BEFORE THE NORTH CAROLINA MARINE FISHERIES COMMISSION

North Carolina Wildlife Federation, Petitioner	)	PETITION FOR RULEMAKING PURSUANT TO N.C. GEN. STAT. § 150B-20 AND 15A N.C. ADMIN CODE 3P .0301 TO AMEND 15A N.C. ADMIN. CODE 3J .0104, 3L .0101, 3L .0103 & TO ADD 15A N.C. ADMIN. CODE 3R.0119

On behalf of the North Carolina Wildlife Federation ("Petitioner"), the undersigned file 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 require 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 addressed to the Chairman of the Commission and outlines requirements for a petition for rulemaking.

The amended rules would create a new designation for Internal Coastal Waters—Shrimp Trawl Management Areas—to be delineated under 15A N.C. Admin. Code 3R .0119; designate all Internal Coastal Waters not otherwise designated under 15A N.C. Admin. Code 3R .0103 (Primary Nursery Areas), 3R .0104 (Permanent Secondary Nursery Areas), 3R .0105 (Special Secondary Nursery Areas), 3J.0104(b)(3) (Trawl Net Prohibited Area), 3R .0106 (Trawl Net Prohibited Areas), or 3R .0114 (Shrimp Trawl Prohibited Areas) as Shrimp Trawl Management Areas; close Shrimp Trawl Management Areas from 12:00 a.m. until 11:59 p.m. on Tuesdays and Thursdays; establish criteria for the opening of shrimp season in Shrimp Trawl Management Areas; and reduce total headrope length for shrimp trawls operating in Shrimp Trawl Management Areas and other areas described in 15A N.C. Admin. Code 3L .0103(d) from 220

feet to 110 feet.

The North Carolina Wildlife Federation is a nonprofit organization with a mission to protect, conserve, and restore North Carolina wildlife and habitat.

Pursuant to 15A N.C. Admin. Code 3P .0301, this Petition is addressed to the Chairman of the MFC. Fifteen (15) copies of this Petition will be submitted to the Chairman 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 RULE

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

II. 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: 3J .0104, 3L .0101, and 3L .0103; and the adoption of a new section: 3R .0119.

The Commission's rulemaking authority is plainly stated in state statute. The MFC must "[m]anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction."[1] 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."[2] The MFC has jurisdiction over the "conservation of marine and estuarine resources . . . and all activities connected with the conservation and

[1] N.C. Gen. Stat. § 143B-289.51(b)(1) (2019).
[2] N.C. Gen. Stat. § 143B-289.52(a) (2019); *see also* N.C. Gen. Stat. § 113-182(a) (2019).

regulation of marine and estuarine resources" in North Carolina.[3] The Commission's 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."[4] The Commission must adopt rules to "provide a sound, constructive, comprehensive, continuing, and economical coastal fisheries program" for the State.[5] All regulation of commercial and recreational fishing must be "in the interest of the public,"[6] as the marine and estuarine resources of North Carolina "belong to the people of the State."[7]

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.[8] The MFC, together with the North Carolina Coastal Resources Commission and the Environmental Management Commission, adopted the CHPP and must implement the recommendations contained in the CHPP.[9] 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.[10] Among the CHPP's many stated goals is that of enhancing and protecting habitats from adverse physical impacts. Affording important habitats additional protection furthers the goals of the CHPP.

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[3] N.C. Gen. Stat. § 113-132(a) (2019); *see also* N.C. Gen. Stat. § 143B-289.51(b)(1) (2019); N.C. Gen. Stat. § 113-134.1 (2019) (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").
[4] N.C. Gen. Stat. § 143B-289.52(a)(1)(a)-(b) (2019); *see also* N.C. Gen. Stat. § 113-182(a) (2019).
[5] N.C. Gen. Stat. § 143B-289.51(b)(2) (2019).
[6] N.C. Gen. Stat. § 143B-289.52(a)(2) (2019).
[7] N.C. Gen. Stat. § 113-131(a) (2019).
[8] *See* N.C. Gen. Stat §§ 143B-289.52(a)(11), 143B-279.8 (2019). *See also North Carolina Coastal Habitat Protection Plan: Source Document*, N.C. DEP'T OF ENVT'L QUALITY 2 (2016), *available at* http://portal.ncdenr.org/c/document_library/get_file?uuid=5d02ccd2-3b9d-4979-88f2-ab2f9904ba61&groupId=38337 [hereinafter *CHPP*].
[9] N.C. Gen. Stat. § 143B-279.8(c) (2019).
[10] N.C. Gen. Stat. § 143B-279.8(a) (2019).

