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NORTH CAROLINA

GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
20CVS012925-910

WAKE COUNTY

COASTAL CONSERVATION
ASSOCIATION OF NORTH CAROLINA,
et al.,

Plaintiffs,

v.

STATE OF NORTH CAROLINA,

Defendant.

ORDER IN LIABILITY PHASE

This matter came on for trial on liability issues before the undersigned from January 20, 2026 through February 25, 2026 in the Superior Court of Wake County.

The Plaintiffs were represented by Keith H. Johnson, Andrew H. Erteschik, John M. Durnovich, and Paul M. Cox of Poyner Spruill LLP. The State was represented by Marc D. Bernstein, Scott A. Conklin, Ashton H. Roberts, Rachel G. Posey, and Henry J. Gargan of the North Carolina Department of Justice.

Having carefully considered the trial testimony, exhibits, arguments of counsel, and applicable law, the Court makes the following findings of fact and conclusions of law.

FINDINGS OF FACT

I. In 1997, the Fisheries Reform Act was enacted to bring about comprehensive fisheries management reform.

A. In the last quarter of the 20th century, uncontrolled commercial fishing put enormous pressure on North Carolina's coastal fisheries.

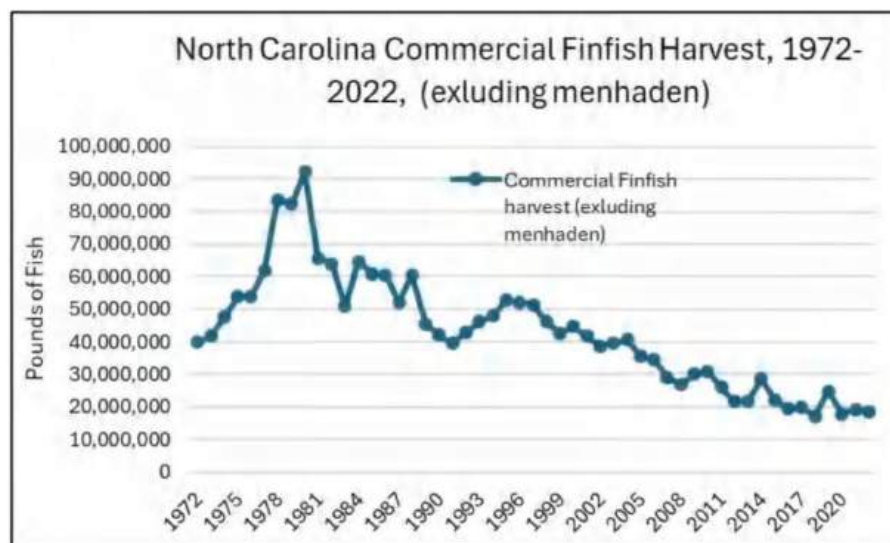
1. North Carolinians have always harvested large quantities of coastal finfish and shellfish for personal consumption. (P. Ex. 211, p. 60). This long heritage of sustenance and personal fishing in North Carolina dates back hundreds of years, long predating the state's commercial fisheries. (P. Ex. 3, p. 5).

2. Most North Carolina citizens who are shore-based anglers have limited boat access or no boat access, and for that reason, they have historically depended on certain readily accessible, mostly estuarine finfish species. (P. Ex. 211; T. 1292–93). Those species include Atlantic croaker, blue crab, Eastern oyster, flounder of various species, hard clam, kingfishes (sea mullet), red drum, river herring, spot, spotted seatrout, striped bass and weakfish. (P. Ex. 211, p. 60; T. 1294–95).

3. Up until the last quarter of the 20th century, North Carolina's coastal fisheries were so abundant that overharvest and allocation were seldom issues of concern. (T. 59–72, 369–74, 382–84, 390, 526–33, 966–71). As one example of this abundance, southeastern North Carolina was known for its "spot runs," when families would drive to the coast and crowd the piers to harvest abundant spot. (P. Ex. 110; T. 66–70, 326–27, 708–10, 968–72). These spot runs fueled tremendous economic activity from inland recreational anglers traveling to the coast. (P. Ex. 211, p. 61).

4. In the 1960s and 1970s, sought-after fish like spot, Atlantic croaker, weakfish, and flounder were highly abundant. (T. 325). Recreational anglers with little experience could harvest dozens of weakfish in a single day on the Pamlico Sound (T. 966–68, 970), stock their freezers on vacation trips (T. 968), catch flounder from docks along banks of the sound (T. 848), and harvest enough Atlantic croaker for neighborhood fish fries. (T. 848–49).

5. In the 1970s, however, commercial finfish landings increased dramatically. Between 1972 and 1981 alone, commercial finfish landings increased from 40 million pounds to over 90 million pounds, as reflected in the following chart:



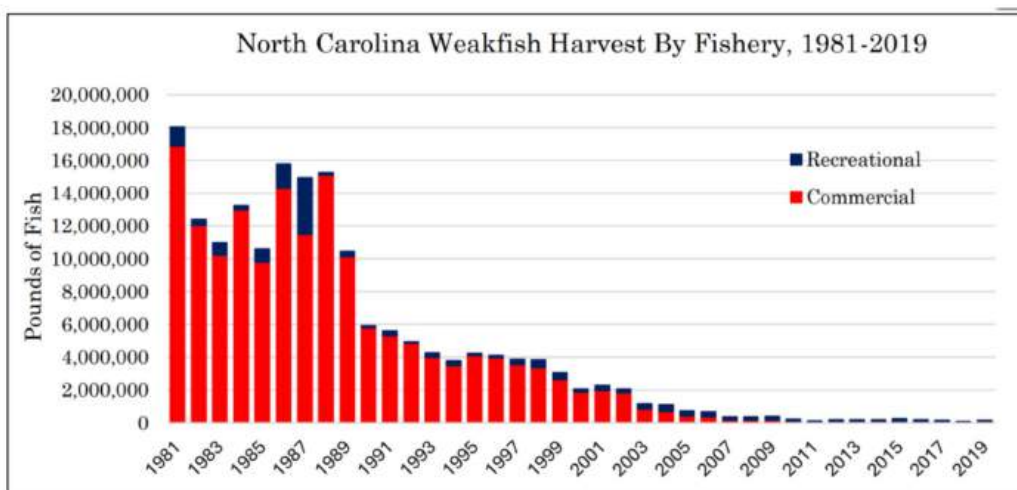
(P. Ex. 38).

6. As described by Doug Mumford, a former Division of Marine Fisheries (“DMF”) employee who monitored commercial harvests as a port agent from 1978 to the late 1980s, enormous catches—especially of spot, Atlantic croaker, weakfish, and blue crab—were reported during this time under no quotas. (T. 328–30, 333, 369–74, 382–84, 390). Also during this time, the catch ballooned from the use of

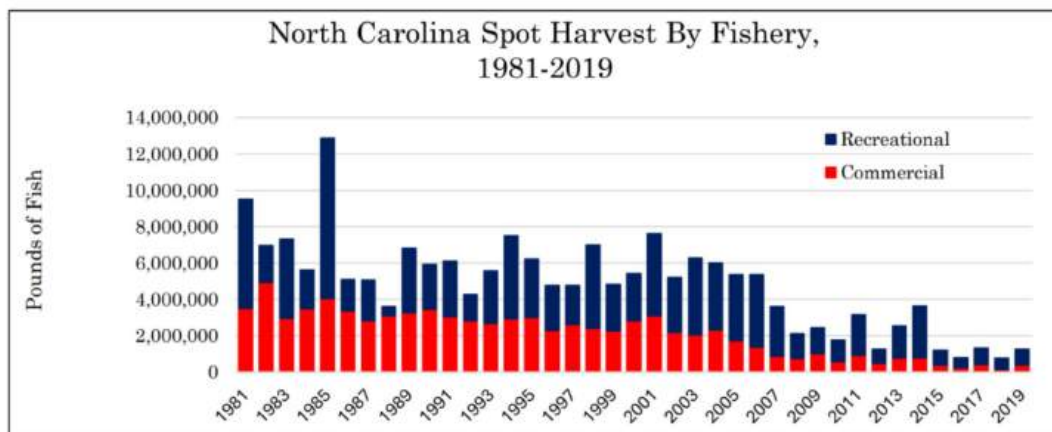
various commercial nets off the coast and in the Pamlico Sound. (P. Ex. 38; T. 353, 355–56).

7. Commercial finfish landings then began a precipitous decline in the late 1970s or early 1980s (P. Ex. 38). Today, they are half of what they were in the early 1970s. (P. Ex. 38).

