast shore to a point 34° 46.0511' N - 76° 34.3170' W; and

(B) South Leopard Creek - southeast of a line beginning on the southwest shore at a point 34° 45.4930' N - 76° 34.7622' W; running northeasterly to the northeast shore to a point 34° 45.5720' N - 76° 34.6236' W; and

(ii) Turner Creek (Gibbs Creek) - west of a line beginning on the north shore at a point 34° 43.4693' N - 76° 37.6372' W; running southerly to the south shore to a point 34° 43.4054' N - 76° 37.6585' W; and

(c) Newport River - west of a line beginning on the north shore at a point 34° 46.5635' N - 76° 44.3998' W; running southerly to Lawton Point to a point 34° 45.6840' N - 76° 44.0895' W;

(i) Russel Creek - northeast of a line beginning on the north shore at a point 34° 45.5840' N - 76° 39.8020' W; running southeasterly to the south shore to a point 34° 45.5819' N - 76° 39.7895' W;

(ii) Ware Creek - northeast of a line beginning on the north shore at a point 34° 46.4576' N - 76° 40.5020' W; running southeasterly to the south shore to a point 34° 46.4125' N - 76° 40.4460' W;

(iii) Bell Creek - east of a line beginning on the north shore at a point 34° 47.2805' N - 76° 40.9082' W; running southerly to the south shore to a point 34° 47.0581' N - 76° 40.8854' W;

(iv) Eastman Creek - east of a line beginning on the north shore at a point 34° 47.8640' N - 76° 41.0671' W; running southerly to the south shore to a point 34° 47.8027' N - 76° 41.0605' W;

(v) Oyster Creek - north of a line beginning on the west shore at a point 34° 46.6610' N - 76° 42.5011' W; running easterly to the east shore to a point 34° 46.7161' N - 76° 42.3481' W;

(vi) Harlow Creek - north of a line beginning on the west shore at a point 34° 46.7138' N - 76° 43.4838' W; running northeasterly to the east shore to a point 34° 46.8490' N - 76° 43.3296' W;

(vii) Calico Creek - west of a line beginning on the north shore at a point 34° 43.7318' N - 76° 43.1268' W; running southerly to the south shore to a point 34° 43.6066' N - 76° 43.2040' W; and

(viii) Crab Point Bay - northwest of a line beginning on the northeast shore at a point 34° 44.0615' N - 76° 42.9393' W; running southwesterly to the southwest shore to a point 34° 43.9328' N - 76° 43.0721' W;

(12) Bogue Sound - Bogue Inlet Area:

(a) Gales Creek - north of the Highway 24 Bridge;

(b) Broad Creek - north of the Highway 24 Bridge;

(c) Sanders Creek - north of a line beginning at a point 34° 42.4694' N - 76° 58.3754' W on the west shore; running easterly to a point 34° 42.4903' N - 76° 58.1434' W on the east shore;

(d) Goose Creek - north of a line beginning on the west shore at a point 34° 41.8183' N - 77° 00.7208' W; running easterly to the east shore to a point 34° 41.8600' N - 77° 00.5108' W;

(e) Archer Creek - west of a line beginning on the north shore at a point 34° 40.4721' N - 77° 00.7577' W; running southerly to the south shore to a point 34° 40.3521' N - 77° 00.8008' W;

(f) White Oak River - northwest of a line beginning on the northeast shore at a point 34° 45.6730' N - 77° 07.5960' W; running southwesterly to the southwest shore to a point 34° 45.2890' N - 77° 07.7500' W;

(i) Pettiford Creek - east of a line beginning on the north shore at a point 34° 42.8670' N - 77° 05.3990' W; running southerly to the south shore to a point 34° 42.6310' N - 77° 05.3180' W; and

(ii) Holland Mill Creek - west of a line beginning on the north shore at a point 34° 43.8390' N - 77° 08.0090' W; running southeasterly to the south shore to a point 34° 43.4800' N - 77° 07.7650' W;

(g) Hawkins Creek - west of a line beginning on the north shore at a point 34° 41.1210' N - 77° 07.5720' W; running southerly to the south shore to a point 34° 41.0460' N - 77° 07.5930' W;

(h) Queen's Creek - north of state road number 1509 bridge:

(i) Dick's Creek - west of a line beginning on the north shore at a point 34° 39.9790' N - 77° 09.3470' W; running southeasterly to the south shore to a point 34° 39.9350' N - 77° 09.3280' W;

(ii) Parrot Swamp - west of a line beginning on the north shore at a point 34° 40.6170' N - 77° 09.7820' W; running southeasterly to the south shore to a point 34° 40.3660' N - 77° 09.5980' W; and

(iii) Hall's Creek - east of a line beginning on the north shore at a point 34° 41.0740' N - 77° 09.8640' W; running easterly to the south shore to a point 34° 41.0300' N - 77° 09.6740' W; and

(i) Bear Creek - west of a line beginning at Willis Landing at a point 34° 38.7090' N - 77° 12.6860' W; running southeasterly to the south shore to a point 34° 38.4740' N - 77° 12.3810' W;

(13) New River Area:

(a) Salliers Bay area - all waters north and northwest of the IWW beginning at a point on the shoreline 34° 37.0788' N - 77° 12.5350' W; running easterly to a point near Beacon "58" at a point 34° 37.9670' N - 77° 12.3060' W; running along the IWW near Cedar Point to a point 34° 33.1860' N - 77° 20.4370' W; running northerly to a point on the shoreline 34° 33.1063' N - 77° 20.4679' W; following the shoreline to the point of origin; including Howard Bay, Mile Hammock Bay, Salliers Bay, and Freeman Creek;

(b) New River Inlet area (including Hellgate Creek and Ward's Channel) - all waters south of the IWW from a point on the shoreline 34° 33.0486' N - 77° 18.6295' W; running northwesterly to a point near Beacon "65" 34° 33.0550' N - 77° 18.6380' W; running along the IWW to a point near Beacon "15" 34° 31.0630' N - 77°

22.2630' W; running southerly to a point on the shoreline 34° 30.9212' N - 77° 22.2257' W; following the shoreline across New River Inlet at the COLREGS demarcation line back to the point of origin excluding the marked New River Inlet Channel;

(c) New River:

(i) Trap's Bay - northeast of a line beginning on the west shore at a point 34° 34.0910' N - 77° 21.0010' W; running southeasterly to the east shore to a point 34° 33.8260' N - 77° 20.4060' W;

(ii) Courthouse Bay:

(A) Tributary of Courthouse Bay - southeast of a line beginning on Harvey's Point at a point 34° 35.0050' N - 77° 22.3910' W; running northeasterly to the east shore to a point 34° 35.0830' N - 77° 22.1890' W;

(B) Tributary of Courthouse Bay - northwest of a line beginning on the west shore at a point 34° 35.0970' N - 77° 22.6010' W; running northeasterly to the east shore to a point 34° 35.1630' N - 77° 22.5030' W; and

(C) Rufus Creek - east of a line beginning at a point on the north shore 34° 34.4630' N - 77° 21.6410' W; running southerly to a point near Wilken's Bluff 34° 34.3140' N - 77° 21.6620' W;

(iii) Wheeler Creek - south of a line beginning on the west shore at a point 34° 34.0570' N - 77° 23.3640' W; running easterly to a point near Poverty Point 34° 34.1060' N - 77° 23.2440' W;

(iv) Fannie Creek - south of a line beginning on the west shore at a point 34° 34.1470' N - 77° 23.6390' W; running easterly to the east shore to a point 34° 34.1300' N - 77° 23.5600' W;

(v) Snead's Creek - northwest of a line beginning on the west shore at a point 34° 35.2850' N - 77° 23.5500' W; running northerly to the east shore to a point 34° 35.3440' N - 77° 23.4860' W;

(vi) Everette Creek - south of a line beginning on the west shore at a point 34° 34.2570' N - 77° 24.8480' W; running easterly to the east shore to a point 34° 34.2380' N - 77° 24.6970' W;

(vii) Stone's Creek - southwest of a line beginning on the northwest shore at a point 34° 36.6170' N - 77° 26.8670' W; running southeasterly to the southeast shore to a point 34° 36.5670' N - 77° 26.8500' W;

(viii) Muddy Creek - north of a line beginning on the west shore 34° 36.8670' N - 77° 26.6340' W; running easterly to the east shore to a point 34° 36.8670' N - 77° 26.6170' W;

(ix) Mill Creek - north of a line beginning on the west shore at a point 34° 37.2350' N - 77° 25.7000' W; running easterly to the east shore to a point 34° 37.2360' N - 77° 25.6890' W;

(x) Whitehurst Creek - west of a line beginning on the north shore at a point 34° 38.0780' N - 77° 22.6110' W; running easterly to the south shore to a point 34° 38.0720' N - 77° 22.6000' W;

(xi) Town Creek - west of a line beginning on the north shore at a point 34° 39.6060' N - 77° 23.0690' W; running southerly to the south shore to a point 34° 39.5950' N - 77° 23.0830' W;

(xii) Lewis Creek - southwest of a line beginning on the northwest shore at a point 34° 40.9330' N - 77° 24.5290' W;

running southeasterly to the southeast shore to a point 34° 40.9190' N - 77° 24.5040' W;