The proposed rules will ensure that important habitat areas for commercially and recreationally valuable species are adequately protected by: (1) designating Shrimp Trawl Management Areas in Internal Coastal Waters, and (2) limiting effort and restricting gear within these newly designated areas. These measures are consistent with and fulfill the 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. Establishing the areas open for fishing, regulating the opening of shrimp season, and managing the use of gear within its jurisdictional waters fall squarely within the MFC's authority to regulate the appropriate areas and methods for the taking of fish.[11] In addition, the MFC has explicit authority to establish seasons for the taking of fish.[12] Neither the Fisheries Reform Act nor any other legislation restricts when the Commission may take action on these critical issues.[13]

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

The goals of the Petition are to support a sustainable shrimp trawl fishery and significantly reduce the mortality of bycatch associated with that fishery. The measures proposed in the Petition will achieve these goals by managing the areas open to shrimping, the

[11] *See* N.C. Gen. Stat. § 143B-289.52(a)(1)(a) (2019).
[12] *Id.* § 143B-289.52(a)(1)(b).
[13] 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) (2019). Fishery management plans may be species-specific, or may be based on gear or geographic areas; all fishery management plans are based on harvest of the target stock. *Id*. § 113-182.1(b). The proposed rules are not species-specific management measures and do not fall under this scheme. Instead, the proposed rules designate Shrimp Trawl Management Areas and provide for appropriate practices designed to protect these areas for numerous species, including those non-target species taken as bycatch. All of the proposed rules may be adopted by the MFC outside of the fishery management plan process outlined by the Fisheries Reform Act.

appropriate times when shrimp may be taken, and the gear used for shrimping. The measures proposed in this Petition will ensure that shrimp trawling is conducted in a responsible manner that minimizes the bycatch of juvenile finfish species and macroinvertebrates from estuarine waters and facilitates the rebuilding of overfished and depleted finfish populations.

The lack of adequate habitat protections and declining and depleted status of many of our coastal fish stocks suggests a failure of the MFC to meet its duties to "conserve, protect, and regulate" marine and estuarine resources. While environmental factors such as habitat loss and poor water quality may affect the status of fish stocks, fishing practices also contribute to the decline and depletion of several stocks and are more controllable. Excessive bycatch of juvenile fish and other non-target species in the shrimp trawl fishery in estuarine and near shore waters contributes to the current unknown or depleted status of several commercially and recreationally valuable species, including but not limited to Atlantic croaker, spot, weakfish, southern flounder, and blue crabs.

North Carolina has the largest and most productive estuarine system of any state on the east coast.[14] Estuarine-dependent species account for more than 90 percent of the State's commercial fisheries landings and over 60 percent of the recreational harvest.[15] The 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

[14] *Estuarine Benthic Habitat Mapping Program – Shellfish and Submerged Aquatic Vegetation*, N.C. DEP'T OF ENV'TL QUALITY, http://portal.ncdenr.org/web/mf/shellfish-habitat-mapping (last visited May 10, 2019).
[15] *See CHPP*, *supra* note 8, at 11.

and are exposed to shrimp trawls and other fishing gear. North Carolina is the *only* state on the Atlantic coast that permits extensive trawling in inshore estuarine waters. 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 and other invertebrates such as blue crabs and horseshoe crabs.[16]

Commercially and recreationally valuable species, including Atlantic croaker, spot, weakfish, and southern flounder are in unknown, depleted, and/or overfished status, and fisheries managers have struggled to mitigate further decline in these stocks.[17] In fact, these species also account for the vast majority of finfish bycatch in North Carolina waters.[18] As noted in the attached expert reports, bycatch mortality in North Carolina's shrimp trawl fishery contributes to the declining status of these important populations.[19] Currently, hundreds of millions of juvenile fish fall victim to shrimp trawl bycatch each year, and therefore do not spawn, replace