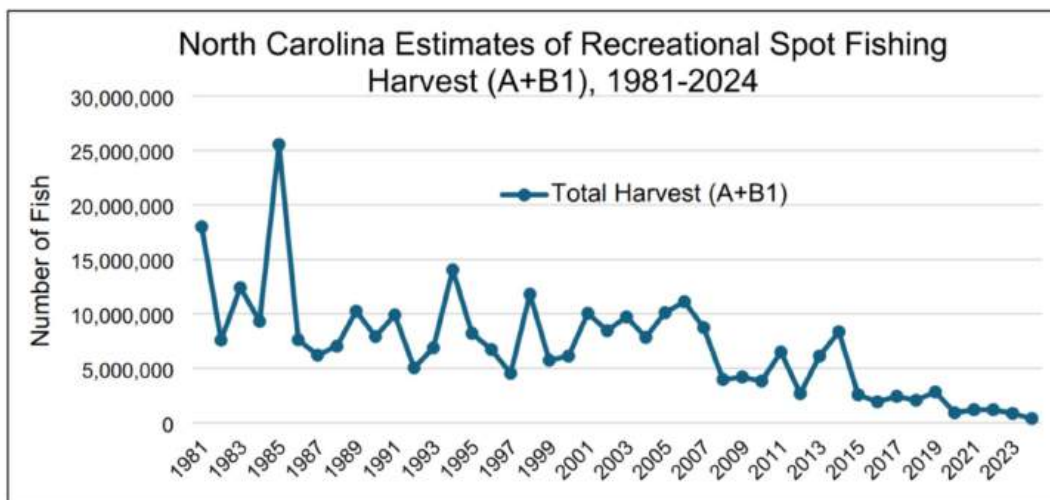
8. From the early 1980s, these declines in abundance of historically significant stocks in both recreational and commercial catches continued, as reflected in the following charts:



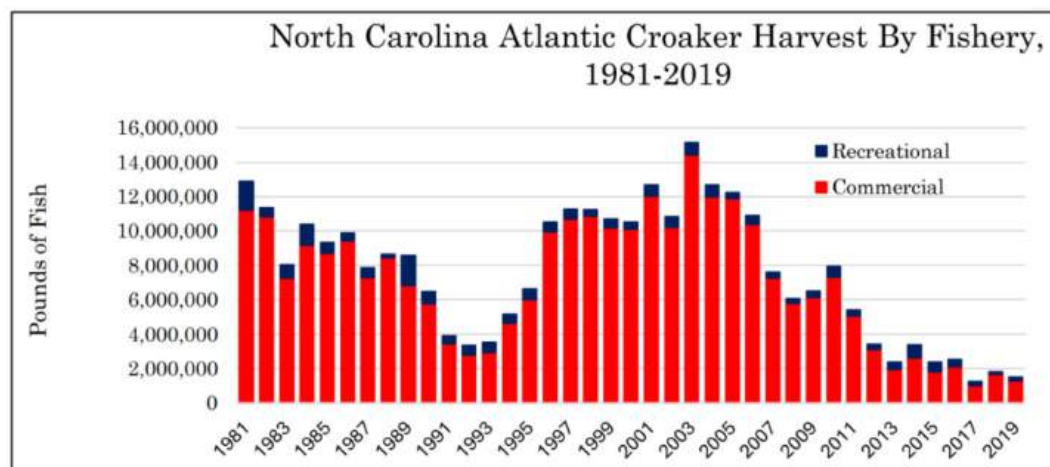
(P. Ex. 111a).



(P. Ex. 112a).



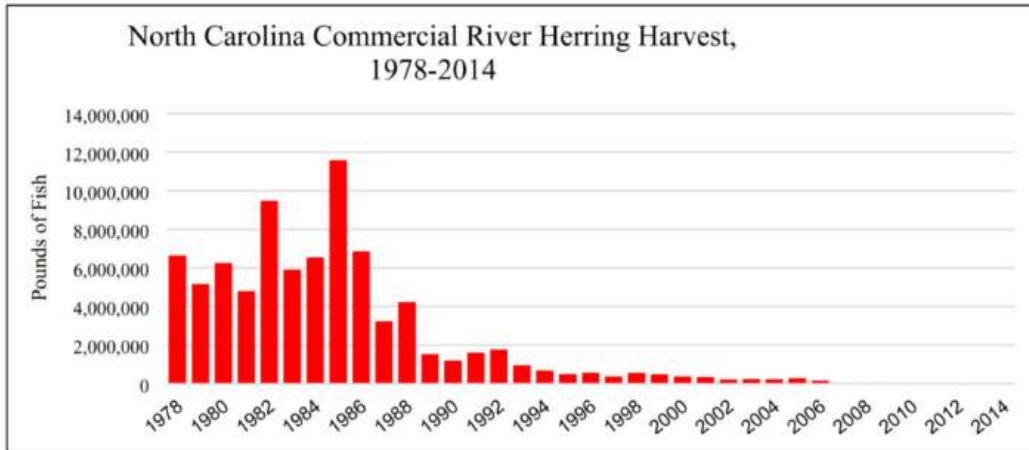
(P. Ex. 206).



(P. Ex. 113a).

9. As one example, river herring—believed to be the oldest fishery in North Carolina, which supplied dependable sustenance to thousands of North Carolinians for hundreds of years—sharply declined until its ultimate collapse.

(P. Ex. 211, p. 60). That decline is reflected in the following chart:



(P. Ex. 40, p. 4).

10. By the early 1990s, stock abundances continued to decline, and commercial fishermen compensated by deploying more gear, causing overcapitalization that only worsened the decline. (T. 97). Also during this time, changes in commercial gear—mass-produced monofilament gillnet webbing, net reels, and larger shrimp trawl vessels—dramatically increased harvest capacity and unknown amounts of bycatch. (T. 1119, 1360–61; P. Ex. 101).

11. A number of witnesses testified in great detail about these declines. The Court understands that these accounts are anecdotal and gives them weight only for purposes of helping the Court understand the historical context in which this dispute arises. The Court has not factored such anecdotal evidence into any of its scientific findings. Those findings are made exclusively based on the expert testimony that the Court has found to be credible and material. To the extent the Court recites these witnesses' testimony in the Order, it finds that testimony as fact. Alan Jernigan is a full-time waterman who spends over 200 days per year on North Carolina's coastal waters and comes from a multi-generational commercial

fishing family. (T. 704–06). He has participated in commercial shrimping, gillnetting, shellfishing, oyster dredging, and commercial grouper fishing, in addition to working as a fish dealer, recreational fishing guide, and professional tournament angler. (T. 704–06). He described tournaments no longer held in North Carolina (T. 737–38), losing clients to South Carolina (T. 726), the loss of the spot fishery central to North Carolina coastal culture (T. 708–09), the Atlantic croaker fishery that “does not exist anymore” (T. 732–33), weakfish too scarce to justify the effort (T. 732–33), and “total localized depletion” of spotted seatrout “wiped out by the commercial net fisheries” (T. 739).

12. John Gary Hardison, who has lived and fished near the Pamlico Sound for more than 70 years, provided consistent testimony. (T. 521). He described how once-abundant stocks of blue crab, spotted seatrout, flounder, Atlantic croaker, and spot drove a vibrant local economy, but today, the fishing—and the businesses it once supported—are virtually nonexistent. (T. 524–27). Mr. Hardison, a pilot, also described his experiences viewing shrimp trawlers while flying his plane over the Pamlico Sound. (T. 536–37). He described the industrialization of the shrimp-trawling fleet beginning in the 1970s, with vessels more than doubling in size since then. (T. 536–39).

13. Joe Albea, producer of 24 seasons of the PBS television program *Carolina Outdoor Journal*, provided compelling testimony based on his 55 years of experience on North Carolina’s coastal waters. (T. 547, 552). He described what the Pamlico Sound was like before the declines: “as good as you’d want it. . . . [W]e’d

catch a cooler full and carry enough back for a family and the share of the neighborhood.” (T. 562–63). At that time, the “big three” of Pamlico Sound—Atlantic croaker, spot, and weakfish—“were really sought after.” (T. 547–48). “They were not only good fun to catch but they were good to eat and there were a lot of them.” (T. 547–48). When asked about the same areas after the declines, Albea described how, in 24 seasons of producing *Carolina Outdoor Journal*, he never filmed a show on Atlantic croaker, spot, or weakfish in the Pamlico Sound because “it hasn’t been worth the effort, given the size and the scarcity.” (T. 569–72). He described how, before the declines, “you couldn’t find room to fish” on the piers, but as the fish disappeared, the piers closed. (T. 566–67, 573, 592). As Mr. Albea testified, “half the commercial industry is gone . . . [a]nd they’re gone because of a reason: there’s no fish out there.” (T. 612).