(xiii) Northeast Creek - east of a line beginning at the mouth of Scale's Creek at a point 34° 43.7350' N - 77° 24.1190' W; running southeasterly to the south shore to a point 34° 43.3950' N - 77° 23.5450' W;

(xiv) Southwest Creek - southwest of a line beginning on the north shore at a point 34° 41.8500' N - 77° 25.6460' W; running southeasterly to the south shore to a point 34° 41.5540' N - 77° 25.2250' W; and

(xv) Upper New River - north of a line beginning on the west shore at a point 34° 42.9770' N - 77° 25.9070' W; running easterly through a point near Beacon "53" to a point 34° 43.2600' N - 77° 25.3800' W; to the east shore to a point 34° 43.4260' N - 77° 25.0700' W; and

(d) Chadwick Bay - all waters bounded by a line beginning on Roses Point at a point 34° 32.2240' N - 77° 22.2880' W; running easterly to a point near Marker "6" at 34° 32.4180' N - 77° 21.6080' W; then following the IWW to a point near Marker "14" at 34° 31.3220' N - 77° 22.1520' W; following the shoreline of Chadwick Bay back to the point of origin;

(i) Fullard Creek (including Charles Creek) - northwest of a line beginning on the north shore at a point 34° 32.2210' N - 77° 22.8080' W; running southeasterly to the south shore to a point 34° 32.0340' N - 77° 22.7160' W; and

(ii) Bump's Creek - north of a line beginning on the west shore at a point 34° 32.3430' N - 77° 22.4570' W; running northeasterly to the east shore to a point 34° 32.4400' N - 77° 22.3830' W;

(14) Stump Sound Area - Stump Sound - all waters north of the IWW from a point on the shoreline 34° 31.1228' N - 77° 22.3181' W; running southerly to a point across the IWW from Beacon"15" 34° 31.1040' N - 77° 22.2960' W; running along the IWW to a point near Marker "78" 34° 25.4050' N - 77° 34.2120' W; running northerly to a point on the shoreline 34° 24.5183' N - 77° 34.9833' W; running along the shoreline to the point of origin; except 100 feet north of the IWW from a point across from Beacon "49" 34° 28.1330' N - 77° 30.5170' W to a point near Marker "78" 34° 25.4050' N - 77° 34.2120' W. All waters south of IWW from a point on the shoreline 34° 31.0550' N - 77° 22.2574' W; running northerly to a point near Beacon "15" at 34° 31.0630' N - 77° 22.2630' W; running along the IWW to a point across the IWW from Marker "78" 34° 25.3110' N - 77° 34.1710' W; running southeasterly to a point on the shoreline 34° 23.9817' N - 77° 35.0367' W; running along the shoreline to the point of origin; except 100 feet on the south side of the IWW from a point near Beacon "49" 34° 28.0820' N - 77° 30.4600' W at Morris Landing to a point across the IWW from Marker "78" 34° 25.3110' N - 77° 34.1710' W and except the dredged canals at Old Settler's Beach and the dredged channel from the IWW north of Marker "57" to the Old Settler's Beach Canals;

(15) Topsail Sound Area:

(a) Virginia Creek - all waters northwest of a line beginning on the southwest shore near the mouth at a point 34° 24.8030' N - 77° 35.5960' W; running northeasterly to a point 34° 25.0333' N - 77° 35.3167' W; running easterly to intersect the nursery area line near Becky's Creek at a point 34° 25.4050' N - 77° 34.2120' W, with the exception of the natural channel as marked by the North Carolina Division of Marine Fisheries;

(b) Old Topsail Creek - all waters northwest of a line beginning on the northeast shore at a point 34° 21.7740' N - 77° 40.3870' W; running southwesterly to the southwest shore to a point 34° 21.4930' N - 77° 40.6900' W, with the exception of the dredged channel as marked by the North Carolina Division of Marine Fisheries;

(c) Topsail Sound - all waters enclosed within a line starting near Beacon "BC" at a point 34° 24.6110' N - 77° 35.7050' W; then bounded on the northeast and southeast by Bank's Channel, on the southwest by Marker "98" channel and on the northeast by the IWW; then back to the point of origin; and

(d) Mallard Bay Area - all waters northwest of the IWW beginning at a point on the shoreline 34° 24.0278' N

- 77° 36.8498' W; running southerly to a point 34° 24.0167' N - 77° 36.7333' W near Beacon "93"; running southwesterly to a point 34° 23.8167' N - 77° 36.9667' W; running southwesterly along the marsh line to a point on the shoreline 34° 22.6168' N - 77° 38.8580' W near Beacon "96"; running along the shoreline to the point of origin;

(16) Middle Sound Area:

(a) Howard Channel and Long Point Channel area - all waters southeast of the IWW beginning at a point on the shoreline 34° 20.4514' N - 77° 40.0183' W; running along the shorelines of Topsail Inlet Channel and Marker # 98 Channel to a point near Beacon "98" 34° 21.5670' N - 77° 40.4580' W; running along the IWW to a point on the north side of the Figure 8 Island Marina Channel to a point 34° 16.5120' N - 77° 45.4870' W; following the shoreline of Figure 8 Island Marina Channel to a point 34° 16.2628' N - 77° 44.7855' W; following the shoreline across Rich Inlet at the COLREGS demarcation line to the point of origin. [with the exception of Howard Channel from the IWW to New Topsail Inlet, Green Channel from Marker "105" to Rich's Inlet, Butler's Creek (Utley's Channel) from the IWW to Nixon's Channel, and Nixon's Channel from IWW to Rich's Inlet;]

(b) Futch Creek - northwest of a line beginning on the north shore at Baldeagle Point at a point 34° 17.9900' N - 77° 44.4930' W; running southerly to Porter's Neck to a point 34° 18.1170' N - 77° 44.3760' W;

(c) Page's Creek - northwest of a line beginning on the north shore at a point 34° 16.7420' N - 77° 46.6940' W; running southwesterly to the south shore to a point 34° 16.6910' N - 77° 46.8510' W; and

(d) All waters bounded on the north by the Figure Eight Island Causeway, on the east by Mason's Channel, on the south by Mason's Inlet Channel and on the west by the Intracoastal Waterway, with the exception of Mason's Channel;

(17) Greenville Sound Area:

(a) Shell Island area - all waters bounded on the north by Mason's Inlet Channel, on the west by the IWW, on the south by Old Moores Inlet Channel and on the east by Wrightsville Beach;

(b) Howe Creek (Moore's Creek) - northwest of a line beginning on the north shore at a point 34° 14.9060' N - 77° 47.2180' W; running southwesterly to the south shore to a point 34° 14.8470' N - 77° 47.3810' W;

(c) Bradley Creek - all waters west of a line beginning on the north side of the Highway 17, 74 and 76 Bridge at a point 34° 12.9700' N - 77° 50.0260' W; running southerly to the south side of the bridge at a point 34° 12.8620' N - 77° 50.0550' W; and

(d) Wrightsville Beach area - all waters in an area enclosed by a line beginning across the IWW from the mouth of Bradley Creek at a point 34° 12.3530' N - 77° 49.1250' W; running easterly to a point (near the Borrow Pit) 34° 12.3820' N - 77° 48.6610' W; then bounded by Bank's Channel on the east, Shinn Creek on the south and the IWW on the west, back to point of origin;

(18) Masonboro Sound Area:

(a) Masonboro - Myrtle Grove Sound area (west side) - all waters west and northwest of the IWW beginning at a point on the shoreline 34° 12.7423' N - 77° 49.8391' W; running southeasterly to a point at the mouth of Bradley Creek at a point 34° 12.4130' N - 77° 49.2110' W; running along the west side of the IWW to a point opposite Beacon "161" at 34° 03.5590' N - 77° 53.4550' W; running westerly to a point on the shoreline 34° 03.5715' N - 77° 53.4979' W; running along the shoreline back to the point of origin; and

(b) Masonboro - Myrtle Grove Sound area (east side) - all waters south and southeast of a line beginning on the north end of Masonboro Island at a point 34° 10.9130' N - 77° 48.9550' W; running northwesterly to a point near the intersection of Shinn Creek and the IWW 34° 11.3840' N - 77° 49.5240' W; running along the east side of the IWW to a point near Marker "161" 34° 03.5270' N - 77° 53.3550' W; running southerly to a point on the shoreline 34° 03.3917' N - 77° 53.0423' W; running along the shoreline across Carolina Beach Inlet at the COLREGS demarcation line

back to the point of origin (with the exception of Old Masonboro Channel and Carolina Beach Inlet Channel);

(19) Cape Fear River Area:

(a) Cape Fear River - all waters north of a line beginning on the west shore at a point 34° 10.4410' N - 77° 57.7400' W; running easterly through Beacon "59" to the east shore to a point 34° 10.4050' N - 77° 57.1310' W; with the exception of the maintained channel, and all waters north of a line beginning on the west shore at a point 34° 04.6040' N - 77° 56.4780' W; running easterly through Beacon "41" to the east shore to a point 34° 04.7920' N - 77° 55.4740' W; with the exception of 300 yards east and west of the main shipping channel up to Beacon "59" (mouth of Brunswick River);

(b) The Basin (Ft. Fisher area) - east of a line beginning on the north shore at a point 33° 57.2950' N - 77° 56.1450' W; running southeasterly to the south shore to a point 33° 57.1120' N - 77° 56.2060' W;

