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Via Email and U.S. Mail

Chairman Rob Bizzell
Marine Fisheries Commission
P.O Box 769
Morehead City, N.C. 28557

Re: DMF Recommendations for Shrimp FMP Amendment 2

Dear Chairman Bizzell:

The North Carolina Wildlife Federation ("NCWF") has reviewed the North Carolina Division of Marine Fisheries' ("DMF") October 2021 Decision Document for Amendment 2 to the Shrimp Fishery Management Plan ("Draft Amendment 2") and submits these comments for consideration by the Marine Fisheries Commission ("MFC").[1] We are discouraged that only minor adjustments to the fishery have been suggested when compared to the suite of bycatch reduction options provided by our petition(s) for rule-making, and we remain concerned that no measures have been proposed that can be quantitatively assessed in the future. By maintaining the status quo in terms of days fished, gear parameters, tow times, and season openings, any reduction in bycatch, the focus of Amendment 2, is insufficient at best. The current proposals from DMF simply delay mortality in the rivers until juvenile fishes reach the open sound where shrimping effort and resultant bycatch will remain unchanged.

Furthermore, DMF provides no substantive rebuttal or explanation for its choice to ignore or dismiss the technical issues analyzed by NCWF. Instead, DMF repeatedly claims that more comprehensive data is needed to support measures that may impact the commercial harvest. We continue to review the documents and supporting science and provide science-based support for further reductions in effort. The Decision Document relies on economics as the primary driver for the recommendations as opposed to sustainability of the resource.

The Decision Document touts all of the management efforts in the past that only allow trawling in 53% of the internal coastal waters and the efforts to reduce bycatch.[2] Clearly those

[1] *See Shrimp Fishery Management Plan Amendment 2 Decision Document*, N.C. DIV. MARINE FISHERIES (Oct. 2021), https://deq.nc.gov/media/25170/open [hereinafter *Decision Document*].
[2] Decision Document at 3.

efforts have failed to address the problem, as evidenced by the development of Amendment 2. Closing 47% of the internal waters does little to protect juvenile fishes from mortality if the primary pathways for their exits to the ocean are still trawled at maximum levels.[3] If any of the efforts thus far had any measurable benefits to the stocks, we would expect to see some positive response by the fishes and other organisms, but we have not.

I. DECISION DOCUMENT RECOMMENDATIONS

A. Area Restrictions

The additional area restrictions and closures proposed are reasonable first steps, but are a fraction of what is needed to accomplish the goals and objectives of Amendment 2. While any closure to trawl activity should certainly help rebuild lost habitats, any reductions in mortality, however, are short-lived until the fishes move into the open areas.

NCWF has repeatedly stated that it supports maintaining a viable shrimp trawl fishery in North Carolina that is responsible and protects the local, family shrimpers. Our petition(s) provide mechanisms for such a scenario. The closures proposed in the Decision Document disproportionately impact those smaller, local fishermen in favor of maintaining status quo for the large offshore trawlers and out-of-state vessels that will operate unrestricted in Pamlico Sound, sweeping up shrimp and juvenile finfishes saved from any river closures. The Decision Document recommends the exact opposite of what was proposed in the NCWF petition(s), and approved at one point, by the MFC.

Again, while we feel compelled to support the closures presented in the Decision Document from a habitat perspective, they only serve to delay mortality until protected fishes reach open trawl grounds, either in open sounds or the nearshore coastal ocean where protection ends.

B. Effort and Gear Modifications

The Decision Document states that "the goal of bycatch reductions is generally to increase availability of fish to other fisheries."[4] The State appears to discount the critical ecosystem benefits of reduced bycatch. Further, the document suggests that "the results and benefits of shrimp trawl bycatch reductions are uncertain" based on the life history of the fishes involved.[5] The document seems to indicate that DMF and the MFC cannot say, unequivocally, that reducing bycatch is a positive thing. We can find no literature that suggests anything other than the fact that bycatch is a problem and that reduction is critical in all our world's fisheries. This statement is very concerning from a resource management perspective and flies in the face of decades of research. The remainder of the bullets on page 8 of the Decision Document discuss minor adjustments to current practices that avoid impacts to the shrimp trawl industry or purport to reduce bycatch.