14. Other witnesses likewise testified about their personal observations of these declines. Mr. Mumford testified about the declines he observed in North Carolina’s coastal waters (T. 328–30, 382–84, 390), as did Richard Andrews and Seth Vernon, two full-time recreational fishing guides. (T. 635–74, 675–742). Debra Fox, a sustenance fisher, testified about the impact of declining fish stocks on her ability to harvest fish for sustenance. (T. 2089–121). Consistent with the personal observations of these witnesses, the data confirm that the abundances of most species historically important to the general public declined dramatically in the last 40 years. (P. Ex. 211, p. 60, Addendum 1).

15. By the early 1990s, recreational anglers, commercial fishermen, scientists, and the general public all began to realize that in the absence of comprehensive reform, the current state of North Carolina's coastal fisheries today could eventually become their reality. (T. 103–08). As described in news reports from the 1990s, the people of North Carolina began to demand significant reforms. (T. 86, 101; P. Ex. 11–12).

B. In 1996, the Moratorium Steering Committee proposed comprehensive coastal fisheries management reform.

16. The General Assembly responded to the calls for reform in 1994 by declaring a commercial fishing license moratorium and creating the Moratorium Steering Committee (“MSC”). (P. Ex. 13). The MSC was charged with undertaking “a comprehensive study of the fishery industry, including reviewing available measures to control effort,” to implement “[t]he State’s duty to preserve and protect its marine and estuarine resources.” (P. Ex. 13).

17. Dr. Tim Nifong, who served as general counsel to the MSC—attending every meeting of both the full committee and its subcommittees and recording the committees’ findings, conclusions, and recommendations—testified at trial. (T. 103–08). He described how the MSC and its subcommittees met regularly, and how their work ultimately culminated in the Report of the Moratorium Steering Committee, which he prepared for the MSC. (T. 103–08; P. Ex. 14).

18. In 1996, following two years of study, the MSC approved and issued its report, which proposed comprehensive coastal fisheries management reform intended to control commercial fishing effort to end overfishing and recover all

coastal fish stocks to overall health and historic abundances. (P. Ex. 14). Among its recommendations, the MSC proposed that state fisheries management plans ensure the “long-term viability” of all commercially and recreationally significant species and stocks, that DMF develop methodology for obtaining accurate catch-per-unit-effort data, that FMPs examine bycatch in all fisheries and set maximum bycatch levels, that the Marine Fisheries Commission (“MFC”) be authorized to limit entry into commercial fisheries to control effort, and that the MFC impose commercial harvest limits for all species and fisheries. (P. Ex. 14, pp. 2, 18–21, 81; P. Ex. 15; T. 103–08). That report ultimately served as the basis for new legislation the following year, as described below. (T. 109). Plaintiffs insist upon calling some of the recommendations “key” recommendations based on Dr. Nifong’s testimony. Dr. Nifong does not speak for the MSC and the Court accepts all the MSC’s recommendations as merely recommendations without assigning more weight to one than another. The Court also notes that the General Assembly did not adopt all the MSC’s recommendations.

C. In 1997, the Fisheries Reform Act was enacted and established a new management standard: long-term viability.

19. In 1997, the MSC’s recommended management reforms ultimately led to the General Assembly’s enactment of the Fisheries Reform Act (“FRA”). *See* S.L. 1997-400. The FRA was touted as ushering North Carolina into modern fisheries management, and the intended solution for the decline in coastal fisheries abundance observed in the last quarter of the 20th century. *See* S.L. 1997-400; (T. 85; P. Ex. 211, p. 5).

20. The expectation was that the FRA would be the statutory framework for reversing the long-term trends in declining abundance for multiple managed species or developing precautionary management plans for those fisheries where landings had increased to a point that declines seemed imminent (e.g., blue crab). (P. Ex. 211, p. 5). To that end, the FRA brought about a new management model intended to control commercial harvest effort, halt overfishing, and rebuild North Carolina's depleted public trust fish stocks to overall health and historic abundances. (T. 1095, 1144).

21. To achieve these goals, the FRA prescribed a new standard against which the State's coastal fisheries management would be assessed. Under the FRA, the standard for managing historically significant coastal fisheries was—and remains to this day—achieving “long-term viability.” S.L. 1997-400.

22. When this standard was introduced in 1997, it marked the first time that North Carolina's coastal fisheries managers had been provided with a management standard for managing North Carolina's significant fish stocks. (T. 1144). As former DMF Fisheries Director Dr. Louis Daniel testified, the ultimate goal of the “long-term viability” standard was to achieve a healthy stock in all important respects, because if a stock is healthy in all important respects, it is likely to be self-maintaining in that healthy condition for the long term. (T. 1142–44).

23. All of the State's witnesses who were questioned about the FRA's use of long-term viability as the standard agreed that long-term viability is, in fact, the

standard. DMF's Fisheries Director, Katherine Rawls, confirmed at trial that "long-term viability is the standard" for fisheries management, and that long-term viability "means more than just sustainable harvest." (T. 3762). DMF's Special Assistant for Councils, Chris Batsavage, likewise agreed that "long-term viability is the standard," and that "the end goal is long-term viability." (T. 3639–40). DMF's Deputy Director, Michael Loeffler, also verified interrogatory responses acknowledging that long-term viability "is the goal of the State's fishery management plans." (T. 2324; P. Ex. 207). No witness contended otherwise.

24. In addition to these fact witnesses, the Court also heard expert testimony on long-term viability from three fisheries science and management experts, all of whom were tendered by the Plaintiffs and accepted by the Court without objection from the State, as described more fully below.

D. Long-term viability is a well-established fisheries management standard, as the unrebutted expert testimony confirmed.

1. Dr. Louis Daniel

25. Dr. Daniel served as DMF's Fisheries Director from 2007 to 2016, overseeing all aspects of DMF's management of North Carolina's coastal fisheries. (P. Ex. 211, pp. 1–2; T. 1075–93). He holds a Ph.D. in Marine Science from the Virginia Institute of Marine Science at the College of William and Mary (1995), an M.S. in Marine Biology from the College of Charleston (1988), and a B.A. in Biology from Wake Forest University (1985). (P. Ex. 211, pp. 1–4; T. 1075). He was employed by the North Carolina Division of Marine Fisheries for 21 years (1995–2016). (P. Ex. 211, p. 2). During his career, Dr. Daniel served as Chair and Vice-

Chair of the Atlantic States Marine Fisheries Commission (2011–15), Chair and Vice-Chair of the South Atlantic Fishery Management Council (2003–06), and represented North Carolina on numerous interstate and federal advisory and management boards. (P. Ex. 211, pp. 2–3). He is also an adjunct professor at the North Carolina State University Center for Marine Sciences and Technology, where he teaches marine resource management and policy. (T. 1090).

26. In forming his opinions, Dr. Daniel carefully reviewed the extensive record in this case, including all North Carolina Fishery Management Plans and stock assessments, Atlantic States Marine Fisheries Commission (“ASMFC”) interstate plans, DMF Stock Status Reports, FMP annual reviews, species-trends analyses completed for this case by one of the Plaintiffs’ other fisheries-management experts, Dr. Sean Powers, and other relevant documents pertaining to North Carolina’s coastal fisheries—materials spanning many thousands of pages. (P. Ex. 211, pp. 3–4 and App. 3; T. 1093–95). He was tendered and received as an expert in fisheries science and management without objection from the State. (T. 1093). For the most part, the Court finds Dr. Daniel’s testimony, based on his 30 years of experience in fisheries science and management—including nine years as DMF’s Fisheries Director—to be credible and persuasive. In this order, anytime the Court recites to Dr. Daniels’ testimony, it is finding his testimony true and finds it to be fact. The Court does not find everything Dr. Daniels testified to as fact. There were times when his testimony was successfully challenged on cross examination and times when the court found him to be overly biased due to the circumstances of

his departure as DMF's fisheries director. However, on balance, the Court finds his testimony to be helpful to an understanding of the issues and the portions cited herein are credible, factual and material.

27. On the long-term viability standard, Dr. Daniel testified that this statutory standard requires fish stocks to be maintained at healthy, self-sustaining levels, so that the spawning stock biomass trends along a target rather than merely hovering at a threshold, and the population retains a healthy age structure with representatives of older age classes. (T. 1136–37, 1142–44). In practical terms, achieving long-term viability means that fish stocks do not fall into a depressed state requiring repeated management interventions where the public is continually told they cannot fish. (T. 1142). Dr. Daniel emphasized that age structure is a critical indicator of long-term viability: If a population lacks older fish—for example, a species that historically lived to ten years but now rarely exceeds four years—fisheries managers know there is a problem that is almost always attributable to overfishing. (P. Ex. 211, pp. 27–29; T. 1246–47).