(c) Walden Creek - all waters northwest of a line beginning on the north side of county road No. 1528 bridge at a point 33° 58.2950' N - 77° 59.0280' W; running southerly to the south side of the bridge at a point 33° 58.2250' N - 77° 59.0440' W;

(d) Baldhead Island Creeks:

(i) Baldhead Creek - southeast of a line beginning on the north shore at a point 33° 51.7680' N - 77° 59.1700' W; running westerly to the south shore to a point 33° 51.7590' N - 77° 59.1850' W;

(ii) Cape Creek - southeast of a line beginning on the north shore at a point 33° 51.9740' N - 77° 58.3090' W; running southwesterly to the south shore to a point 33° 51.9480' N - 77° 58.3480' W;

(iii) Bluff Island Creek (East Beach Creek) - south of a line beginning on the west shore at a point 33° 52.6740' N - 77° 58.1530' W; running easterly to the east shore to a point 33° 52.6850' N - 77° 58.0780' W; and

(iv) Deep Creek - south of a line on the west shore at a point 33° 52.6850' N - 77° 58.0780' W; running northeasterly to the east shore to a point 33° 52.7690' N - 77° 58.0110' W;

(e) Dutchman Creek - north of a line beginning on the west shore at a point 33° 55.1560' N - 78° 02.7260' W; running southeasterly to the east shore to a point 33° 55.1130' N - 78° 02.5990' W;

(f) Denis Creek - west of a line beginning on the north shore at a point 33° 55.0410' N - 78° 03.5180' W; running southerly to the south shore to a point 33° 55.0120' N - 78° 03.5110' W;

(g) Piney Point Creek - west of a line beginning on the north shore at a point 33° 54.6310' N - 78° 03.5020' W; running southerly to the south shore to a point 33° 54.6040' N - 78° 03.5010' W;

(h) Molasses, Coward and Smokehouse creeks - all waters bounded by the IWW and the Elizabeth River on the north and east, the Oak Island Coast Guard canal on the east, Oak Island on the south and the CP and L Discharge canal on the west; and

(i) Oak Island area - all waters north of the IWW from a point on the shoreline 33° 55.2827' N - 78° 03.7681' W; running southerly to a point across the IWW from Marker # 9 33° 55.2610' N - 78° 03.7630' W; running along the IWW to a point near Beacon "18" 33° 55.7410' N - 78° 10.2760' W; running northerly to a point on the shoreline 33° 55.7718' N - 78° 10.2744' W; running along the shoreline back to the point of origin; all waters south of the IWW from a point near Marker "9" 33° 55.2060' N - 78° 03.7580' W; running along the IWW to a point across the IWW from Beacon "18" 33° 55.7199' N - 78° 10.2764' W; running southerly to a point on the shoreline 33° 55.6898' N - 78° 10.2775' W; running along the shoreline back to the point of origin;

(20) Lockwoods Folly Inlet Area:

(a) Davis Creek and Davis Canal - east of a line beginning on the north shore at a point 33° 55.2280' N - 78° 10.8610' W; running southerly to the south shore to a point 33° 55.1970' N - 78° 10.8390' W;

(b) Lockwoods Folly River - north of a line beginning on the west shore at a point 33° 56.3880' N - 78° 13.2360'

W; running easterly to the east shore to a point 33° 56.6560' N - 78° 12.8350' W; and

(c) Spring Creek (Galloway Flats area) - all waters northwest of a line beginning on the north shore at a point 33° 55.7350' N - 78° 13.7090' W; running southwesterly to the south shore to a point 33° 55.5590' N - 78° 13.7960' W;

(21) Shallotte Inlet Area:

(a) Shallotte River - north of a line beginning on Bill Holden's Landing at a point 33° 55.8840' N - 78° 22.0710' W; running northeasterly to Gibbins Point to a point 33° 56.3190' N - 78° 21.8740' W;

(b) Shallotte River (Ocean Flats) - excluding Gibbs Creek, the area enclosed by a line beginning at Long Point 33° 54.6210' N - 78° 21.7960' W; then bounded on the south by the IWW, the west by Shallotte River, the north by Gibb's Creek and the east by the shoreline of the Shallotte River back to the point of origin;

(c) Shallotte Creek (Little Shallotte River) - east of a line beginning on Shell Landing at a point 33° 55.7390' N - 78° 21.6410' W; running southerly to Boone's Neck Point to a point 33° 55.5990' N - 78° 21.5480' W;

(d) Saucepan Creek - northwest of a line beginning on the west shore at a point 33° 54.7007' N - 78° 23.4183' W; running northerly to the east shore (mouth of Old Mill Creek) to a point 33° 54.9140' N - 78° 23.4370' W; and

(e) Old Channel area - all waters south of the IWW from a point near Beacon "83" 33° 54.2890' N - 78° 23.1930' W; running along the IWW to a point near Ocean Isle Beach Bridge 33° 53.7270' N - 78° 26.3760' W; running southerly to a point on the shoreline 33° 53.7082' N - 78° 26.3732' W; running southerly along the shoreline to a point on the shoreline 33° 53.3827' N - 78° 26.2118' W; running along the shoreline to the point of origin; except the dredged finger canals at Ocean Isle Beach located on the south side of the IWW between the Ocean Isle Beach Bridge and IWW Marker "89"; and

(22) Little River Inlet Area:

(a) Gause Landing area - all waters north of the IWW from a point on the shoreline 33° 53.9053' N - 78° 25.6064' W; running southerly to a point near Beacon "90" 33° 53.8790' N - 78° 25.5950' W; then following the IWW to a point at the intersection of the IWW and the South Carolina line; 33° 52.0003' N - 78° 33.5633' W; running northerly along the South Carolina line to a point on the shoreline 33° 52.0290' N - 78° 33.5893' W; running along the shoreline to the point of origin;

(b) Eastern Channel Area - all waters bounded on the east and south by Eastern Channel, on the west by Jink's Creek and on the north by the IWW;

(c) The Big Narrows Area:

(i) Big Teague Creek - west of a line beginning on the north shore at a point 33° 52.8260' N - 78° 30.0110' W; running southerly to the south shore to a point 33° 52.8040' N - 78° 29.9940' W;

(ii) Little Teague Creek - west of a line beginning on the north shore at a point 33° 52.9280' N - 78° 30.1500' W; running southeasterly to the south shore to a point 33° 52.9130' N - 78° 30.1220' W; and

(iii) Big Norge Creek - south of a line beginning on the west shore at a point 33° 52.8550' N - 78° 30.6190' W; running easterly to the east shore to a point 33° 52.8620' N - 78° 30.5900' W;

(d) Mad Inlet area - all waters south of the IWW from a point on the shoreline 33° 52.3121' N - 78° 30.4990' W; running northerly to a point near the Sunset Beach Bridge 33° 52.8450' N - 78° 30.6510' W; then following the IWW to a point at the intersection of the IWW and the South Carolina line 33° 51.9888' N - 78° 33.5458' W; running southeasterly along the South Carolina line to a point on the shoreline; running along the shoreline across Mad Inlet at the COLREGS demarcation line to the point of origin; with the exception of Bonaparte Creek; and

(e) Calabash River - all waters east of a line beginning at a point on the north side of state road No. 1164 bridge at a point 33° 53.3850' N - 78° 32.9710' W; running southerly to the south side of the bridge at a point 33° 53.3580' N - 78° 32.9750' W.

Authority G.S. 113-134; 113-182; 143B-289.52.

TITLE 17 – DEPARTMENT OF REVENUE

***Notice** is hereby given in accordance with G.S. 150B-21.2 that the Department of Revenue intends to adopt the rules cited as 17 NCAC 05G .0101, .0102, .0201, .0301 - .0303, .0401, .0402, .0501 - .0505, .0601, .0701, .0801 - .0803, .0901 - .0905, .1001 - .1006, .1101 - .1105, .1201, .1301 - .1303.*

Link to agency website pursuant to G.S. 150B-19.1(c): *www.dor.state.nc.us*

Proposed Effective Date: *See S.L. 2016-94, s. 38.4(b)*

Public Hearing:
Date: *October 31, 2016*
Time: *10:00 a.m.*
Location: *NC Dept of Revenue, Room 135, 501 N Wilmington St, Raleigh, NC 27604*

Reason for Proposed Action: *The General Assembly enacted SL 2016-94 (H.B. 1030) which requires the Department of Revenue to adopt rules interpreting the substantive provision of G.S. 105-130.4(1) concerning the application of market-based sourcing of receipts for purposes of the sales factor.*

Comments may be submitted to: *Lennie Collins, P.O. Box 871, Raleigh, NC 27602, phone 919-814-1163, fax 919-733-1821, email Lennie.collins@ncdor.gov*

Comment period ends: *January 3, 2017*

Fiscal impact (check all that apply).
☐ **State funds affected**
☐ **Environmental permitting of DOT affected**
Analysis submitted to Board of Transportation
☐ **Local funds affected**
☐ **Substantial economic impact (≥$1,000,000)**
☐ **Approved by OSBM**
☒ **No fiscal note required by S.L. 2016-94, s. 38.4.(a)**

CHAPTER 05 - CORPORATE FRANCHISE, INCOME, AND INSURANCE TAXES

SUBCHAPTER 05G – MARKET-BASED SOURCING FOR APPORTIONMENT OF INCOME

SECTION .0100 – GENERAL RULES

17 NCAC 05G .0101 SCOPE

The rules in this Subchapter do not apply to receipts from the sale of tangible personal property. Other receipts are in North Carolina when the taxpayer's market for the sales is in North Carolina. The rules of this Subchapter establish uniform rules for:

(1) determining to what extent the market for a sale is in North Carolina;

(2) reasonably approximating the state or states of assignment where the state or states cannot be determined;

(3) excluding receipts from the sale of intangible property from the numerator and denominator of the sales factor pursuant to G.S. 105-130.4(1); and

(4) excluding receipts from the denominator of the sales factor where the state or states of assignment cannot be determined or reasonably approximated.