[3] *See id.*
[4] *Id.* at 8.
[5] *Id.*

The Decision Document states that "[p]rotecting [submerged aquatic vegetation ("SAV") and shell bottom] habitats from shrimp trawls also results in bycatch reduction."[6] However, this reduction would be only temporary. Shell bottom and SAV utilization by juvenile fishes is ephemeral. Once juveniles move from the protected areas, they are subjected to status quo trawl effort in the open areas. We are unaware of any mechanism that the State's hypothesis can be tested.

The Decision Document further states that "[b]ecause of current BRD [bycatch reduction device] requirements and other effort restrictions, shifting shrimp trawl effort to larger waterbodies where finfish can disperse is not expected to result in increased bycatch."[7] The DMF has ample survey and characterization data to refute its own statement. If Amendment 2 successfully closes the small areas proposed, mortality will only be delayed until those fishes move into the open sounds where trawling will remain at status quo levels. We believe the evidence supports the fact that more fishes will be concentrated in the open areas and bycatch will increase.

The Decision Document recommends to maintain the status quo for headrope at 220 feet, allow no-trawl gear in closed trawl areas, eliminate recreational limits, and continue to work on the bycatch reduction devices, which have shown no quantifiable reductions in population mortality.[8] The options rejected in the Decision Document, those proposed by the NCWF petition(s) such as tow time limits, fishing time restrictions, reduced headrope length, mid-week closures, are all rejected due to perceived burdens to the fishery or enforcement concerns.[9] The Decision Document's justifications for these rejected alternatives appear to be unconfirmed supposition, and DMF provides no argument to reject the options provided in the petition(s) on any technical basis.

C. Region-specific Recommendations

The Decision Document also proposes various closures for the Northern, Central and Southern Regions. While these closures appear substantive, there is no way to determine if they actually reduce mortality of juvenile fishes at the population level. In fact, the Decision Document states that the "magnitude of benefits [from these closures] is unknown,"[10] and "impacts to the trawl fishery are likely minimal."[11] Yet the Decision Document concludes that these closures will "likely reduce bycatch."[12] We believe it is more likely that bycatch will not be reduced. Upon closer examination, the closures in the Central and Northern areas maintain status quo trawling effort in the areas most used by juvenile fishes, based on all known survey and observer data. Simply closing the areas proposed provides no long-term protection or corridors to offshore spawning grounds.

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[6] *Id.*
[7] *Id.*
[8] *See id.* at 9.
[9] *Id.*
[10] *Id.* at 12.
[11] *Id.*
[12] *Id.*

The Decision Document suggests that these closures will allow fishes to disperse into the open sounds where they are less concentrated. We question how a lower concentration can reduce bycatch in open areas. The suggestion that it may is speculative and not based on any data. The fact that effort will now be concentrated in open areas with the highest concentrations of juvenile fishes at status quo is more likely to simply delay mortality rather than reduce it.

The areas proposed in the Southern area may actually reduce bycatch mortality in the estuary; however, open areas adjacent to the inlets in the Atlantic Ocean will offset many of those gains through nearshore ocean trawling.

The region-specific recommendations will likely have the greatest impact on the smaller, local shrimpers who must now travel longer distances to shrimp in open areas. Forcing the smaller shrimpers into direct competition with the large offshore trawlers and out-of-state vessels in the open sound raises concerns for their economics and safety at sea. It appears that the larger, more influential trawlers will be virtually unaffected by Amendment 2, if adopted as proposed.

II. DRAFT AMENDMENT 2–ANALYSIS AND DISCUSSION

Draft Amendment 2 fails to reduce bycatch and, if approved, will result in five more years of extraordinary bycatch that we do not believe these resources can withstand.

NCWF is concerned that the substantive actions proposed in our petition were summarily dismissed by DMF staff based on anecdotal social and economic information rather than peer-reviewed science. Despite numerous documents and supporting science provided by NCWF, the opportunity to discuss these issues with staff has been rejected or ignored by leadership of DMF and the Department of Environmental Quality.

After reviewing the Decision Document, we have continued to develop information based on the science that contradicts the statements and recommendations provided by DMF to the MFC. A final issue we would like to address relates to the continued debate over the magnitude and fate of juvenile finfish and other marine resources that are sacrificed for every pound of shrimp harvested.