28. Dr. Daniel illustrated these points using a chart showing that merely reaching the spawning stock biomass “threshold”—the minimum level at which a stock is no longer classified as overfished—does not equate to long-term viability. (T. 1136–37; P. Ex. 224). As he explained, long-term viability requires that the spawning stock biomass trend along a higher “target” level, which provides the buffer necessary to sustain the stock through natural fluctuations and given management uncertainty. (T. 1136–37, P. Ex. 224).

2. Dr. Sean Powers

29. Dr. Sean Powers is the Director of the Stokes School of Marine and Environmental Sciences at the University of South Alabama and a Senior Marine Scientist at Dauphin Island Sea Lab. (P. Ex. 216, p. 2; T. 1513). He received his Ph.D. in Zoology from Texas A&M University (1997) with concentrations in biostatistics, marine biology, and ecology, and later served as a Marine Policy Fellow and Program Manager at the National Science Foundation before joining the University of North Carolina at Chapel Hill's Institute of Marine Sciences. (P. Ex. 216, p. 2). Dr. Powers has authored over 150 peer-reviewed publications and led or participated in more than 60 state and federally supported research projects. (P. Ex. 216, pp. 34, 53–63). He has served on several National Academy of Sciences Study Committees focused on marine fisheries, and he currently serves as a member and former chair of the Gulf of Mexico Fishery Management Council's Standing Statistical Committee. (P. Ex. 216, pp. 2–3). Dr. Powers' experience includes conducting various forms of stock assessments, including formal model-based assessments, such as the 2024 assessment for Southern flounder in Alabama. (T. 1649; P. Ex. 216, p. 5).

30. In forming his opinions, Dr. Powers carefully reviewed all North Carolina Fishery Management Plans and stock assessments, ASMFC interstate plans, DMF Stock Status Reports, FMP annual reviews, and other relevant documents pertaining to North Carolina's coastal fisheries—materials spanning many thousands of pages. (P. Ex. 216; T. 1513–15). He was tendered and received as an expert in fisheries science and management without objection from the State.

(T. 1513). The Court finds Dr. Powers’ testimony, based on his approximately 30 years of experience in fisheries science and management, to be credible and persuasive. In this order, anytime the Court recites to Dr. Powers’ testimony, it is finding his testimony true and finds it to be fact.

31. On the long-term viability standard, Dr. Powers testified that a fish stock exhibits long-term viability when it contains enough adult breeding fish—measured by what scientists call the Spawning Potential Ratio (“SPR”)—to sustain the population over time by producing enough offspring to replace those that die or are harvested. (T. 1622). SPR is calculated based on the species’ natural life cycle, including how long the fish live, when they mature, and how often they reproduce. (T. 1622). Biologists measure viability across fish generations rather than calendar years because, as Dr. Powers explained, “we want to see it viable for a generation and a half” for a stock to be considered healthy. (T. 1624). Dr. Powers also explained how a viable fishery will also maintain its SPR at or above a “target” level—a safety margin above the minimum “threshold” below which the stock would be considered depleted. (T. 1626) (P. Ex. 224). As he testified at trial, “significantly truncated stocks”—i.e., those lacking older mature fish— “by definition lack long-term viability.” (T. 1677–78; P. Ex. 216, p. 22).

3. Dr. Greg Stunz

32. Dr. Greg Stunz is the Senior Executive Director of the Harte Research Institute at Texas A&M University–Corpus Christi, where he also holds the Endowed Chair for Fisheries and Oceans Health, is a Regents Professor of Marine

Biology, and is Founding Director of the Center for Sport Fish Science and Conservation. (T. 1760; P. Ex. 220, p. 2). He holds a Ph.D. in wildlife and fisheries sciences from Texas A&M University at College Station (1999), an M.S. in wildlife and fisheries sciences from Texas A&M University (1995), and a B.S. in biology from the University of Texas at San Antonio (1990). (T. 1761–62; P. Ex. 220, p. 2 and Ex. A (CV)). He has approximately 30 years of experience specializing in fisheries management. (T. 1763–64; P. Ex. 220, p. 2). He currently supervises a research staff of approximately 180 and manages approximately \$70 million in research grants at the Harte Research Institute. (T. 1766–67). He has published over 80 peer-reviewed publications and testified before Congress on fisheries science and management matters on three occasions. (T. 1767, 1774–75; P. Ex. 220, p. 2).

33. Dr. Stunz also has extensive experience as an active fisheries decisionmaker. This experience has included serving a nine-year term on the Gulf of Mexico Fishery Management Council—including as Chair and Vice Chair—as well as serving as Chair of the Council Coordinating Committee, which coordinates all eight federal fishery management councils. (T. 1771–72). In those roles, he made direct decisions on harvest limits, seasons, and allocation of fisheries resources. (T. 1771). He also serves as an advisory member of the Texas Saltwater Resource Committee, which he testified is “very similar in structure” to the federal fishery management councils, in that both involve Governor-appointed commissions that use advisory committees to inform management decisions. (T. 1775–76).

34. In forming his opinions, Dr. Stunz reviewed many thousands of pages of fisheries-management documents, including North Carolina stock assessments, FMPs and amendments, DMF stock status reports, FMP annual reviews, Dr. Powers' trends analysis, the expert reports of the other witnesses, and other materials. (T. 1776–77; P. Ex. 220, p. 2 and Appendix). He was tendered and received as an expert in fisheries science and management without objection from the State. (T. 1779; P. Ex. 220). The Court finds Dr. Stunz's testimony, based on his approximately 30 years of experience in fisheries science and management, to be credible and persuasive. In this order, anytime the Court recites to Dr. Stunz's testimony, it is finding his testimony true and finds it to be fact.

35. On the long-term viability standard, Dr. Stunz testified that this standard is the primary goal of modern fisheries management, and that while other jurisdictions may refer to it by different nomenclature—for example, “sustainable fisheries management”—it is the same standard as “long-term viability.” (T. 1780–81; P. Ex. 220, pp. 2–3). Dr. Stunz reviewed the statutory definition of “long-term viability” codified at N.C. Gen. Stat. § 113-182.1B, and explained that in the field of fisheries science and management, that well-recognized concept means that “you have a healthy viable stock in perpetuity.” (T. 1781–82).

36. As Dr. Stunz further explained, to achieve long-term viability, fisheries managers must allow harvest of only the surplus production that naturally occurs in a healthy, viable spawning fish stock, without allowing so much fishing effort on the spawning stock that the harvest would impact recruitment of new fish moving

into the adult population (i.e., without allowing recruitment overfishing). (P. Ex. 220, p. 3). The analogy that applies, as Dr. Stunz testified, is that of an endowment fund: a well-managed fishery, like a well-managed endowment, produces surplus that can be harvested indefinitely—it “is there forever and it’s set up so you’re only withdrawing a relatively small amount, but through appreciation and earnings, it’s continually producing revenue, or in this case, fish, forever. It does not go away.” (T. 1782; P. Ex. 220, pp. 2–3). As he explained, the critical caveat is that “you have to be ultra cautious you never get into that principal or so far into the principal that you begin to affect the sustainability of your endowment.” (T. 1783).

37. In response to Dr. Daniel, Dr. Powers, and Dr. Stunz’s testimony, no witness for the State offered contrary testimony about the meaning of long-term viability or the recognized goals of fisheries management described above. The Court has found these expert witnesses’ testimony to be fact based on their knowledge, training, experience; as well as their demeanor, extensive preparation and ability to withstand cross examination. It has used the same tests of truthfulness that the law requires of any factfinder. The Court has not accepted their testimony as fact merely based upon that testimony being un rebutted.

E. The FRA prescribed key management reforms to achieve the long-term viability standard.

38. For stocks significant enough to warrant management, the original FRA in 1997 provided guidance criteria to help meet the long-term viability standard. (P. Ex. 20; T. 154). It did so in several ways, as discussed below.

1. Optimal Yield vs. Maximum Sustainable Yield

39. The FRA required that management plans include measures to prevent overfishing while achieving, on a continuing basis, the “optimal yield” from the fishery. *See* S.L. 1997-400, § 3; *see also* N.C. Gen. Stat. § 113-182.1(b)(3) (1997). The FRA thus followed the federal model of managing to optimal yield (“OY”).

40. An understanding of OY first requires an understanding of the concept of Maximum Sustainable Yield (“MSY”). (P. Ex. 213, p. 7; T. 1120, 1784). MSY is the maximum amount of fish that can theoretically be harvested from a stock on a continuing basis without depleting the overall stock biomass. (P. Ex. 213, p. 7; T. 1120, 1784). MSY represents the “razor’s edge” of maximum yield—the absolute peak of the yield curve that a stock can endure and yet remain sustainable. (P. Ex. 213, p. 7).