Authority G.S. 105-130.4; S.L. 2016-94.

17 NCAC 05G .0102 DEFINITIONS

As used in this Subchapter, the following definitions shall apply:

(1) "Billing address" means the location stated in the books and records of the taxpayer as the primary mailing address relating to a customer's account as of the time of the transaction as kept in good faith in the regular course of business and not for tax avoidance purposes.

(2) "Business customer" means a customer that is a business operating in any form, including a sole proprietorship. Sales to a non-profit organization; a trust; the U.S. Government; a foreign, state or local government; or to an agency or instrumentality of that government are treated as sales to a business customer.

(3) "Code" means as defined in G.S. 105-228.90.

(4) "Department" means the North Carolina Department of Revenue.

(5) "Good faith" means a state of mind consisting in honesty in belief or purpose, faithfulness to one's duty or obligation, observance of reasonable commercial standards of fair dealing in a given trade or business, or absence of intent to defraud or to seek unconscionable advantage.

(6) "Individual customer" means a customer that is not a business customer.

(7) "Intangible property" means property that is not physical or whose representation by physical means is merely incidental and includes,

(a) copyrights;
(b) patents;
(c) trademarks;
(d) trade names;
(e) brand names;
(f) franchises;
(g) licenses;
(h) trade secrets;
(i) trade dress;
(j) information;
(k) know-how;
(l) methods;
(m) programs;
(n) procedures;
(o) systems;
(p) formulae;

15A NCAC 03K .0110 is amended with changes as published in 31:07 NCR 587 as follows:

15A NCAC 03K .0110 PUBLIC HEALTH AND CONTROL OF OYSTERS, CLAMS, ~~SCALLOPS~~ SCALLOPS, AND MUSSELS

~~(a) To protect public health, the Fisheries Director may, by proclamation, impose any or all of the following restrictions on oysters, clams, scallops, and mussels to ensure the sale or distribution of shellfish from approved areas or shellstock dealers as defined in Rule 15A NCAC 18A .0301 and to ensure that shellfish have not been adulterated or mislabeled during cultivation, harvesting, processing, storage and transport, in compliance with the National Shellfish Sanitation Program Guide for Control of Molluscan Shellfish, Section II: Model Ordinance:~~

(a) The National Shellfish Sanitation Program Guide for Control of Molluscan Shellfish, Section II: Model Ordinance (Model Ordinance) includes minimum requirements for the sale or distribution of shellfish from approved areas or shellstock dealers, as defined in 15A NCAC 18A .0301, and to ensure that shellfish have not been adulterated or mislabeled during:

(1) cultivation;

(2) harvesting;

(3) processing;

(4) storage; and

(5) transport.

(b) To protect public health and to address variable conditions of the Model Ordinance, the Fisheries Director may, by proclamation, impose requirements as set forth in Paragraph (c) of this Rule on any of the following:

(1) oysters;

(2) clams;

(3) scallops;

(4) mussels;

(5) areas used to store shellfish;

(6) means and methods to take shellfish;

(7) vessels used to take shellfish; and

(8) shellstock conveyances as defined in 15A NCAC 18A .0301.

(c) Proclamations issued under this Rule may impose any of the following requirements:

(1) specify time and temperature controls;

(2) specify sanitation requirements to prevent a food safety hazard, as defined in 15A NCAC 18A .0301, or cross-contamination or adulteration of shellfish;

~~(2)~~(3) specify sanitation control procedures as specified in 21 Code of Federal Regulations (CFR) Part 123.11;

~~(3)~~(4) specify Hazard Analysis Critical Control Point (HACCP) requirements as specified in 21 CFR Part:

(A) 123.3 Definitions;

(B) 123.6 HACCP Plan;

(C) 123.7 Corrective Actions;

(D) 123.8 Verification;

(E) 123.9 Records; and

(F) 123.28 Source Controls;

~~(4)~~(5) specify tagging and labeling requirements;

~~(5)~~(6) implement the National Shellfish Sanitation Program's training requirements for shellfish harvesters and certified shellfish dealers;

~~(6)~~(7) require sales records and collection and submission of information to provide a mechanism for shellfish product to be traced back to the water body of origin; and

~~(7)~~(8) require implicated product recall and specify recall procedures.

[~~21 CFR 123.3 (2015), 123.6-9 (1997), 123.11 (2015), and 123.28 (1997)~~]21 CFR 123.3, 123.6-9, 123.11, and 123.28 are hereby incorporated by [~~reference.~~]reference, including subsequent amendments and editions. A copy of the reference materials can be found at http://www.ecfr.gov/cgi-bin/text-idx?SID=f4cdd666e75f54ccda1d9938f4edd9ab&mc=true&tpl=/ecfrbrowse/Title21/21tab_02.tpl, free of charge.[~~—A copy of the CFR in effect on the date of this Rule can be found at http://portal.ncdenr.org/web/mf/rules-and-regulations, free of charge.~~]

~~(b)~~(d) Proclamations issued under this Rule shall suspend appropriate rules or portions of rules under the authority of the Marine Fisheries Commission as specified in the proclamation. The provisions of 15A NCAC 03I .0102 terminating suspension of a rule pending the next Marine Fisheries Commission meeting and requiring review by the Marine Fisheries Commission at the next meeting shall not apply to proclamations issued under this Rule.

History Note: *Authority G.S. 113-134; 113-182; 113-201; 113-221.1; 113-221.2; 143B-289.52;*
Eff. April 1, 2014;
Amended Eff. May 1, 2017.

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

January 27, 2017

MEMORANDUM **Periodic Review 02-17**

TO: Marine Fisheries Commission

FROM: Catherine Blum, Fishery Management Plan and Rulemaking Coordinator

SUBJECT: Periodic Review of Rules Update

This memo describes the materials about the Periodic Review and Expiration of Existing Rules for the February 2017 commission meeting. There are two informational items; these are followed by a third item that will be accompanied by a presentation. The commission is scheduled to vote on approval of this item to begin the rule review process. Each item is summarized below:

Periodic Review and Expiration of Existing Rules

Session Law 2013-413, the Regulatory Reform Act of 2013, implemented requirements known as the "Periodic Review and Expiration of Existing Rules." These requirements are codified in a new section of Article 2A of Chapter 150B of the General Statutes in G.S. 150B-21.3A. A copy of the statute is provided in the briefing materials. These requirements directly affect the commission as the agency with the authority to set rules for marine and estuarine resources under its jurisdiction.

Under the requirements, each agency is responsible for conducting a review of all its rules at least once every 10 years in accordance with a prescribed process. The review has two parts: a report phase, followed by the re-adoption of rules. The Office of Administrative Hearings developed a schedule for all agencies with rules to undergo the periodic review, numbering approximately 20,000 rules statewide. The process is scheduled to begin for the commission at its February 2017 business meeting. The Office Administrative Hearings created a flow chart showing the steps in the process and a copy is included in the briefing materials.

An evaluation of the rules under the authority of the Marine Fisheries Commission will be undertaken in two lots. A report on the rules in Title 15A, Environment and Natural Resources, Chapter 03, Marine Fisheries is due to the Rules Review Commission December 2017. A report on the rules in Chapter 18, Environmental Health, for portions of Subchapter A that govern shellfish sanitation and recreational water quality is due January 2019. The Marine Fisheries Commission has approximately 210 rules in Chapter 03 and approximately 165 rules in Chapter 18A. The Marine Fisheries Commission is the body with the authority for the various approval steps prescribed in the process for these rules.

Nothing Compares

State of North Carolina | Division of Marine Fisheries
3441 Arendell Street | P.O. Box 769 | Morehead City, North Carolina 28557
252-726-7021

Vote to Approve Initial Agency Determination of 15A NCAC 03 Rules

The first step in the process is for each agency to make a determination as to whether each rule is necessary with substantive public interest, necessary without substantive public interest, or unnecessary. A table is included in the briefing materials that lists the commission's rules in Chapter 03 of Title 15A of the North Carolina Administrative Code, along with the initial determination and whether rules implement or conform to a federal regulation. A presentation about this table or "report" will be given to the commission at its February 2017 meeting; the commission is scheduled to vote on approval of the draft report.

After the draft report is approved it will be posted on the division's web site for public comment for a minimum of 60 days. It is important to note, for the purposes of these requirements, "public comment" means written comments from the public objecting to the rule. The agency must review the public comments and prepare a brief response addressing the merits of each comment. This information becomes the final report and is scheduled to be voted on by the commission for approval at its August 2017 meeting. The final report is then submitted to the Rules Review Commission, which, if approved, is forwarded to the Joint Legislative Administrative Procedure Oversight Committee for final determination.