[16] Despite repeated claims by the Division of Marine Fisheries and industry representatives that North Carolina has made progress in shrimp trawl bycatch reduction as the result of Bycatch Reduction Device ("BRD") testing and implementation, the Federation is unaware of any science that indicates these devices function as anything other than a trawl efficiency device. The Federation has not found evidence to suggest that BRD use increases the number of juvenile fishes that escape the estuarine trawling grounds and enter the adult stock. In fact, the sole reliance on these devices to reduce bycatch has borne little fruit and provided few quantifiable benefits to affected fish populations (e.g., spot, croaker, southern flounder). The Federation welcomes the opportunity to discuss these issues in detail with the Division of Marine Fisheries and the Commission.

[17] *Weakfish*, N.C. DIV. MARINE FISHERIES, http://portal.ncdenr.org/web/mf/Weakfish-sso (last visited May 20, 2019); *Atlantic croaker*, N.C. DIV. MARINE FISHERIES, http://portal.ncdenr.org/web/mf/atlantic-croaker (last visited May 20, 2019); *Spot*, N.C. DIV. MARINE FISHERIES, http://portal.ncdenr.org/web/mf/Spot-sso (last visited May 20, 2019); *Southern Flounder*, N.C. DIV. MARINE FISHERIES, http://portal.ncdenr.org/web/mf/southern-flounder#Stock (last visited May 20, 2019)

[18] 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 ENVTL. QUALITY 14, 17 (Oct. 2015).

[19] *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 2.

themselves, and contribute to the adult population. Increasing juvenile recruitment is critical to rebuilding the stock and age structure of these species.[20]

Critical ecosystem services are also lost as a result of sustained high bycatch levels.[21] Atlantic croaker, spot, weakfish, and southern flounder 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.[22] 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.[23]

Habitat protection for juvenile fish is also lacking. Nursery areas serve as vital habitat areas for the development of finfish and shellfish species from early larval to late juvenile life stages. 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.[24]

Atlantic croaker, spot, weakfish, and southern flounder, among other estuarine-dependent species, spawn in coastal and near-shore ocean waters and recruit as early juveniles in estuarine

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[20] *Id.*
[21] *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.
[22] *See* Travelstead & Daniel, *supra* note 19, at 12.
[23] *See id*. at 15; *see also* Barbieri, *supra* note 21, at 11.
[24] *See* Barbieri, *supra* note 21, at 5 (citing Able 2005, Beck, et. al., 2001, Heck and Crowder 1991); *see also* Lefcheck, et al., *Are coastal habitats important nurseries? A meta-analysis*, CONSERVATION LETTERS (2019); e12645. https://doi.org/10.1111/conl.12645 (attached hereto as Exhibit M).

habitats like the Pamlico Sound.[25] 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.[26] 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.[27]

The results of the annual Pamlico Sound Survey consistently indicate high levels of abundance of Atlantic croaker, spot, and weakfish in the Pamlico Sound.[28] Moreover, length frequency data suggests that the vast majority of the fish found in the Pamlico Sound are juveniles that have not yet reached maturity.[29] These results are consistent with the Division of Marine Fisheries' characterization studies conducted in inshore waters south of the Pamlico Sound and in ocean waters.[30] In addition, physical habitat characteristics, including bottom type, salinity, and temperature, support the growth of juveniles into adulthood in inshore and ocean waters.[31]

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.[32] Otter trawls catch essentially everything in their path, leading to extraordinarily high levels of bycatch,

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[25] *See* Barbieri, *supra* note 21, at 9 (citing Lowerre-Berbieri et al. 1995, Barbieri et al. 1994a, Weinstein and Walters 1981, Chao and Musik 1977).
[26] *See id*.
[27] *See id.* at 11-12.
[28] *See* Travelstead & Daniel, *supra* note 19, at 10-11 (citing Knight and Zapf 2015).
[29] *See id*. Abundance is the most important variable in determining the presence of nursery areas. *See 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?p_l_id=1169848&folderId=24626903&name=DLFE-134540.pdf [hereinafter *Amendment 1*], at 169.
[30] *See* Travelstead & Daniel, *supra* note 19, at 11 (citing Brown 2015, Knight 2015, Knight and Zapf 2015, Brown 2009, Johnson 2006, Logothetis & McCuiston 2004, Johnson 2003, Diamond-Tissue 1999).
[31] *See id*. at 12.
[32] *See* Brown, *supra* note 18, at 1.