41. Dr. Stunz testified that fisheries managers “never want to approach [MSY] too closely and for sure you never want to go past it, because the pattern in fisheries has been very clear: once you’re past that maximum sustainable yield, it becomes very difficult to get out of that, and in some cases . . . your fisheries never recover.” (T. 1784). He described MSY as “a very dangerous benchmark”—useful to know as a theoretical threshold, but one that fisheries managers should never approach too closely. (T. 1784–85). Dr. Daniel likewise testified that managing to MSY is “a risky management approach” because it “allows a harvest level that typically . . . further reduces the age structure of the population and it’s not something that necessarily factors in any variability that may occur.” (T. 1121). He explained that MSY should be viewed as the “threshold” or “bottom line” below

which a stock becomes overfished—“the edge of the cliff”—and that “you certainly don’t want to manage for the edge of the cliff.” (T. 1122).

42. Acceptable fisheries management therefore “buffers” MSY by prescribing an optimal yield (OY), rather than attempting to maximize the harvest. (P. Ex. 220, p. 3). As Dr. Stunz explained, “optimal yield is reduced b[y] a variety of factors from how much certainty you have in your fishery to what is the optimization in terms of social things that fishery provides. You build in a variety of buffers so that you’re not pushing too far, to your maximum sustainable yield.” (T. 1784). As Dr. Stunz explained, the buffers can be analogized to a car’s fuel tank: “Your car will go so far in terms of number of miles that your gas tank will hold, but you never really know how far that is until of course you run out of gas.” (T. 1786). Fisheries managers therefore “build in buffers”—a gas gauge with markers at full, half, and quarter, and a low-fuel warning—to avoid “running out of gas.” (T. 1787; P. Ex. 220, p. 3). Especially when there are data gaps, Dr. Stunz explained, “you don’t drive past half a tank,” because fisheries managers need to impose greater buffers to account for what they do not know. (T. 1787).

43. OY also reflects the principle that fisheries managers should aim for a long-term harvest that provides the greatest overall benefit to the public. (P. Ex. 213, p. 7). Under the original FRA, OY was defined as the amount of fish “[p]rescribed on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor.” S.L. 1997-400, § 2; (P. Ex. 20). Thus, to determine OY, fisheries managers first determine MSY, and then

they reduce or adjust that figure downward to account for uncertainty and other relevant factors. (T. 1120–22). As a result, OY is always some amount of harvest less than MSY. (T. 1122).

2. Fisheries Management Plans

44. Another management reform brought about by the FRA was establishing a uniform process to guide fisheries management decisions: the process for formulating and periodically amending fisheries management plans (“FMPs”). *See* S.L. 1997-400 § 3. As Dr. Daniel explained, this was the “heart” of the FRA: the requirement that the State prepare FMPs “for all commercially or recreationally significant species or fisheries that comprise State marine or estuarine resources,” coupled with the mandate that “[t]he goal of the plans shall be to ensure the long-term viability of the State’s commercially and recreationally significant species or fisheries.” S.L. 1997-400, § 3; (P. Ex. 211, p. 5).

3. Licensing Reform

45. The FRA also restructured the state’s licensing scheme to make all fishing licenses individual licenses. S.L. 1997-400, §§ 4–6; (T. 141).

46. This licensing reform was intended to create a complete sampling universe of all persons harvesting coastal fishery resources, thereby eliminating the data gaps that had previously hampered sound fisheries management decisions. (P. Ex. 14, pp. 22–24; T. 141).

47. As Dr. Nifong testified, although some of the MSC’s management recommendations were not expressly adopted in enacting the FRA, many of the

important recommendations of the MSC that were not included in the FRA still could have been carried out within the existing statutory authority of DMF and the MFC. (T. 154–55). Thus, as Dr. Nifong testified, the FRA as adopted in 1997, coupled with preexisting MFC management authority, gave the State all the tools needed to manage stocks sustainably. (T. 154). No witness contradicted this testimony.

F. After a 2004 amendment to the FRA that allowed for maximum sustainable yield, the State engaged in more than two decades of risk-prone management.

48. In 2004, a fundamental change was made to the FRA’s provisions on permissible harvest levels. (P. Ex. 211, p. 7; P. Ex. 213, p. 13; T. 1921). This change began with DMF requesting that the General Assembly replace the definition of optimal yield with a new but similar concept: “sustainable harvest.” (P. Ex. 211, pp. 6–7). DMF did not intend for this to be a material change, but ultimately, DMF’s proposed language was not enacted. (P. Ex. 211, pp. 6–7).

49. Instead, the General Assembly crafted a different definition of “sustainable harvest”—one that allowed for management based on MSY instead of OY. (P. Ex. 211, pp. 7–8; P. Ex. 20). The new definition of “sustainable harvest,” which remains today, reads as follows:

The amount of fish that can be taken from a fishery on a continuing basis without reducing the stock biomass of the fishery or causing the fishery to become overfished.

N.C. Gen. Stat. § 113-129(14a) (emphasis added); (P. Ex. 20).

50. In connection with this statutory change, the term “overfished” was also redefined as the condition of the fishery below the level that is adequate for the recruitment class of a fishery to replace the spawning class of the fishery. N.C. Gen. Stat. § 113-129(12c) (2004). In addition, the term “overfishing” was defined as fishing that causes a level of mortality that prevents a fishery from producing a sustainable harvest.¹ N.C. Gen. Stat. § 113-129(12d) (2004).

51. As Dr. Daniel explained, the sum total of these changes in 2004—the new definition of “sustainable harvest” alongside the new definition of “overfished”—was, in essence, the scientific definition of MSY. (P. Ex. 211, p. 7). This was a significant step backwards, in Dr. Daniel’s view, from the “precautionary approach” to fisheries management (described in greater detail below in Section IV.B.2), which he explained is instilled in every fisheries biologist during their professional training. (P. Ex. 211, p. 7; T. 1111).

52. As Dr. Daniel explained, fisheries managers cannot achieve long-term viability when managing to a biomass “threshold” that allows harvest at MSY. (T. 1158). He further testified that he was not aware of any example of a stock that had been managed to MSY that exhibits long-term viability. (T. 1158).

53. Indeed, with its sustainable harvest standard equivalent to MSY, North Carolina is unique. (P. Ex. 213, p. 19). No evidence at trial indicated that any other jurisdiction allows for fisheries to be managed to MSY.

¹ In practical terms, a stock is “overfished” when its population has already fallen too low, whereas “overfishing” is when the current rate of fishing is too high and, if continued, will cause the stock to become overfished. (T. 149).

54. Although the FRA's original, overarching standard—long-term viability—has not changed since 1997, the 2004 change has also remained in place. As a result, for more than two decades, the State's fisheries managers have believed they have the discretion to manage North Carolina's coastal fisheries to MSY, without including universally recognized levels of buffers for uncertainty. (P. Ex. 213, p. 13).

II. Today, none of North Carolina's pre-FRA depleted stocks have been restored to long-term viability, and many other managed stocks have declined to the point of nonviability.

A. After nearly 30 years, the State has completely failed to meet the long-term viability standard.

1. Not a single one of North Carolina's stocks managed under a Fisheries Management Plan exhibits long-term viability.

55. Up until 2017, DMF's biological review team evaluated state-managed and regionally managed species against published criteria, including a category of "viable." (T. 1270–72). Although some stock status categories were renamed or refined over their period of use, the assessment criteria did not materially change. (T. 148). Historically, less than half the stocks listed qualified as viable: In 1998 (the first post-FRA report), four of 14 state-managed stocks were listed as viable (T. 1460), and in 2016, only three of fourteen stocks were listed as viable. (T. 1463).

56. During his testimony, Dr. Daniel described the early work of a biological review team at DMF to reform stock status reports and develop criteria for a "healthy" or "viable" stock. (T. 1082, 1271). That work helped inform what

species were in most need of management plans, and it informed the public about the status of stocks. (T. 1270).

57. At trial, the Plaintiffs presented the most recent set of DMF's criteria for a "viable" stock, which was issued by DMF in 2017. (P. Ex. 24). Those viability criteria required that a stock cannot be overfished, that overfishing of the stock cannot be occurring, and that the stock must exhibit the following: stable or increasing trends in average length and weight, stable catch per unit effort, stable spawning stock biomass, stable juvenile abundance indexes based on historical averages, stable age structure that includes representatives of the older age classes, and stable or declining trends in fishing mortality. (P. Ex. 24, p. 11; T. 1142).

58. In 2017, however, DMF replaced the stock status reports entirely. (T. 1270–73). In their place, DMF issued an annual "Fishery Management Plan Review," which indicates only whether a stock is overfished or subject to overfishing, if known. (T. 1273–75). The prior viability and other criteria that DMF had used for years to determine stock status were abandoned. (T. 1273–75).