The second part of the process is the re-adoption of rules. The final report determines the process for re-adoption. Rules determined to be necessary and without substantive public interest and for which no public comment was received remain in effect without further action. Rules determined to be unnecessary and for which no public comment was received expire on the first day of the month following the date the report becomes effective. Rules determined to be necessary with substantive public interest must be readopted as though the rules were new rules. The Rules Review Commission works with each agency to consider the agency's rulemaking priorities in establishing a deadline for the re-adoption of rules.

Staff recommends the commission consider adopting the rule classifications presented by staff in the draft report.

§ 150B-21.3A. Periodic review and expiration of existing rules.

(a) Definitions. – For purposes of this section, the following definitions apply:

(1) Commission. – Means the Rules Review Commission.

(2) Committee. – Means the Joint Legislative Administrative Procedure Oversight Committee.

(3) Necessary with substantive public interest. – Means any rule for which the agency has received public comments within the past two years. A rule is also "necessary with substantive public interest" if the rule affects the property interest of the regulated public and the agency knows or suspects that any person may object to the rule.

(4) Necessary without substantive public interest. – Means a rule for which the agency has not received a public comment concerning the rule within the past two years. A "necessary without substantive public interest" rule includes a rule that merely identifies information that is readily available to the public, such as an address or a telephone number.

(5) Public comment. – Means written comments objecting to the rule, in whole or in part, received by an agency from any member of the public, including an association or other organization representing the regulated community or other members of the public.

(6) Unnecessary rule. – Means a rule that the agency determines to be obsolete, redundant, or otherwise not needed.

(b) Automatic Expiration. – Except as provided in subsection (e) of this section, any rule for which the agency that adopted the rule has not conducted a review in accordance with this section shall expire on the date set in the schedule established by the Commission pursuant to subsection (d) of this section.

(c) Review Process. – Each agency subject to this Article shall conduct a review of the agency's existing rules at least once every 10 years in accordance with the following process:

(1) Step 1: The agency shall conduct an analysis of each existing rule and make an initial determination as to whether the rule is (i) necessary with substantive public interest, (ii) necessary without substantive public interest, or (iii) unnecessary. The agency shall then post the results of the initial determination on its Web site and invite the public to comment on the rules and the agency's initial determination. The agency shall also submit the results of the initial determination to the Office of Administrative Hearings for posting on its Web site. The agency shall accept public comment for no less than 60 days following the posting. The agency shall review the public comments and prepare a brief response addressing the merits of each comment. After completing this process, the agency shall submit a report to the Commission. The report shall include the following items:

a. The agency's initial determination.

b. All public comments received in response to the agency's initial determination.

c. The agency's response to the public comments.

(2) Step 2: The Commission shall review the reports received from the agencies pursuant to subdivision (1) of this subsection. If a public comment relates to a rule that the agency determined to be necessary and without substantive public interest or unnecessary, the Commission shall determine whether the public comment has merit and, if so, designate the rule as necessary with substantive public interest. For purposes of this subsection, a public comment has merit if it addresses the specific substance of the rule and

relates to any of the standards for review by the Commission set forth in G.S. 150B-21.9(a). The Commission shall prepare a final determination report and submit the report to the Committee for consultation in accordance with subdivision (3) of this subsection. The report shall include the following items:

a. The agency's initial determination.
b. All public comments received in response to the agency's initial determination.
c. The agency's response to the public comments.
d. A summary of the Commission's determinations regarding public comments.
e. A determination that all rules that the agency determined to be necessary and without substantive public interest and for which no public comment was received or for which the Commission determined that the public comment was without merit be allowed to remain in effect without further action.
f. A determination that all rules that the agency determined to be unnecessary and for which no public comment was received or for which the Commission determined that the public comment was without merit shall expire on the first day of the month following the date the report becomes effective in accordance with this section.
g. A determination that all rules that the agency determined to be necessary with substantive public interest or that the Commission designated as necessary with public interest as provided in this subdivision shall be readopted as though the rules were new rules in accordance with this Article.

(3) Step 3: The final determination report shall not become effective until the agency has consulted with the Committee. The determinations contained in the report pursuant to sub-subdivisions e., f., and g. of subdivision (2) of this subsection shall become effective on the date the report is reviewed by the Committee. If the Committee does not hold a meeting to hear the consultation required by this subdivision within 60 days of receipt of the final determination report, the consultation requirement is deemed satisfied, and the determinations contained in the report become effective on the 61st day following the date the Committee received the report. If the Committee disagrees with a determination regarding a specific rule contained in the report, the Committee may recommend that the General Assembly direct the agency to conduct a review of the specific rule in accordance with this section in the next year following the consultation.

(d) Timetable. – The Commission shall establish a schedule for the review and readoption of existing rules in accordance with this section on a decennial basis as follows:

(1) With regard to the review process, the Commission shall assign each Title of the Administrative Code a date by which the review required by this section must be completed. In establishing the schedule, the Commission shall consider the scope and complexity of rules subject to this section and the resources required to conduct the review required by this section. The Commission shall have broad authority to modify the schedule and extend the time for review in appropriate circumstances. Except as provided in subsections (e) and (f) of this section, if the agency fails to conduct the review by the date set by the Commission, the rules contained in that Title

which have not been reviewed will expire. The Commission shall report to the Committee any agency that fails to conduct the review. The Commission may exempt rules that have been adopted or amended within the previous 10 years from the review required by this section. However, any rule exempted on this basis must be reviewed in accordance with this section no more than 10 years following the last time the rule was amended.

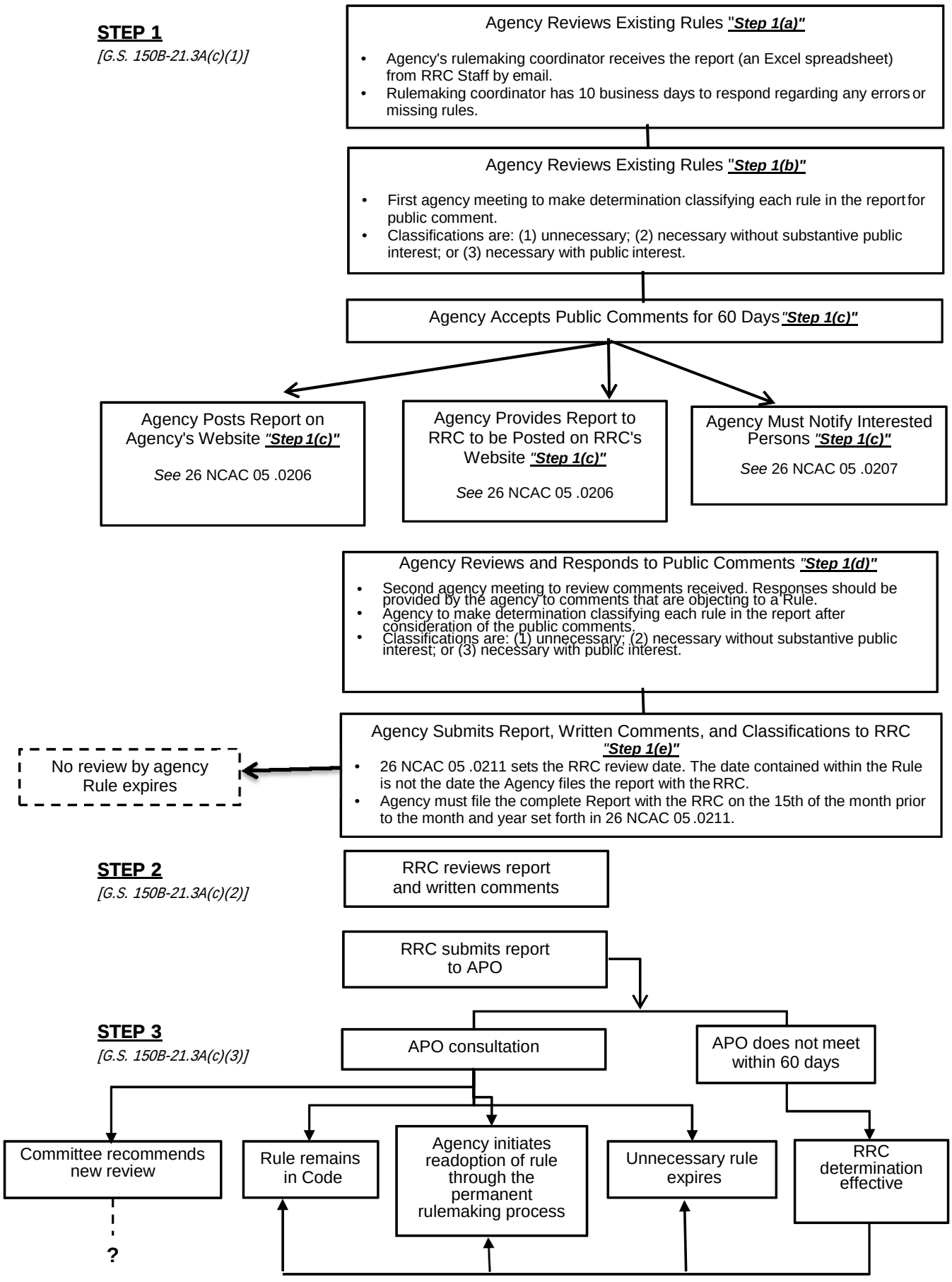
(2) With regard to the readoption of rules as required by sub-subdivision (c)(2)g. of this section, once the final determination report becomes effective, the Commission shall establish a date by which the agency must readopt the rules. The Commission shall consult with the agency and shall consider the agency's rule-making priorities in establishing the readoption date. The agency may amend a rule as part of the readoption process. If a rule is readopted without substantive change or if the rule is amended to impose a less stringent burden on regulated persons, the agency is not required to prepare a fiscal note as provided by G.S. 150B-21.4.