even when bycatch reduction devices are properly installed. 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.[33] These impacts include physical disruption of habitat, changes in functional organization of species, increases in total suspended solids and turbidity, destruction of submerged aquatic vegetation, and decreases in habitat complexity.[34]

In North Carolina, designated Primary Nursery Areas, Permanent Secondary Nursery Areas, and Special Secondary Nursery Areas 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."[35]

The MFC's efforts to minimize bycatch of juvenile finfish have proven unsuccessful to date. The MFC fell far short of taking meaningful action to protect important habitat areas and reduce bycatch of juvenile fish in Amendment 1 to the Shrimp Fishery Management Plan and has done little since the adoption of Amendment 1 to address this important issue.[36]

The Federation proposes to designate all Internal Coastal Waters not already closed to trawling as Shrimp Trawl Management Areas. The proposed rules would also provide clear guidance to the Fisheries Director in his/her exercise of proclamation authority to open shrimp season in these newly designated areas. The proposed rules would additionally reduce effort in

[33] *See CHPP*, *supra* note 8, at 163.
[34] *See id*. at 163-67.
[35] *See Amendment 1*, *supra* note 29, at 168; *see also* 15A N.C. Admin. Code 3N .0104-0105 (2019).
[36] *See generally Amendment 1*, *supra* note 29.

Shrimp Trawl Management Areas by limiting shrimp trawling to Mondays, Wednesdays, and Fridays every week and reducing the maximum headrope length to 110 feet in all Shrimp Trawl Management Areas and other areas listed under 15A N.C. Admin. Code 3L .0103(d).

a. Shrimp Trawl Management Areas

The newly designated Shrimp Trawl Management Areas will still allow commercial shrimping to take place in areas where juvenile fishes are known to occur, but at a reduced level and capacity.

While we do not seek to designate additional nursery areas in the Petition, the Federation strongly encourages the Commission to examine the Division of Marine Fisheries' juvenile fish sampling data and, should the data support such a move, to expand designations of Secondary Nursery Areas. It is critical to provide greater protection in areas where juvenile fishes are most abundant and in corridors that facilitate their movements into offshore coastal waters.[37]

b. Opening of shrimp season

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 in Shrimp Trawl Management Areas once the shrimp count reaches 60 shrimp per pound (heads on) during sample tows in the Pamlico Sound, or once the harvest of shrimp exceeds the harvest of juvenile fish during sample tows in the Pamlico Sound, or June 15, whichever is earliest.[38]

[37] Petitioners have included a map of the proposed Shrimp Trawl Management Areas as Exhibit N. The Southern Environmental Law Center will provide the Division of Marine Fisheries and the Commission GIS data needed to map this area under separate cover.

[38] *See* Travelstead & Daniel, *supra* note 19, at 18-19. Shrimp season typically opens in mid-May. *See, e.g., Proclamation: Re: Crab Trawling and Taking of Shrmp with Nets – Central and Northern Regions (SH-3-2017)*, N.C. DIV. MARINE FISHERIES,

c. Three day shrimping week

Reducing the number of fishing days each week will reduce overall effort and, thus, bycatch of juvenile species in state waters. Under existing rules, shrimp trawling is prohibited in inshore waters from 9:00 p.m. on Friday until 5:00 p.m. on Sunday evenings.[39] An additional two-day closure would reduce overall bycatch, provide fish species the opportunity to move out of trawling areas, and allow fish to potentially recover from encounters with shrimp trawls during fishing days.[40] Shrimp landings are highest immediately after the opening of trawling for the week, suggesting that an additional two days of closure could improve overall efficiency in the fishery.[41]