We know that brown shrimp are the primary *target* species taken in shrimp trawls in the estuarine nursery grounds of North Carolina. Undisputable, however, is the fact that unmarketable, juvenile fishes and crabs that would be of great potential value to commercial and recreational fisheries if allowed to grow are the primary *catch*.

Brown (2015) conducted the most robust characterization of the North Carolina shrimp trawl fishery and its bycatch from 2012–2015.[13] Brown (2015), however, did not provide any expanded estimates from his findings. A simple expansion of Brown's data, however, reveals

[13] *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 ENVTL. QUALITY (Oct. 2015).

enormous numbers. In 2014, 361.6 million fishes, crabs, mollusks, and jellyfishes weighing 21.7 million pounds were taken as bycatch in the 2014 shrimp trawl fishery while using BRDs.[14] The total landings of shrimp harvested in 2014 based on Brown 2015 was 4.6 million pounds and DMF trip ticket data verifies that 4.7 million pounds of shrimp were harvested in 2014.[15] Consequently, the expanded bycatch estimates presented here are credible.

Based on the data, for every pound of shrimp landed (heads on) in 2014, there were 4.7 pounds of bycatch brought on board.[16] Consistent with the ASMFC findings for bycatch mortality from trawl fisheries and the fact that the study did not consider delayed mortality of bycatch that came onboard, we must assume 100% mortality of the 361.6 million animals taken as bycatch. Though there may theoretically be some survival of discarded bycatch,[17] we find that survival of even a small fraction is highly unlikely, given our own and others' observations of the predation that occurs by marine mammal, avian, and other fish predators that routinely follow trawlers to take advantage of the both the discarded bycatch and the organisms that manage to escape the trawl interior through a BRD.

Numerous studies have shown that approximately 50% of the juvenile fishes, and perhaps some of the other marine resources, escape through certified BRDs during a shrimp trawl tow. During 2014, tow times ranged from 40 minutes to 6 hours, with an average of 3 hours.[18] Tow times of this length would result in high mortality rates of fish brought on deck. A missing piece of the puzzle, however, is the mortality of the bycatch escaping via the BRDs and not brought on board the vessel. If one assumes that the BRDs reduce bycatch by 50%, then an additional 21.7 million pounds of potential bycatch were encountered by shrimp trawls in 2014. The mortality associated with those fishes that escaped or those fishes that were crushed when extruded from the meshes of the trawl is unknown. It is well established, however, that numerous predators follow shrimp trawls throughout the fishing effort. Bottlenose dolphins, sharks, rays, birds, and numerous fishes such as bluefish, the mackerels and cobia follow the shrimp trawls from start to finish. Fishes squeezed through the meshes or that escape through BRDs are easy prey. On haul back, especially when the net is "washing" behind the boat just prior to bringing on deck, numerous fishes are extruded and consumed or picked from nets by birds. While the number is unknown, a large percentage of the fishes that escape via the BRD and are not brought on deck perish; yet the current, faulty, assumption is that they all survive.

Another mortality factor, often not considered, is that most fishes encounter multiple trawls every day, week, and month throughout the seven- to eight-month shrimping season. Each encounter further increases an individual fish's chance of mortality. Consequently, the

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[14] *See* Brown (2015) at Table 44 (pp. 114-15) and Table 58 (pp. 136-37). These numbers were summed and expanded to reflect total effort.
[15] *See* DMF, Fisheries Statistics, https://deq.nc.gov/about/divisions/marine-fisheries/science-and-statistics/fisheries-statistics#license-and-statistics-annual-report.
[16] *See* Brown (2015) at Table 44 (pp. 114-15) and Table 58 (pp. 136-37).
[17] *See, e.g.*, DMF, *Draft Amendment 2 to the North Carolina Shrimp Fishery Management Plan* (Oct. 2021) [hereinafter "Draft Amendment 2"] at 38 ("In fisheries where discard losses are a large portion of the catch, including or excluding discard losses can impact the yield, effort, and biomass at Maximum Sustainable Yield (MSY) as does the survival rate of the discarded catch.").
[18] Brown (2015) at 8.

actual impacts of the shrimp trawl fishery to juvenile fishes over the course of the season is likely much higher than values from a single tow, but are unknown. For example, if one million weakfish recruit into Pamlico Sound at the beginning of the shrimp season in May, it is unknown how many will likely survive until their November/December migration out of the sound. The role that shrimp trawling plays in reducing this survival rate is a critical, but unacknowledged, issue.