59. Before trial, the Plaintiffs sought to determine which, if any, state-managed stocks exhibit long-term viability, and they asked the State this question in the form of an interrogatory. (P. Ex. 207). The State responded that it "makes no contention regarding whether any of the species listed exhibit long-term viability."² (P. Ex. 207).

² The Court finds this response notable given the State's duties as trustee of North Carolina's coastal fisheries resources (*see* Conclusions of Law Section I.A.), including the basic duty of all trustees to monitor trust assets.

60. At trial, notwithstanding the State's response to the interrogatory, the Court was presented with the answer to the Plaintiffs' inquiry when Dr. Daniel applied the State's own 2017 long-term viability criteria to the current data from the most recent DMF-issued Fishery Management Plan Review. (T. 1284; P. Ex. 24, p. 11; P. Ex. 25). Based on the most recent data, he evaluated all 13 stocks managed under State FMPs, and he offered his expert conclusion, which the State did not attempt to rebut: Not a single one of the 13 state-managed stocks exhibits long-term viability. (T. 1284; P. Ex. 24, p. 11; P. Ex. 25). His conclusion was as follows:

- 5 stocks: overfished, and thus, by definition, did not exhibit long-term viability.
- 1 stock (spotted seatrout): overfishing is occurring, and thus, by definition, did not exhibit long-term viability.
- 1 stock (red drum): overfishing is not occurring, but whether it is overfished is unknown, and thus, did not exhibit long-term viability.
- 6 stocks: status unknown, and thus, by definition, cannot be said to exhibit long-term viability.

(T. 1284; P. Ex. 24, p. 11; P. Ex. 25).

61. As Dr. Daniel summarized, after nearly 30 years of management under the FRA, and across 13 state-managed stocks, "we haven't got a success . . . and we haven't rebuilt any stocks." (T. 1291). Dr. Daniel's expert conclusions, including that the State has failed to rebuild a single historically overfished stock back to long-term viability since the FRA was enacted, were entirely unrebutted. (T. 1291).

2. Further confirming their lack of long-term viability, multiple state-managed stocks show significant age truncation.

62. Dr. Daniel and Dr. Powers both gave uncontroverted testimony that the single most important data set for assessing long-term viability is age composition. (P. Ex. 216, pp. 9–10; T. 1246–47). Age truncation—a lack of expected older fish in the population curve—signals a lack of long-term viability. (T. 1605). This is in large part because older females in a fish population produce disproportionately more viable eggs, and thus, are critical to long-term viability. (P. Ex. 216, p. 9; T. 1604, 1248).

63. As Dr. Powers testified, having a healthy age structure, especially older-class females, is critical to hedging against the unknowns and risk in fisheries management. (T. 1677–78). As Dr. Powers explained, “the key to successful fisheries management . . . is making sure that you can take advantage of the good year” by “[making] sure that you have enough spawning stock biomass—or essentially reserves—that the fish population can produce enough eggs in that good year, where you can repopulate and advance and have a high recruitment,” which is why fisheries managers have a “responsibility to make sure that we’ve maintained that reserve so on those few good years we get, the population is sufficient to replenish itself.” (T. 1532–33).

64. In his report and testimony, Dr. Powers explained that if fish are harvested at too high a rate, the data will show that they are not “escaping” into those older age classes. (P. Ex. 216, pp. 9–10; T. 1604). The result is the lack of egg production expected with older class fish. (T. 1604). He further explained:

[T]he chances of an individual fish egg surviving to a juvenile fish and then surviving to a reproducible fish is infinitesimally small. So the more millions you can throw at it, the better the chance that that fish is going to replace itself as well as its partner. [I]f you don't have those older age classes, you're really dealing with very much lower probability.

(T. 1605–06).

65. In his report, Dr. Powers explained that once a stock population is materially reduced by recruitment overfishing—that is, harvest levels so high that the spawning stock cannot produce enough offspring to replace fish lost to harvest and natural mortality—the lack of potential recruits results in longer-term delays in rebuilding the population. (P. Ex. 216, p. 10). Crossing this critical threshold compounds other challenges the fishery might face (e.g., habitat loss, climate, or poor water quality) and makes recovery more difficult. (P. Ex. 216, p. 10). He further explained that recruitment overfishing means harvest at levels that cause the spawning stock population to decrease, losing egg capacity. (T. 1608). He described a tipping point where enough spawning stock has been lost, making any recovery take much longer. (T. 1607–09).

66. In these ways, age truncation is, as Dr. Powers explained, an indication of unsustainable harvest, and it can reveal threats to recovery and long-term viability if not reversed. (P. Ex. 216, pp. 9–10). For those same reasons, truncated fish stocks, by definition, lack long-term viability. (T. 1677–78). Dr. Daniel also agreed with these expert conclusions. (T. 1246–47).

67. As Dr. Daniel testified, multiple state-managed stocks in North Carolina show moderate to severe age truncation, including Atlantic croaker, river

herring, Southern flounder, spot, spotted seatrout, striped bass, and weakfish. (P. Ex. 216, p. 22; T. 1679). In his expert report, he summarized each species with species profiles that demonstrated the age truncation in all state-managed species except for red drum. (T. 1260; P. Ex. 211). Those species profiles are incorporated in the Court's findings in Section II.B.

68. Dr. Powers further noted that age truncation is likely occurring in other species, as well, given the "prevalent, risk-prone NC management strategies." (P. Ex. 216, p. 22; T. 1679). The degree of truncation in these populations is "considerably higher" than what would be expected even in a stock managed to the minimum 30% spawning potential ratio threshold—meaning that younger fish dominate the population while older, more fecund spawning fish that would naturally be present have been removed by excessive harvest.³ (P. Ex. 219, p. 3; T. 1679–80).

69. The State did not present any witness to rebut the conclusion that multiple state-managed stocks show significant age truncation, further confirming their lack of long-term viability.

3. Multiple state-managed stocks have collapsed or are collapsing.

70. Dr. Daniel also presented the results of his analysis on whether certain fish stocks in North Carolina meet a published definition for determining that a

³ The degree of truncation in a number of historically important stocks is addressed below in Section II.A.2.

stock has “collapsed,” or, in Dr. Daniel’s opinion based on that definition of “collapsed,” that a stock is “collapsing.” (P. Ex. 36; T. 1219–31). The criteria he used for whether a stock has “collapsed” were derived from a 2011 peer-reviewed article published in Proceedings of the National Academy of Sciences. (P. Ex. 36, p. 1; T. 1220). Under those criteria, a stock has “collapsed” if, for two consecutive years, commercial landings fell below 10% of the average of the five highest years’ landings. (P. Ex. 36, p. 1; T. 1220).

71. Applying these criteria to North Carolina’s 13 state-managed stocks, Dr. Daniel concluded that 7 of 13 of them—including 4 shellfish stocks (bay scallop, blue crab, Eastern oyster, and hard clam) and 3 finfish stocks (estuarine striped bass, river herring, and Southern flounder)—had “collapsed” or were “collapsing” under state management, and that of the remaining 6 stocks, 2 were “depressed” (spotted seatrout and striped mullet), 3 were “unknown” because of lack of data (kingfishes, sheepshead, and shrimp), and only 1, red drum, was “recovering.” (P. Ex. 36, pp. 2–3).

72. Dr. Daniel also conducted the same analysis of landings data for Atlantic croaker, spot, and weakfish, which, although regionally managed (rather than managed under a state FMP), were historically “incredibly valuable” fisheries in North Carolina—important to both fishing heritage and the ecosystem. (P. Ex. 211, pp. 59–61; T. 1220–22). As Dr. Daniel testified, the data shows that all three of those species meet the criteria for being classified as “collapsed.” (P. Ex. 36, pp. 1–2, 4–7; T. 1229–31).

73. The State did not attempt to refute Dr. Daniel's conclusions. Instead, when the State was asked by interrogatory what species managed under State FMPs meet the definition of "collapsed," the State responded that "DMF does not use the term 'collapsed' regarding marine fisheries management," and "[t]herefore, the State does not apply Dr. Daniel's definition or any other definition of 'collapsed.'" (P. Ex. 207). Notably, the State did not contend that it was improper to make such an assessment, only that it would not engage in such an exercise.

B. Coastal fish stocks that are historically significant to the general public lack long-term viability.

74. Along with the 13 stocks managed under State FMPs, there are a number of other coastal fish stocks that are historically significant to the average North Carolinian who harvests fish. These include species like spot and Atlantic croaker, which Dr. Powers testified were fairly easy to catch with a variety of gears and baits. (T. 1636; P. Ex. 216, p. 5).