(e) Rules to Conform to or Implement Federal Law. – Rules adopted to conform to or implement federal law shall not expire as provided by this section. The Commission shall report annually to the Committee on any rules that do not expire pursuant to this subsection.

(e1) Rules to Protect Inchoate or Accrued Rights of Retirement Systems Members. – Rules deemed by the Boards of Trustees established under G.S. 128-28 and G.S. 135-6 to protect inchoate or accrued rights of members of the Retirement Systems administered by the State Treasurer shall not expire as provided by this section. The Commission shall report annually to the Committee on any rules that do not expire pursuant to this subsection.

(f) Other Reviews. – Notwithstanding any provision of this section, an agency may subject a rule that it determines to be unnecessary to review under this section at any time by notifying the Commission that it wishes to be placed on the schedule for the current year. The Commission may also subject a rule to review under this section at any time by notifying the agency that the rule has been placed on the schedule for the current year. (2013-413, s. 3(b); 2014-115, s. 17; 2014-120, s. 2; 2015-164, s. 7; 2015-286, s. 1.6(a).)

Periodic Review and Expiration of Existing Rules



G.S. 150B-21.3A Report for 15A NCAC 03, MARINE FISHERIES

Agency - Marine Fisheries Commission

Comment Period - Filled in by Agency

Date Submitted to APO - Filled in by RRC staff

Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
SUBCHAPTER 03H – SCOPE OF MANAGEMENT	**SECTION .0100 – SCOPE OF MANAGEMENT**	15A NCAC 03H .0102	SCOPE OF MANAGEMENT	Amended Eff. April 1, 2011	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03H .0103	PROCLAMATION AUTHORITY OF FISHERIES DIRECTOR	Amended Eff. April 1, 2011	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
SUBCHAPTER 03I – GENERAL RULES	**SECTION .0100 – GENERAL RULES**	15A NCAC 03I .0101	DEFINITIONS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0102	TEMPORARY SUSPENSION OF RULES	Recodified from 15A NCAC 3I .0002 Eff. December 17, 1996	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0103	CONFISCATION AND DISPOSITION	Recodified from 15A NCAC 3I .0003 Eff. December 17, 1996	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0104	INTRODUCE, TRANSFER OR HOLD IMPORTED MARINE AND ESTUARINE ORGANISMS	Amended Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0105	LEAVING DEVICES UNATTENDED	Amended Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0107	ENDANGERED OR THREATENED SPECIES	Amended Eff. July 1, 1999	Necessary without substantive public interest	Yes If yes, include the citation to the federal law	16 USC 1533 (c)	Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0108	OCEAN FISHING PIERS	Recodified from 15A NCAC 3I .0008 Eff. December 17, 1996	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0109	ARTIFICIAL REEFS AND RESEARCH SANCTUARIES	Recodified from 15A NCAC 3I .0009 Eff. December 17, 1996	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0110	MILITARY DANGER ZONES AND RESTRICTED AREAS	Amended Eff. August 1, 2004	Necessary without substantive public interest	Yes If yes, include the citation to the federal law	33 CFR 334.410-334.450	Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0113	BIOLOGICAL SAMPLING	Recodified from 15A NCAC 3I .0013 Eff. December 17, 1996	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0114	RECORDKEEPING REQUIREMENTS	Amended Eff. June 1, 2013	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0115	REPLACEMENT COSTS OF MARINE AND ESTUARINE RESOURCES - FISH	Recodified from 15A NCAC 3I .0015 Eff. December 17, 1996.	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0116	CORAL AND LIVE ROCK	Amended Eff. April 1, 2011	Necessary without substantive public interest	Yes If yes, include the citation to the federal law	50 CFR 622.223	Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0118	DISPOSAL OF EVIDENCE	Recodified from 15A NCAC 3I .0018 Eff. December 17, 1996	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03I .0119	PROHIBITED FISHING ACTIVITY DUE TO PUBLIC HEALTH OR SAFETY	Recodified from 15A NCAC 3I .0019 Eff. December 17, 1996	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0120	POSSESSION OR TRANSPORTATION LIMITS	Amended Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

G.S. 150B-21.3A Report for 15A NCAC 03, MARINE FISHERIES

Agency - Marine Fisheries Commission

Comment Period - Filled in by Agency

Date Submitted to APO - Filled in by RRC staff

Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03I .0121	MAPS AND MARKING	Eff. April 1, 2011	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03I .0122	USER CONFLICT RESOLUTION	Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
SUBCHAPTER 03J - NETS, POTS, DREDGES, AND OTHER FISHING DEVICES	**SECTION .0100 - NET RULES, GENERAL**	15A NCAC 03J .0101	FIXED OR STATIONARY NETS	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0102	NETS OR NET STAKES	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0103	GILL NETS, SEINES, IDENTIFICATION, RESTRICTIONS	Amended Eff. April 1, 2016	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0104	TRAWL NETS	Amended Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0105	PURSE SEINES	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0106	CHANNEL NETS	Amended Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0108	NETS PULLED BY MORE THAN ONE BOAT	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0109	LONG-HAUL FISHING OPERATIONS, IDENTIFICATION REQUIREMENTS	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0110	SEINES	Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0111	FYKE OR HOOP NETS	Amended Eff. April 1, 2003	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0200 - NET RULES, SPECIFIC AREAS	15A NCAC 03J .0202	ATLANTIC OCEAN	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0203	CHOWAN RIVER AND ITS TRIBUTARIES	Amended Eff. September 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0204	CURRITUCK SOUND AND ITS TRIBUTARIES	Amended Eff. September 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0206	SOUTHPORT BOAT HARBOR	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0207	DUKE ENERGY PROGRESS BRUNSWICK NUCLEAR PLANT INTAKE CANAL	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0208	NEW RIVER	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0209	ALBEMARLE SOUND/CHOWAN RIVER RIVER HERRING MANAGEMENT AREAS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0300 - POTS, DREDGES, AND OTHER FISHING DEVICES	15A NCAC 03J .0301	POTS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Agency - Marine Fisheries Commission