In its original petition, the Federation did not specify closure days in order to maximize flexibility to the Fisheries Director. In its fiscal note evaluating the economic and fiscal impacts of the original petition, the Division suggested it would be difficult and expensive to enforce this proposed rule without specifying closure days.[42]

To address these concerns, the Federation proposes limiting the number of days for trawling in designated Shrimp Trawl Management Areas to three specific days each week: Monday (12:00 a.m. until 11:59 p.m.), Wednesday (12:00 a.m. until 11:59 p.m.), and Friday (12:00 a.m. until 8:59 p.m.).

d. Maximum headrope of 110 feet

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http://portal.ncdenr.org/c/document_library/get_file?uuid=8b8fd8bc-d962-4017-a6a3-e8c7b3b8a6ce&groupId=38337.

[39] 15A N.C. Admin. Code 3L .0102.

[40] *See* Travelstead & Daniel, *supra* note 19, at 18; *see also Amendment 1*, *supra* note 29, 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).

[41] *See Amendment 1*, *supra* note 29, at 301 (citing Johnson 2006); *see also* Travelstead & Daniel, *supra* note 19, at 18.

[42] As noted in its July 2018 and February 2019 letters to the Commission, the Federation disagrees with the Division of Marine Fisheries' economic and fiscal analyses.

Average headrope length in otter trawls has increased steadily over time, which in turn has increased overall yield and led to higher levels of bycatch.[43] In 2012, average maximum headrope length on commercial otter trawls measured 94 feet.[44] By 2015, average maximum headrope length increased to 134 feet.[45] As discussed in detail in the attached expert reports, a headrope length restriction will reduce the total amount of bycatch by reducing the overall net size on all shrimp trawls in state waters.[46] Reductions in headrope length may also reduce the adverse habitat impacts of trawling by reducing the surface area swept by trawl nets.[47] 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.[48]

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.[49] In Alabama, recreational shrimp trawl nets cannot exceed 16 feet (only one net per boat) and commercial trawl nets cannot exceed a combined 50 feet in length (limit of two nets per boat).[50]

The Federation proposes a maximum headrope length on all shrimp trawls in newly designated Shrimp Trawl Management Areas and all other areas listed under 15A N.C. Admin.

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[43] *See id.* at 17-18.
[44] *Id.* (citing Brown 2015). *See also Amendment 1*, *supra* note 29, at 312-313.
[45] Travelstead & Daniel, *supra* note 19, at 17 (citing Brown 2015).
[46] *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).
[47] *See, e.g.*, J. Hiddink, et al., *Global analysis of depletion and recovery of seabed biota after bottom trawling disturbance*, PNAS Vol. 114 (2017) (developing a tool for estimating "depletion and recovery of seabed biota after trawling" and encouraging managers to use this tool to analyze "tradeoffs between harvesting fish and wider ecosystem effects of such activities.").
[48] *Compare* 15A N.C. Admin. Code 3L .0103(c) *with id.* 3L .0103(d).
[49] *See* 22 Miss. Admin. Code Pt. 2, R. 05 (2019) (restricting individual trawl net sizes in different coastal areas to twelve, twenty five, and fifty feet and placing limitations on the size of trawl doors).
[50] *See* Ala. Admin. Code. r. 220-3-.01(8) (2019).

Code 3L .0103(d) not to exceed 110 feet. A consistent maximum headrope length not to exceed 110 feet in internal waters will provide clarity and consistency for all fishermen and result in more efficient fishing practices in state waters.

IV. STATEMENT OF THE EFFECT ON EXISTING RULES OR ORDERS

The proposed rules will amend the following sections of 15A of the N.C. Administrative Code: 3J .0104, 3L .0101, and 3L .0103; and will add a new section: 3R .0119. The proposed changes are not expected to affect any other existing rules.

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

Supporting materials, including peer-reviewed research papers, are attached hereto as Exhibits B through M and summarized below:

- **Exhibit B:** J. Travelstead & L. Daniel, *A Technical Review of a proposal submitted by the North Carolina Wildlife Federation to reduce mortality of juvenile fishes in North Carolina*, submitted to the N.C. Marine Fisheries Commission (Nov. 2016).