75. Although all fish species contribute to ecosystem health, not all fish are equal to the average North Carolinian who harvests fish, and certain fish stocks found in estuarine or near-shore waters have been especially significant. (T. 398). Mr. Mumford, when asked "are all fish equal to the angler in terms of the value" responded: "Absolutely not. Not even close." (T. 398). Ms. Fox, who fishes for sustenance and depends on fish for protein, described how the species, size, and quality of a fish are of the utmost importance to her, because she needs fish that are large enough to filet and are good for eating. (T. 2099–100). When asked whether a

three-inch lizardfish is the same to her as a 24-inch trout, Ms. Fox testified: “I don’t know a soul that eats a lizardfish.” (T. 2101).

76. Today, the harvest for the shore-based angler is likely to consist of lizardfish, pinfish, pigfish, and small sharks—a dramatic decline in quality from historically available species like spot, Atlantic croaker, Southern flounder, striped bass, weakfish, blue crab, and river herring, which have historically been the backbone of personal-use harvest in North Carolina, representing both cultural heritage and a source of sustenance. (P. Ex. 211, pp. 60–61). As noted above, witnesses including Mr. Hardison, Mr. Albea, Mr. Jernigan, Mr. Sasser, and Mr. Mumford testified to the cultural significance of these species to their families and communities over generations. *See* Section I.A.

77. As Dr. Daniel described in his report, and as his species profiles reflect, the species abundances of most fish historically important to the general public in North Carolina have declined dramatically in the last 40 years. (P. Ex. 211, p. 60). His findings confirmed that many finfish and shellfish populations are at historic low levels of abundance. (P. Ex. 216; T. 1636–38). In particular, Atlantic croaker, spot, and weakfish—species historically important to the general public in North Carolina—are all either “collapsed” or “collapsing.” (P. Ex. 36, pp. 4–7; T. 1220–22, 1229–31).

78. Based on the unrebutted conclusions from Dr. Daniel’s species profiles (P. Ex. 211), the unrebutted conclusions from Dr. Powers’ trends analysis (P. Ex. 216), and the corroborating testimony of fact witnesses who observed these declines

firsthand, the Court has made specific findings below as to each historically significant species. Although the health of those historically significant fish species varies somewhat, the ultimate conclusion is that not a single one of them exhibits long-term viability. (P. Ex. 211; T. 1246–57, 1622–26).

1. Southern flounder

79. No estuarine stock in North Carolina carries a more storied reputation among anglers than Southern flounder. (P. Ex. 44). DMF estimated that recreational anglers made 132,842 trips targeting flounder in 2000 alone. (P. Ex. 44, p. 75). Mr. Mumford testified that for anglers targeting a specific stock, “without a doubt, flounder was the most popular answer I ever remember.” (T. 343). The recreational gig fishery for Southern flounder holds particular cultural significance for North Carolinians, and multiple witnesses described its importance to coastal communities. (T. 58–60 (Nifong); T. 526 (Hardison); T. 973–74 (Sasser); T. 1297 (Daniel)).

80. Southern flounder also supports one of the largest and most valuable commercial fisheries in the state. (P. Ex. 44, p. 1). From 1994 through 2003, it ranked as North Carolina’s most economically valuable commercial finfish species, averaging 3.6 million pounds and \$6.3 million per year. (P. Ex. 44, p. 1). North Carolina accounted for approximately 99% of annual U.S. South Atlantic coast commercial Southern flounder landings between 1978 and 2017. (P. Ex. 53, p. 20).

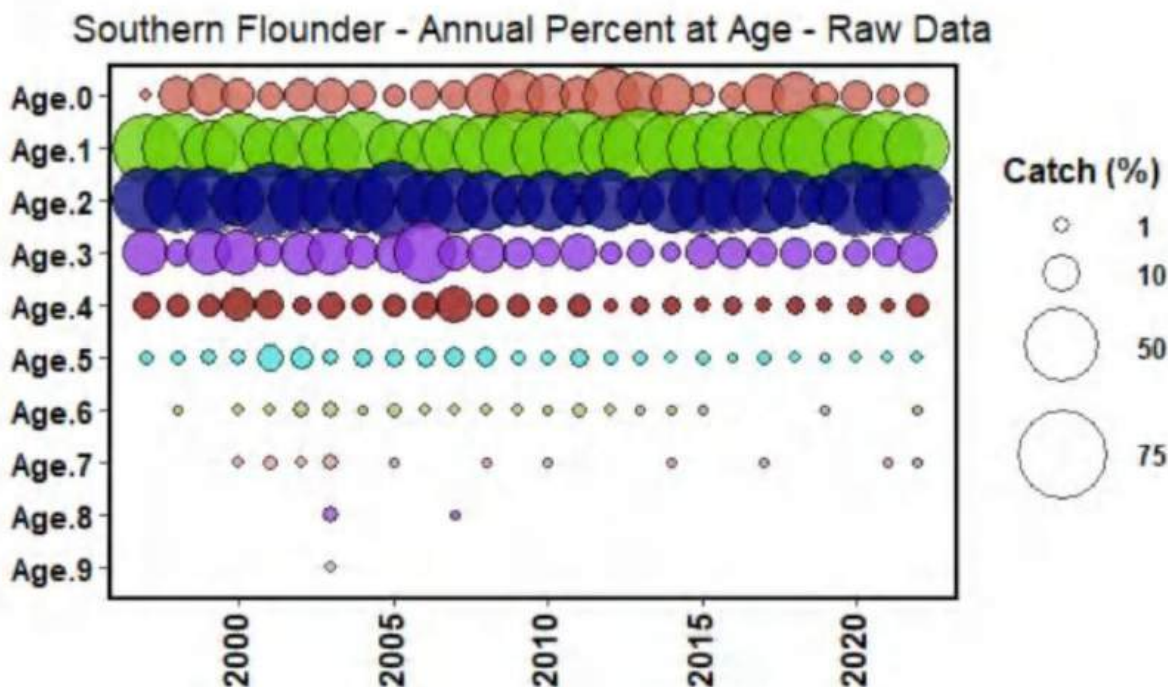
81. Today, Southern flounder lacks long-term viability. (P. Ex. 211, p. 47; T. 1465). Dr. Nifong testified that DMF assessed Southern flounder as “viable” only

once—in 1998—based on pre-FRA, 1997 data. (T. 1465). Successive stock assessments beginning in 2005 confirm that overfishing has been occurring since at least 1991. (T. 1217; P. Ex. 211, p. 10). The 2019 coast-wide stock assessment found the stock to be regionally overfished, with overfishing occurring, spawning stock biomass decreasing since 2006, and recruitment showing a generally declining trend. (P. Ex. 53, pp. 1, 10–11, 20).

82. As Dr. Powers testified, “the biological sampling stock assessments, all the fisheries independent indices, all create the same picture of a declining non-viable stock.” (T. 1646). He concluded that the stock is “unlikely to improve in the near future” because the decline is long-term and the State does not seem to have any plan to remedy that decline. (P. Ex. 216, p. 15; T. 1646). Dr. Daniel concluded that the data “clearly indicates a collapsing stock,” with commercial landings peaking in the mid-1990s at approximately 4 million pounds, and by 2022, commercial quota-driven landings falling to 0.36 million pounds—a 91.9% decline. (P. Ex. 211, pp. 71, 83).

83. The age structure of North Carolina’s Southern flounder population is similarly concerning. (P. Ex. 218, p. 074214; T. 1644). Dr. Daniel testified that Southern flounder live to approximately 9 years of age, but the North Carolina population now consists primarily of juvenile females, and individuals older than age 3 are uncommon to rare. (T. 1133; P. Ex. 211, p. 14). By 2022, of the 1,474 Southern flounder aged by DMF, 99% were fish age 4 and younger, with only 8 fish age 5 or older. (P. Ex. 211, p. 70). Because only 50% of female Southern flounder are

mature at the current minimum harvest size of 15 inches, most are removed from the stock before their first spawn, and second-year spawners are rare. (P. Ex. 211, pp. 70–71). Mr. Batsavage confirmed this evidence of age truncation: “We’ve seen age truncation over time for sure,” as well as “fewer older fish.” (T. 3629–30). An age structure graph presented by Dr. Powers at trial illustrated that age truncation is evident over the entire time series from 1994 to 2022:



(P. Ex. 218, p. 074214; T. 1644).