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03J .0302	RECREATIONAL USE OF POTS	Amended Eff. April 1, 2011	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0303	DREDGES AND MECHANICAL METHODS PROHIBITED	Amended Eff. March 1, 1994	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0304	ELECTRICAL FISHING DEVICE	Amended Eff. July 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0305	TROTLINES (MULTIPLE HOOK OR MULTIPLE BAIT)	Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0306	HOOK-AND-LINE	Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0400 - FISHING GEAR	15A NCAC 03J .0401	FISHING GEAR	Amended Eff. June 1, 1996	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0402	FISHING GEAR RESTRICTIONS	Amended Eff. October 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0500 – POUND NETS	15A NCAC 03J .0501	DEFINITIONS AND STANDARDS FOR POUND NETS AND POUND NET SETS	Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0502	POUND NET SET PERMIT APPLICATION AND PROCESSING	Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0503	POUND NET SET PERMIT RENEWAL	Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0504	POUND NET SET PERMIT TRANSFER	Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03J .0505	POUND NET SET PERMIT CONDITIONS	Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
SUBCHAPTER 03K - OYSTERS, CLAMS, SCALLOPS AND MUSSELS	**SECTION .0100 – SHELLFISH, GENERAL**	15A NCAC 03K .0101	PROHIBITED SHELLFISH AREAS/ACTIVITIES	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0102	PROHIBITED RAKES	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0103	SHELLFISH MANAGEMENT AREAS	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0104	PERMITS FOR PLANTING SHELLFISH FROM PROHIBITED/POLLUTED AREAS	Amended Eff. April 1, 2003	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0105	RECREATIONAL HARVEST OF SHELLFISH	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0106	TAKING OR UNLOADING OYSTERS AND CLAMS ON SUNDAY OR AT NIGHT	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0107	DEPURATION OF SHELLFISH	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0108	DREDGES/MECHANICAL METHODS PROHIBITED	Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0109	SHELLFISH HARVESTER AND DEALER TAGS	Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03K .0110	PUBLIC HEALTH AND CONTROL OF OYSTERS, CLAMS, SCALLOPS AND MUSSELS	Eff. April 1, 2014	Necessary without substantive public interest	Yes If yes, include the citation to the federal law	21 CFR 123.3, 6-9, 11, 28	Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03K .0111	PERMITS TO USE MECHANICAL METHODS FOR SHELLFISH ON SHELLFISH LEASES OR FRANCHISES	Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0200 – OYSTERS	15A NCAC 03K .0201	OPEN SEASON AND POSSESSION LIMIT	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0202	SIZE LIMIT AND CULLING TOLERANCE	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0204	DREDGES / MECHANICAL METHODS PROHIBITED	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0205	MARKETING OYSTERS TAKEN FROM PRIVATE SHELLFISH BOTTOMS	Amended Eff. April 1, 2003	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0207	OYSTER SIZE AND HARVEST LIMIT EXEMPTION	Eff. April 1, 2003	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0208	SEED OYSTER MANAGEMENT AREAS	Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0209	OYSTER SANCTUARIES	Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0300 - HARD CLAMS (MERCENARIA)	15A NCAC 03K .0301	SIZE AND HARVEST LIMIT	Amended Eff. March 1, 1994	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0302	MECHANICAL HARVEST SEASON	Amended Eff. April 1, 2003	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0304	PROHIBITED TAKING	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0305	CLAM SIZE AND HARVEST LIMIT EXEMPTION	Amended Eff. September 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0400 - RANGIA CLAMS	15A NCAC 03K .0401	PROHIBITED (POLLUTED) AREA PERMIT REQUIREMENT	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0402	SEASON, SIZE AND HARVEST LIMITS	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0403	DISPOSITION OF MEATS	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0404	DREDGES/MECHANICAL METHODS PROHIBITED AND OPEN SEASON	Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0405	OYSTERS, MUSSELS, HARD CLAMS PROHIBITED	Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0500 - SCALLOPS	15A NCAC 03K .0501	BAY SCALLOP HARVEST MANAGEMENT	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0502	TAKING BAY SCALLOPS AT NIGHT AND ON WEEKENDS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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		15A NCAC 03K .0503	PROHIBITED BAY SCALLOP DREDGE	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0504	CALICO SCALLOP SEASON	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0505	SEA SCALLOPS SIZE LIMIT AND TOLERANCE	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0507	MARKETING SCALLOPS TAKEN FROM SHELLFISH LEASES OR FRANCHISES	Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03K .0508	SCALLOP SEASON AND HARVEST LIMIT EXEMPTIONS	Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
SUBCHAPTER 03L – SHRIMP, CRAB, AND LOBSTER	**SECTION .0100 - SHRIMP**	15A NCAC 03L .0101	SHRIMP HARVEST RESTRICTIONS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0102	WEEKEND SHRIMPING PROHIBITED	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0103	PROHIBITED NETS, MESH LENGTHS AND AREAS	Amended Eff. May 1, 2015	Necessary with substantive public interest	Yes If yes, include the citation to the federal law	50 CFR 222.102, 223.205(a), 223.206(d), 223.207	Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0105	RECREATIONAL SHRIMP LIMITS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0200 – CRABS	15A NCAC 03L .0201	CRAB HARVEST RESTRICTIONS	Amended Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0202	CRAB TRAWLING	Amended Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0203	CRAB DREDGING	Amended Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0204	CRAB POTS	Amended Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0205	CRAB SPAWNING SANCTUARIES	Amended Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0207	HORSESHOE CRABS	Amended Eff. April 1, 2011	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0208	STONE CRABS (MENIPPE MERCENARIA)	Eff. December 1, 2006	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0300 – LOBSTER	15A NCAC 03L .0301	AMERICAN LOBSTER (NORTHERN LOBSTER)	Amended Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03L .0302	SPINY LOBSTER	Amended Eff. March 1, 1996	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
SUBCHAPTER 03M - FINFISH	**SECTION .0100 – FINFISH, GENERAL**	15A NCAC 03M .0101	MUTILATED FINFISH	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0102	UNMARKETABLE FINFISH	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0103	MINIMUM SIZE LIMITS	Amended Eff. April 1, 2014.	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
	SECTION .0200 - STRIPED BASS	15A NCAC 03M .0201	GENERAL	Amended Eff. June 1, 2013	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0202	SEASON, SIZE AND HARVEST LIMIT: INTERNAL COASTAL WATERS	Amended Eff. June 1, 2013	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0204	SEASON, SIZE AND HARVEST LIMIT: ATLANTIC OCEAN	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0205	PROHIBITED TRAWLING	Amended Eff. December 1, 2007	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0300 - SPANISH AND KING MACKEREL	15A NCAC 03M .0301	SPANISH AND KING MACKEREL	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0302	PURSE GILL NET PROHIBITED	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0500 – OTHER FINFISH	15A NCAC 03M .0501	RED DRUM	Amended Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0502	MULLET	Amended Eff. July 1, 2006	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0503	FLOUNDER	Amended Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0506	SNAPPER-GROUPER COMPLEX	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0507	BILLFISH	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0508	STURGEON	Amended Eff. July 1, 1993	Necessary without substantive public interest	Yes If yes, include the citation to the federal law	77 FR 5914	Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03M .0509	TARPON	Eff. October 1, 1992	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0510	AMERICAN EEL	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0511	BLUEFISH	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0512	COMPLIANCE WITH FISHERY MANAGEMENT PLANS	Amended Eff. October 1, 2008	Necessary without substantive public interest	Yes If yes, include the citation to the federal law	16 USC §5103-5106; 16 USC § 1856(b) and 50 CFR 600.605-600.630	Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03M .0513	RIVER HERRING	Amended Eff. June 13, 2016	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0515	DOLPHIN	Amended Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0516	COBIA	Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0517	WAHOO	Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Agency - Marine Fisheries Commission

Comment Period - Filled in by Agency

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03M .0518	KINGFISH (SEA MULLET)	Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0519	SHAD	Amended Eff. April 1, 2012	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0520	TUNA	Amended Eff. April 1, 2011	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03M .0521	SHEEPSHEAD	Eff. April 1, 2014	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SUBCHAPTER 03N - FISH HABITAT AREAS	15A NCAC 03N .0101	SCOPE AND PURPOSE	Amended Eff. December 1, 2007	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03N .0103	NURSERY AREA BOUNDARIES	Amended Eff. December 1, 2007	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03N .0104	PROHIBITED GEAR, PRIMARY NURSERY AREAS	Amended Eff. May 1, 1997	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03N .0105	PROHIBITED GEAR, SECONDARY NURSERY AREAS	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03N .0106	ANADROMOUS FISH SPAWNING AREA BOUNDARIES	Eff. December 1, 2007	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
SUBCHAPTER 03O - LICENSES, LEASES, FRANCHISES AND PERMITS	**SECTION .0100 - LICENSES**	15A NCAC 03O .0101	PROCEDURES AND REQUIREMENTS TO OBTAIN LICENSES, ENDORSEMENTS AND COMMERCIAL FISHING VESSEL REGISTRATIONS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0102	RECREATIONAL FISHING TOURNAMENT LICENSE TO SELL FISH	Amended Eff. December 1, 2006	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0103	AUXILIARY VESSELS	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0104	COMMERCIAL UNLOADING OF FISH	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0105	BAIT AND MUSSEL DEALERS	Amended Eff. August 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0106	DISPLAY OF LICENSES AND REGISTRATIONS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0107	LOST LICENSE REPLACEMENT	Amended Eff. December 1, 2006	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0108	LICENSE TRANSFERS	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0109	ASSIGNMENT OF SCFL	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0110	LICENSE REFUNDS	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0111	SURRENDER OF LICENSES	Amended Eff. October 1, 2012	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03O .0112	FOR HIRE COASTAL RECREATIONAL FISHING	Eff. July 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0113	OCEAN FISHING PIER REPORTING REQUIREMENTS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0114	SUSPENSION, REVOCATION AND REISSUANCE OF LICENSES	Eff. October 1, 2012	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0200 – LEASES AND FRANCHISES	15A NCAC 03O .0201	STANDARDS FOR SHELLFISH BOTTOM AND WATER COLUMN LEASES	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0202	SHELLFISH BOTTOM AND WATER COLUMN LEASE APPLICATIONS	Amended Eff. April 1, 2011	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0203	SHELLFISH LEASE APPLICATION PROCESSING	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0204	MARKING SHELLFISH LEASES AND FRANCHISES	Amended Eff. September 1, 1997	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0205	LEASE RENEWAL	Amended Eff. September 1, 2005	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0206	LEASE PROTEST	Amended Eff. March 1, 1994	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0207	PRODUCTION REPORTS	Amended Eff. September 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0208	CANCELLATION	Amended Eff. April 1, 2003	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0209	TRANSFER OF INTEREST	Amended Eff. April 1, 2011	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0210	SHELLFISH FRANCHISES	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0211	PROTECTION OF PRIVATE SHELLFISH INTEREST	Amended Eff. August 1, 1998	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0300 – RECREATIONAL COMMERCIAL GEAR LICENSES	15A NCAC 03O .0301	ELIGIBILITY FOR RECREATIONAL COMMERCIAL GEAR LICENSES	Amended Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0302	AUTHORIZED GEAR	Amended Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0303	RECREATIONAL COMMERCIAL GEAR LICENSE POSSESSION LIMITS	Amended Eff. July 1, 2006	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0400 – STANDARD COMMERCIAL LICENSE ELIGIBILITY	15A NCAC 03O .0401	ELIGIBILITY BOARD	Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0402	APPLICATION PROCESS	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03O .0403	ELIGIBILITY BOARD REVIEW	Amended Eff. February 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0404	ELIGIBILITY CRITERIA	Amended Eff. October 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0405	APPLICATION DOCUMENTATION	Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0406	STANDARD COMMERCIAL FISHING LICENSE ELIGIBILITY POOL CERTIFICATION	Eff. August 1, 2000	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0500 - PERMITS	15A NCAC 03O .0501	PROCEDURES AND REQUIREMENTS TO OBTAIN PERMITS	Amended Eff. May 1, 2015	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0502	PERMIT CONDITIONS; GENERAL	Amended Eff. April 1, 2009	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0503	PERMIT CONDITIONS; SPECIFIC	Amended Eff. May 1, 2015	Necessary with substantive public interest	Yes If yes, include the citation to the federal law	50 CFR 223.206	Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0504	SUSPENSION/REVOCATION OF PERMITS	Eff. April 1, 2001	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03O .0506	SPECIAL PERMIT REQUIRED FOR SPECIFIC MANAGEMENT PURPOSES	Eff. April 1, 2001	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
SUBCHAPTER 03P - HEARING PROCEDURES	**SECTION .0100 - HEARING PROCEDURES**	15A NCAC 03P .0101	LICENSE/PERMIT DENIAL: INFORMAL HEARING PROCEDURES	Amended Eff. August 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03P .0102	CONTESTED CASE HEARING PROCEDURES	Amended Eff. August 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0200 - DECLARATORY RULINGS	15A NCAC 03P .0201	DECLARATORY RULINGS: GENERALLY	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03P .0202	PROCEDURE FOR REQUESTING DECLARATORY RULINGS	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03P .0203	DEFINITION	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0300 - PETITIONS FOR RULEMAKING	15A NCAC 03P .0301	FORM AND CONTENTS OF PETITION	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03P .0302	REVIEW BY A COMMITTEE OF THE COMMISSION	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03P .0303	PRESENTATION TO THE COMMISSION	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03P .0304	RECOURSE TO DENIAL OF THE PETITION	Eff. April 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
SUBCHAPTER 03Q - JURISDICTION OF AGENCIES: CLASSIFICATION OF WATERS	**SECTION .0100 - GENERAL REGULATIONS: JOINT**	15A NCAC 03Q .0101	SCOPE AND PURPOSE	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One