This technical review, which was submitted in support of the North Carolina Wildlife Federation's November 2016 petition for rulemaking, 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. The authors recommend several management strategies, some of which are proposed by the underlying petition, that the MFC should adopt to provide adequate protection to important habitat areas and mitigate bycatch levels in North Carolina waters.

- **Exhibit C:** Curriculum Vitae for Jack Travelstead

- **Exhibit D:** Curriculum Vitae for Dr. Louis Daniel

- **Exhibit E:** L. Barbieri, *Technical Review: The Need to Reduce Fishing Mortality and Bycatch of Juvenile Fish in North Carolina's Estuaries*, submitted to the N.C. Marine Fisheries Commission (Nov. 2016).

This technical review, which was submitted in support of the North Carolina Wildlife Federation's November 2016 petition for rulemaking, discusses the need to reduce fishing and bycatch mortality of juvenile fish in North Carolina's estuaries.

- **Exhibit F:** Curriculum Vitae for Dr. Luis Barbieri

- **Exhibit G:** E. Barbier, et al., *The value of estuarine and coastal ecosystem services,* 81(2) ECOLOGICAL MONOGRAPHS 169 (2011).

The authors report that the value of coastal habitats that support fisheries is greater at the seaward edge or fringe of coastal ecosystems than further inland. The authors raise concerns about the rate and scale at which these important habitats are lost and conclude that failing to take the benefits of these habitats into account is detrimental to fisheries management and planning.

In North Carolina, nursery areas, including Primary Nursery Areas, Permanent Secondary Nursery Areas, and Special Secondary Nursery Areas, are all located further upstream and away from the most important environments for coastal fisheries nursery habitat according to this research. Reducing effort in the proposed Shrimp Trawl Management Areas, which encompass important habitats, is consistent with the literature. Further, expanding secondary nursery habitat designations into higher salinity habitats closer to the inlets is crucial for protecting habitat and preserving ecosystem services.

- **Exhibit H:** M. Islam & M. Tanaka, *Impacts of pollution on coastal and marine ecosystems including coastal and marine fisheries and approach for management: A review and synthesis,* 48 MARINE POLLUTION BULLETIN 624 (2004).

This paper summarizes pollution effects on coastal ecosystems and concludes that coastal and marine pollution have caused major changes to fisheries and associated ecosystems. Protection of existing habitats and expansion of protected areas is crucial to offset these negative impacts.

While coastal and marine pollution is a measureable problem, the authors suggest that strategies aimed at protecting ecosystems—e.g., reduced exploitation and habitat enhancement/protection—are essential to restoring fisheries and cannot be ignored. Scapegoating pollution as the problem is inconsistent with the literature.

- **Exhibit I: I.** Nagelkerken, et al., *The seascape nursery: a novel spatial approach to identify and manage nurseries for coastal marine fauna,* 16 FISH AND FISHERIES 362 (2015).

This paper addresses "ecosystem corridors," which are "highways connecting nurseries to adult populations." This paper suggests that a significant roadblock exists between the low salinity, lower value nurseries in the uppermost reaches of the estuary and the offshore or nearer shore, high salinity nurseries. Reducing the roadblocks through decreased impacts to the nursery

habitats, including shrimp trawling, and providing protection for migration corridors, e.g., nursery area expansion, are critical considerations for the proposed seascape nursery concept.

The authors conclude by stressing that most inshore bodies of water around the world—for example, the Pamlico Sound in North Carolina—require young fishes and other marine resources to pass through bay mouths or openings between barrier islands, inlets, or deeper tidal channels to reach offshore waters where they join the adult stock and spawn. The authors indicate that these specific areas should be given high conservation importance, as they maintain that connectivity among inshore and offshore ecosystems is critical.

- **Exhibit J:** M. Sheaves, et al., *True Value of Estuarine and Coastal Nurseries for Fish: Incorporating Complexity and Dynamics*, 38 ESTUARIES AND COASTS 401 (2015).

This paper supports the argument that North Carolina's nursery program is rudimentary and fails to consider a broad assessment of nursery habitat value. The authors expand on Beck, et al. (2001) and Dahlgren et al. (2006), both cited by the Division of Marine Fisheries in its fiscal note, which only focus on one aspect of nursery ground value. The authors stress the need to provide protection in critical transition zones between refuge and feeding areas. The authors specifically state that predatory activities—which may include shrimp trawling—in these important habitat corridors can control the supply of recruits.