Based on the ratio method data that DMF disputes as valid,[19] the actual amount of bycatch and/or non-target species mortality associated with a single pound of shrimp may be as high as 4.7 pounds x 2 = 9.4 pounds of non-target species to 1 pound of shrimp. While some may assert this value is extreme, no data are available that indicate the total bycatch is significantly less.

During 2014, shrimp (brown, white, and pink) comprised 18.2% of the observed catches in the estuary while the remaining 81.8% of mostly unmarketable finfish was discarded.[20] During the only other full year of sampling in 2013, a similar value of 20.2% of the observed catches were shrimp.[21]

Brown (2015) states that expanding estimates of bycatch to the fleet level "should be done with caution" but did not make the attempt.[22] Draft Amendment 2 to the Shrimp FMP discusses the ratio method of assessing bycatch, as presented here, and indicates that the ratio method is not as informative as the actual catch rate of the bycatch species (the catch per unit effort, or CPUE, method).[23] Unfortunately, Draft Amendment 2 finds that the "in most cases the data needed to calculate reliable CPUE estimates for bycatch species are lacking,"[24] thereby making estimates using the ratio method the best available science.

Brown (2016, 2017) continued the characterization work in 2016 and the fall of 2017.[25] While these studies did not have the coverage of the 2015 study, they provide similar results. The majority of the harvest from estuarine and ocean trawl observations was juvenile fishes, primarily Atlantic croaker, spot, weakfish, and other commercial and recreationally important species. The Brown 2016 study also examined bycatch in the skimmer trawl fishery and reports that the dominant catch in that fishery is shrimp, providing a great alternative to the shrimp trawl and its primary harvest of juvenile fishes. The decline in the abundance of spot in trawl

[19] *See* Draft Amendment 2 at 32.
[20] *See* Brown (2015) at Table 44 (pp. 114-15) and Table 58 (pp. 136-37).
[21] *See* Brown (2015) at Table 40 (pp. 108-09) and Table 54 (pp. 130-31).
[22] *See* Brown (2015) at 22.
[23] Draft Amendment 2 at 32.
[24] Draft Amendment 2 at 33.
[25] *See* Kevin Brown, *Characterization of the commercial shrimp fishery in the estuarine and ocean (0-3 miles) waters of North Carolina. Completion report for NOAA award no. NA13NMF4740243,* N.C. DEP'T OF ENVTL. QUALITY, DMF (2017); Kevin Brown, *Pilot Study: Characterization of bycatch and discards, including protected species interactions, in the commercial skimmer trawl fishery in North Carolina. Completion report for NOAA award no. NA14NMF47400363 and NA13NMF4740243*, N.C. DEP'T OF ENVTL. QUALITY, DMF (2016).

observations between the 2013-2014 time period (Brown 2015) and 2016-2017 time period (Brown 2016, 2017) is concerning.

The best available data collected from Brown (2015) indicates that each pound of shrimp harvested generates between five to ten pounds of bycatch of finfish and other important marine resources. If one accepts the basic premise that many of the fishes that escape through BRDs or are squeezed through meshes during fishing succumb to injury or predation, the total mortality from shrimp trawl activity is likely closer to ten pounds than five pounds.

DMF presents no data to refute these ratio-based numbers, yet Draft Amendment 2 states that the ratio method is more biased than the CPUE method.[26] As a result, the State appears to simply discount the ratio method and its damning results in hopes that the other method may, someday, indicate that encountering over 43 million pounds of finfish and other marine resources in 2014 to harvest 4.6 million pounds of shrimp is sustainable and not a significant cause of the catastrophic decline in the species encountered in that fishery. Draft Amendment 2 does indicate, however, that the ratio method is used to determine how "clean" a fishery is. The results clearly show that the shrimp trawl fishery is not "clean" when the target species only make up approximately 20% of the catch.