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Agency - Marine Fisheries Commission

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Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03Q .0102	INLAND FISHING WATERS	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0103	COASTAL FISHING WATERS	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0104	JOINT FISHING WATERS	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0105	POSTING DIVIDING LINES	Eff. January 1, 1991	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0106	APPLICABILITY OF RULES: JOINT WATERS	Amended Eff. July 1, 1999	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0107	SPECIAL REGULATIONS: JOINT WATERS	Amended Eff. July 1, 2008	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0108	MANAGEMENT RESPONSIBILITY FOR ESTUARINE STRIPED BASS IN JOINT WATERS	Amended Eff. October 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03Q .0109	IMPLEMENTATION OF ESTUARINE STRIPED BASS MANAGEMENT PLANS: RECREATIONAL FISHING	Amended Eff. October 1, 2004	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
	SECTION .0200 - BOUNDARY LINES: COASTAL-JOINT-INL AND FISHING WATERS	15A NCAC 03Q .0201	SPECIFIC CLASSIFICATION OF WATERS	Amended Eff. August 1, 2004	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03Q .0202	DESCRIPTIVE BOUNDARIES FOR COASTAL-JOINT-INLAND WATERS	Amended Eff. May 1, 2015	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
SUBCHAPTER 03R - DESCRIPTIVE BOUNDARIES	**SECTION .0100 - DESCRIPTIVE BOUNDARIES**	15A NCAC 03R .0101	SEA TURTLE SANCTUARY	Amended Eff. August 1, 2004	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0102	MILITARY DANGER ZONES AND RESTRICTED AREAS	Amended Eff. August 1, 2004	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0103	PRIMARY NURSERY AREAS	Amended Eff. April 1, 2011	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0104	PERMANENT SECONDARY NURSERY AREAS	Amended Eff. April 1, 2011	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0105	SPECIAL SECONDARY NURSERY AREAS	Amended Eff. April 1, 2011	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03R .0106	TRAWL NETS PROHIBITED	Amended Eff. July 1, 2006	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0107	DESIGNATED POT AREAS	Amended Eff. April 1, 2014	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One

G.S. 150B-21.3A Report for 15A NCAC 03, MARINE FISHERIES

Agency - Marine Fisheries Commission

Comment Period - Filled in by Agency

Date Submitted to APO - Filled in by RRC staff

Subchapter	Rule Section	Rule Citation	Rule Name	Date and Last Agency Action on the Rule	Agency Determination [150B-21.3A(c)(1)a]	Implements or Conforms to Federal Regulation [150B-21.3A(e)]	Federal Regulation Citation	Public Comment Received [150B-21.3A(c)(1)]	Agency Determination Following Public Comment [150B-21.3A(c)(1)]	RRC Determination of Public Comments [150B-21.3A(c)(2)	RRC Final Determination of Status of Rule for Report to APO [150B-21.3A(c)(2)]	OAH Next Steps
		15A NCAC 03R .0108	MECHANICAL METHODS PROHIBITED TO TAKE OYSTERS	Amended Eff. April 1, 2016	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0109	TAKING CRABS WITH DREDGES	Amended Eff. August 1, 2004	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0110	CRAB SPAWNING SANCTUARIES	Amended Eff. August 1, 2004	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0111	PURSE SEINES PROHIBITED	Amended Eff. August 1, 2004	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0112	ATTENDED GILL NET AREAS	Amended Eff. April 1, 2016	Necessary with substantive public interest	No		Select One	Necessary with substantive public interest	Select One	Necessary with substantive public interest and must be readopted	Select One
		15A NCAC 03R .0113	POUND NET SET PROHIBITED AREAS	Amended Eff. April 1, 2009	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0114	SHRIMP TRAWL PROHIBITED AREAS	Amended Eff. May 1, 2015	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0115	ANADROMOUS FISH SPAWNING AREAS	Amended Eff. May 1, 2015	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0116	DESIGNATED SEED OYSTER MANAGEMENT AREAS	Amended Eff. April 1, 2014	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0117	OYSTER SANCTUARIES	Amended Eff. April 1, 2011	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0118	EXEMPTED CRAB POT ESCAPE RING AREAS	Eff. April 1, 2014	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
	SECTION .0200 – FISHERY MANAGEMENT AREAS	15A NCAC 03R .0201	STRIPED BASS MANAGEMENT AREAS	Amended Eff. June 1, 2013	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
		15A NCAC 03R .0202	RIVER HERRING MANAGEMENT AREAS	Eff. May 1, 2015	Necessary without substantive public interest	No		Select One	Necessary without substantive public interest	Select One	Necessary without substantive public interest and should remain in effect without further action	Select One
SUBCHAPTER 03S – ECONOMIC ASSISTANCE TO THE FISHING INDUSTRY	**SECTION .0100 – ECONOMIC ASSISTANCE PROGRAMS**	15A NCAC 03S .0101	GENERAL	Eff. October 1, 2004	Unnecessary	No		Select One	Unnecessary	Select One	Unnecessary and should expire on the first day of the month following the consultation	Select One
		15A NCAC 03S .0102	GRANTS TO COMMERCIAL SHRIMPING INDUSTRY FOR ECONOMIC LOSSES DUE TO FOREIGN IMPORTED SHRIMP	Eff. November 1, 2004	Unnecessary	No		Select One	Unnecessary	Select One	Unnecessary and should expire on the first day of the month following the consultation	Select One
		15A NCAC 03S .0103	GRANTS TO COMMERCIAL BLUE CRABBING INDUSTRY	Eff. November 1, 2004	Unnecessary	No		Select One	Unnecessary	Select One	Unnecessary and should expire on the first day of the month following the consultation	Select One

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

January 20, 2017

MEMORANDUM **RS 2-17**

TO: Marine Fisheries Commission

FROM: Kathy Rawls, Fisheries Management Section Chief

SUBJECT: Rule Suspensions

Attached is the temporary rule suspension information for the February 2017 meeting. In accordance with the North Carolina Division of Marine Fisheries Resource Management Policy Number 2014-2, the North Carolina Marine Fisheries Commission will vote on any new rule suspensions that have occurred since the last meeting of the commission. The following rule suspension has occurred since the November 2016 meeting, is subject to approval and noted as an action item on the agenda:

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC 03J .0301 Pots. This suspension allows the division to implement the crab pot escape ring requirements adopted by the commission in the May 2016 Revision to Amendment 2 of the North Carolina Blue Crab Fishery Management Plan. This suspension was effective January 15, 2017, implemented in Proclamation M-11-2016.

In accordance with the policy, the division will report current rule suspensions previously approved by the commission as non-action, items. The current rule suspensions are as follows:

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC 03L .0201 Crab Harvest Restrictions, and portions of 03L .0203 Crab Dredging for an indefinite period of time. This continued suspension allows the division to implement the blue crab harvest restrictions adopted by the commission in the May 2016 Revision to Amendment 2 of the North Carolina Blue Crab Fishery Management Plan. These suspensions were implemented in Proclamation M-11-2016.

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC 03J .0501 Definitions and Standards for Pound Nets and Pound Net Sets for an indefinite period of time. Suspension of portions of this rule allows the division to increase the minimum mesh size of escape panels for flounder pound nets in accordance

with Supplement A to Amendment 1 of the North Carolina Southern Flounder Fishery Management Plan. This suspension was implemented in Proclamation M-34-2015.

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC Shad and 03Q .0107 Special Regulations: Joint Waters for an indefinite period of time. Suspension of portions of these rules allows the division to change the season and creel limit for American shad under the management framework of the North Carolina American Shad Sustainable Fishery Plan. These suspensions were implemented in Proclamation FF-59-2016.