It is also important, and they point out, that nursery ground values differ depending on the species involved and the current system. In other words, a one-size-fits-all scenario fails to take into account the needs of many critical ecosystem components.

The authors conclude that failure to incorporate the various complexities and needs of species into conservation approaches can risk incomplete or inaccurate identification of key habitats and connectivity that lead to significant potential for unexpected negative outcomes.

This paper describes the current situation in North Carolina, where the nursery area program is rudimentary and generic and fails to take into account any species-specific requirements of connectivity or ecosystems function of the juvenile fishes that are transporting estuarine production in the form of fish flesh to the coastal ecosystem. This research also supports the Federation's contention that the shrimping grounds located between the currently designated nursery areas and the offshore stock represent a critical bottleneck to this productivity, and when combined with natural predation, can dramatically reduce productivity.

- **Exhibit K:** J. Bellido, et al., *Fishery discards and bycatch: solutions for an ecosystem approach to fisheries management?*, 670 HYDROBIOLOGIA 317 (2011).

The authors state that "fishery discard practices constitute a *purposeless waste of valuable living resources*, which plays an important role in the *depletion of marine populations*. Furthermore, discarding may have a number of adverse ecological impacts in marine ecosystems,

provoking changes in the overall structure of trophic webs and habitats, which in turn could pose risks for the sustainability of current fisheries." The authors call out shrimp fisheries in particular to illustrate this point.

The authors describe the "core" features of the Ecosystems Approach to Fisheries Management (EAFM): "(a) keeping fleet capacity and fishing mortality rates low enough to prevent ecosystem-wide overfishing, (b) reducing or eliminating bycatch and discards and (c) avoiding habitat-destroying fishing methods."

The EAFM takes into account trophic interactions and area-based management. As the authors describe, such management objectives are not exclusive to EAFM, and most fisheries management agencies around the world attempt to meet at least some of these objectives as part of existing single-species management regimes. The authors cite the recent FAO International Guidelines on Bycatch Management and Reduction of Discards (FAO, 2010), in support of management measures to mitigate bycatch and discard problems. These guidelines advised that "States and [Regional Fisheries Management Organizations or Arrangements] should, where appropriate, map seabed habitats, distributions and ranges of species taken as bycatch, in particular rare, endangered, threatened or protected species, to ascertain where species taken as bycatch might overlap with fishing effort."

The primary aspects of EAFM are central to the goals of the Petition.

- **Exhibit L:** N. Graham, et al., *Fishing practice, gear design, and the ecosystem approach—three case studies demonstrating the effect of management strategy on gear selectivity and discards*, 64 ICES JOURNAL OF MARINE SCIENCE 744 (2007).

The authors state plainly that "[a] basic tenet of the ecosystem approach to fisheries management is that harvesting is conducted with *minimal impact on juvenile fish, non-target species, and marine habitats*."

Therefore, the authors suggest, the tendency to maintain fishing opportunities has to be linked with the longer-term aim of improving sustainability through reducing discards and/or bycatch. In the first instance, it is necessary to define the limits of the quantities of fish of sublegal size or bycatch levels that are acceptable. It is also necessary to shift the monitoring, surveillance, and control onus from landings to catches. By providing the correct incentives and defining realistic targets, the authors suggest that it should be possible to reduce unwanted bycatch and discards.

- **Exhibit M:** J. Lefcheck, et al., *Are coastal habitats important nurseries? A meta-analysis*, CONSERVATION LETTERS (2019).

The authors provide a compelling analysis of 160 peer-reviewed papers that evaluate the importance of structured nursery habitats for marine resources. Their most basic conclusion is

that almost all structured habitats, including seagrasses, marshes, submerged aquatic vegetation, oyster beds, and shell hash bottoms, significantly enhance juvenile density, growth, and survival.

These habitats are critical because they provide a complex three-dimensional space as opposed to unstructured habitats, such as sand and mud, which provide none of the aforementioned structure or protection.