The section on discarded bycatch in shrimp trawls in Draft Amendment 2 contains none of this information. Interestingly, however, Draft Amendment 2 states that southern flounder, summer flounder, and weakfish "*only account for a small portion of the total catch by weight*."[27] A reasonable interpretation based on this statement would be that bycatch of these species has little biological impact or consequence. A closer look suggests the contrary is true.

In 2013, 23,663 weakfish weighing 2,004 pounds were observed by Brown.[28] Observed catches in 2013 represented 0.66% of the total estuarine effort of the fleet.[29] Expanding the observed weakfish catch to the fleet yields 303,666 pounds of weakfish brought on deck. The overall mortality must have been higher due to weakfish that perished during the trawl effort but did not reach the deck of the vessel. The commercial harvest of weakfish in 2013 was merely 120,191 pounds—60% less than the estimated fleetwide bycatch from shrimp trawling.

In 2014, 232,170 weakfish weighing 20,604 pounds were observed as bycatch from commercial shrimp trawls.[30] Observer coverage in 2014 was 1.28% of the total estuarine effort, yielding a conservative estimate of 1.1 million pounds of weakfish bycatch.[31] Commercial landings of weakfish in 2014 were 105,247 pounds.

[26] *See* Draft Amendment 2 at 32–33.
[27] Draft Amendment 2 at 216 (emphasis added).
[28] *See* Brown (2015) at Table 40 (pp. 108-09) and Table 54 (pp. 130-31).
[29] *See* Brown (2015) at Table 2, p. 70.
[30] *See* Brown (2015) at Table 44 (pp. 114-15) and Table 58 (pp. 136-37).
[31] *See* Brown (2015) at Table 3, p. 71.

The estuarine shrimp trawl bycatch of southern flounder was estimated at 188,000 pounds in 2013 and 140,250 pounds in 2014—this is nearly half the current allowable harvest for the commercial southern flounder fishery in 2021.[32]

When compared to bycatch of Atlantic croaker (conservatively estimated as 4.1 million pounds in 2013 and 10.5 million pounds in 2014), weakfish and southern flounder may be a relatively smaller portion of shrimp trawl bycatch, but not inconsequential as suggested by DMF. Furthermore, total bycatch of each of these species is even higher than the estimates provided here, since these data *do not include the bycatch of these species taken in the Atlantic Ocean component of the fishery*.

When compared to the overall bycatch in shrimp trawls, the bycatch of southern flounder, weakfish, and Atlantic croaker may indeed only "account for a small portion of the total catch."[33] However, DMF's characterization of this bycatch as inconsequential to the species concerned, and to the fisheries for them, is misleading. The loss of these species at the juvenile stage translates to future losses in both reproductive capacity of their populations, as well as reduced recruitment to both the commercial and recreational fisheries for them.

III. CONCLUSION

In conclusion, the data from Brown 2015 are the best available and most extensive but have not been adequately analyzed and presented to the public. Management measures contained in Draft Amendment 2 to address bycatch only nibble around the edges and avoid any real progress towards bycatch reduction. Only a significant reduction in the capacity of the fleet and expansion of no trawl areas within the estuarine nursery grounds where the shrimp fleet operates, including within the Pamlico Sound, will address this problem for North Carolina and many other south and mid-Atlantic states that historically depended on the productivity of Pamlico sound to support fisheries production.

The DMF Decision Document suggests that "the results and benefits of shrimp trawl bycatch reductions are uncertain."[34] This mindset has resulted in a North Carolina shrimp management plan that has failed our public trust resources, the east coast ecosystem, our citizens, and the citizens of our sister and partner states. Draft Amendment 2, as recommended by the Decision Document, continues this tradition.

Sincerely,

Tim Gestwicki
CEO
North Carolina Wildlife Federation

[32] *See* DMF, Draft Amendment 3 to the Southern Flounder Fishery Management Plan (Oct. 2021) at 4 (setting total allowable commercial landings at 372,646 pounds and total allowable recreational landings at 159,706 pounds for 2021 and 2022).
[33] *See* Draft Amendment 2 at 216.
[34] Decision Document at 8.