The vast majority of areas within the estuaries of North Carolina which currently serve as nursery habitats for most of the commercially and recreationally important species of fish, crabs, and shrimp, as well as forage species important to the ecosystem, are the unstructured habitats that provide less benefit to juveniles. A primary cause of this lack of structure in the North Carolina estuaries is the lack of protection from bottom disturbing gears such as shrimp trawls, crab trawls, and dredges. As a result, much of the three-dimensional structure, so critical for juvenile growth and survival, has been converted to unstructured habitats and provides less function.

This paper best illustrates the critical needs for the reform sought by the Petition. The paper refutes statements by the Division in the fiscal note analysis for the previous petition.[51] Further, it most certainly challenges the concept that "turning over the bottom" by trawling enhances long term production and survival as presented by Deehr (2014).[52] The Petition strives to address the destruction and two-dimensionality of our once-important estuarine ecosystem that ultimately leads to long-term habitat protection and a return to a productive nursery area system through a more holistic approach to habitat protection.

VI. A STATEMENT ON 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 rules are designed to minimally affect the commercial and recreational fishing industries. Commercial and recreational fishermen would be expected to see increases in the availability and value of fishes available for harvest under the proposed rules. Commercial 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 estuarine waters. The reduction in weekly

[51] *Compare* Exhibit M *with* Division of Marine Fisheries Fiscal Note at 68-69 (citing R.A. Deehr, et al., *Using stable isotope analysis to validate effective trophic levels from Ecopath models of areas closed and open to shrimp trawling in Core Sound, N.C., USA*, 282 ECOLOGICAL MODELING 1–17 (2014)).
[52] *Cf.* R.A. Deehr, et al., *Using stable isotope analysis to validate effective trophic levels from Ecopath models of areas closed and open to shrimp trawling in Core Sound, N.C., USA*, 282 ECOLOGICAL MODELING 1–17 (2014).

shrimping days will apply to all commercial fishermen engaged in shrimping. Finally, fish dealers may be impacted if the availability, quantity, or price of harvested shrimp is positively or negatively affected by the proposed rules.

Efficiencies in terms of reduced effort and associated costs would be measureable. As pointed out in the attached expert reports, limiting commercial shrimp trawling to three days per week allows shrimp to re-congregate during lay days, resulting in greater shrimp harvest on open days, thereby making up for losses but measurably reducing bycatch. It is important to keep in mind that the shrimp trawl fishery is the only fishery where the dominant catch is not the target species. In fact, shrimp are actually a bycatch when compared to the much higher catches of unwanted and discarded juvenile fishes.

Delaying the opening of shrimp season will allow shrimp size to increase, and therefore increase 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.

Cost factors associated with the proposed rule include, but are not limited to, the following: (1) benefits of increased catch per unit of effort of shrimp resulting from increased lay days; (2) increase in quality and size of shrimp; (3) enforcement and patrol expenses; (4) possible cost of new or amended gear, including a headrope meeting the proposed rule requirements; and (5) costs and benefits of delaying the shrimp season by a short time to allow shrimp count to reach 60 shrimp per pound (heads on) or to allow the harvest of shrimp to exceed the harvest of juvenile fish in sampling tows in the Pamlico Sound.

The Division of Marine Fisheries is expected to develop a fiscal analysis to evaluate the fiscal and economic impact of the proposed rules. The Federation submitted two detailed letters

to the Commission outlining its objections to the Division's attempts to evaluate the fiscal and economic impacts of the proposed rules in the November 2017 petition for rulemaking. The Federation stands by those objections, and encourages the Commission to direct the Division to develop the fiscal analysis with an attention to those objections.

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

As described above, the proposed rules will affect a portion of commercial fishing license holders that participate in the commercial shrimp trawl fishery. The majority of commercial fishermen, those that harvest finfish and crabs, the recreational fishing industries, as well as the general public will be positively impacted by the proposed rules. Ultimately, the proposed rules will protect juvenile fishes until they either contribute to the spawning stock, the saleable or legal harvest, or the ecosystem, which will benefit all users in the fishery. 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 PETITIONERS

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Respectfully submitted this the 20th day of May, 2019.

[signature page follows]

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