84. The management history of Southern flounder does not reflect attention to these biological warning signs. (P. Ex. 211, pp. 43–48; T. 1380–81). For example, Mr. Loeffler testified that when the original 2005 FMP was adopted, the North Carolina Southern flounder spawning stock biomass was estimated at just 5.4% of an unfished stock under the then-current rate of fishing mortality. (T. 2275–

76). The MFC nevertheless rejected DMF's recommended harvest reductions. (T. 1380–81). DMF recommended a 33% harvest reduction, which would have required closing the fishery by early November, but at an MFC meeting in Ocracoke—"with a roomful of commercial Southern flounder fishermen"—the commission instead voted for a December closure that "resulted in no reduction in harvest," as "most of the time the fish had already moved offshore and the fishery was no longer operating in December." (T. 1380–81).

85. For his part, Mr. Loeffler confirmed that the early harvest reductions under the 2005 plan were only 17%—below even the 20% threshold that the science indicated was the absolute minimum to begin rebuilding—and that "the actions that the commission chose to select for management at that time did not meet the threshold." (T. 2261). Mr. Loeffler further testified that commercial fishermen in 2005 harvested 86% of Southern flounder while recreational anglers harvested just 14%, yet the 2005 FMP as implemented reduced commercial harvest by only 15% while cutting recreational harvest by 30%. (T. 2283).

86. Recreational availability under current FRA management has been drastically curtailed compared to other states: Dr. Daniel testified that South Carolina allows 10 fish per day year-round and Georgia allows 15, while North Carolina limits anglers to 1 fish per day. (T. 1306–07). Mr. Loeffler acknowledged that the public angler creel limit for Southern flounder decreased from 8 fish per day year-round to 1 fish per day for one week of the year, and that no recreational

harvest season existed in 2024, but meanwhile, a 2024 commercial harvest season remained. (T. 2256–57).

87. Dr. Powers attributes the decline of Southern flounder to “uncontrolled and poorly characterized landings and effort in the commercial fishery, bycatch and high discard mortality from North Carolina gillnet fisheries, and unaccounted-for bycatch in the estuarine shrimp trawl and crab pot fisheries.” (P. Ex. 216, p. 15). Dr. Daniel testified that North Carolina commercial harvest drove the stock’s overharvest, accounting for 85% of coast-wide fishing mortality. (T. 1384). Notably, DMF failed to implement a commercial quota until 2022. (T. 2262–63).

88. The bycatch problem for Southern flounder is substantial. (P. Ex. 212, p. 10; P. Ex. 211, pp. 9–10). Dr. Daniel notes that Southern flounder discards and catches in the commercial gig, pound net, crab trawl, crab pot, gill net, and shrimp trawl fisheries may exceed the entire commercial harvest quota under current management restrictions. (P. Ex. 212, p. 10; P. Ex. 211, pp. 9–10). Shrimp trawl bycatch of Southern flounder during 2013 and 2014 may have been as much as 150,000 to 200,000 pounds. (P. Ex. 211, pp. 9–10). Mr. Loeffler conceded that bycatch of Southern flounder in estuarine shrimp trawls was not taken into account for management of that stock until 2019, and that crab pot bycatch mortality of Southern flounder has never been considered by DMF. (T. 2293).

89. Mr. Batsavage corroborated these failings: He admitted under cross-examination that the State’s management of Southern flounder amounted to “ineffective management” in the face of data that was “really clear,” “missed

opportunities,” and the failure to take “aggressive management” steps until 2019, after “20 years of documented decline.”⁴ (T. 3630–31, 3633). As Dr. Daniel explained, given the unresolved bycatch issues in relation to the commercial quota referenced above, it is now doubtful that the State can reach a sustainable harvest on the (reset) deadline of 2028. (T. 1576–77; see also T. 1384–85; P. Ex. 211, pp. 13–14, 47).

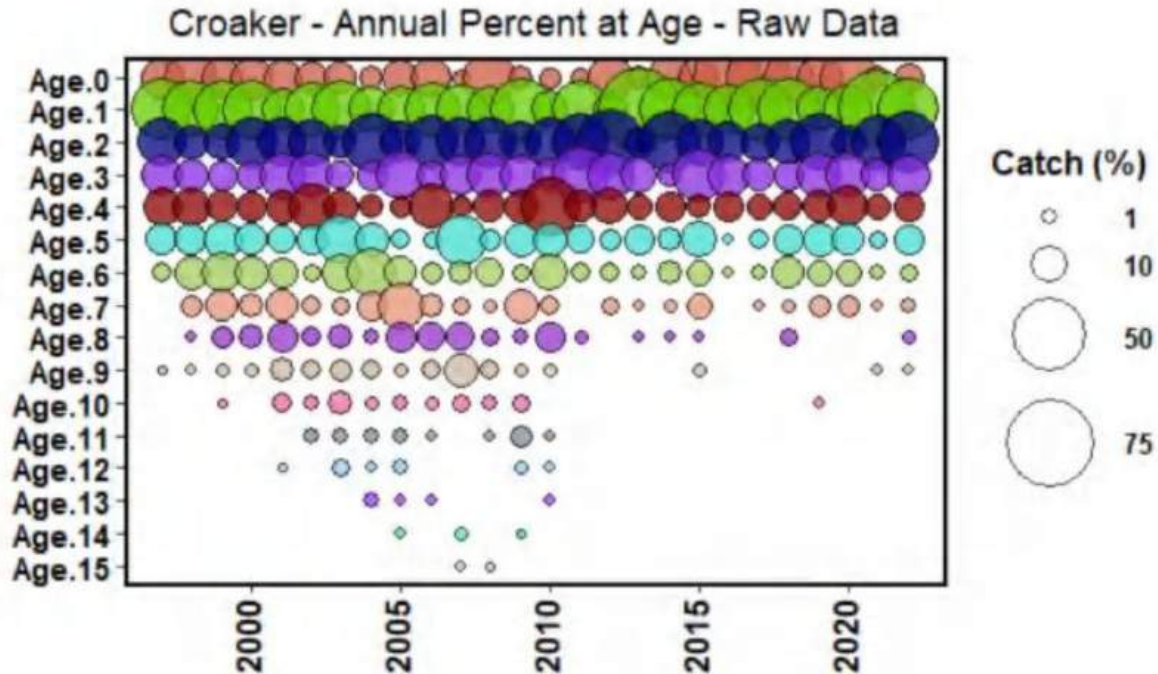
2. Atlantic croaker

90. Atlantic croaker has historically been an important fishery for the general public. (P. Ex. 211, pp. 34–35; P. Ex. 211, Appendix 1, p. 1). Atlantic croaker is “highly sought after by shore (beaches, banks and bridges) and pier anglers because they are easy to catch via hook-and-line, historically making them widely available to subsistence fishermen.” (P. Ex. 211, Appendix 1, p. 1). Numerous witnesses testified as to Atlantic croaker’s historic importance as a target for citizens seeking table-fare. (T. 439–40 (Mumford); T. 528–29 (Hardison); T. 564 (Albea); T. 971–72 (Sasser); T. 2105–07 (Fox)). Atlantic croaker was also once “a ubiquitous component” of commercial fisheries. (P. Ex. 211, Appendix 1, p. 1).

⁴ Although the State points to some recent increases in the spawning stock biomass, age, and length structure of Southern flounder (State’s Proposed Findings ¶ 276) (hereinafter “SPF”), that overlooks the means by which those increases have been achieved: draconian harvest restrictions of 72% since 2020 that have prohibited average citizens from harvesting Southern flounder except for a quota-constrained week or two per year with a bag limit of one-fish per day, or in the case of 2024, prevented them from harvesting Southern flounder at all—all because of the State’s “ineffective management” over the course of more than two decades. (D. Ex. 8, p. 2; P. Ex. 56, p. 2; T. 735; T. 3630–31, 3633).

91. Today, Atlantic croaker lacks long-term viability. (P. Ex. 211, pp. 35–36; T. 1464). From 1998 through 2016, DMF determined that the Atlantic croaker stock was viable in only 5 of 19 management years and has not assessed it as viable since 2008. (T. 1464). As Dr. Daniel concluded, the Atlantic croaker stock has “now collapsed.” (T. 1231; P. Ex. 211, pp. 49–51). Recent data indicates that commercial harvest once peaked at 14,429,197 pounds in 2003—many multiples of the 249,468 pounds commercially harvested in 2023 (the lowest since 1994). (D. Ex. 52, p. 5). Meanwhile, recreational landings decreased from a peak of approximately 1.7 million pounds in 1989 to 0.21 million pounds or less—a decrease of at least 84%. (P. Ex. 211, Appendix 1, pp. 2–3).

The evidence also showed “severe age truncation” for Atlantic croaker (T. 1634), and that the degree of age truncation, by itself, indicates that the stock is “not viable long term.” (T. 1635). The historic maximum age of Atlantic croaker is age 17, but the current maximum age in North Carolina is only age 9, with very few fish older than age 6. (P. Ex. 211, Appendix 1, p. 1). This was reflected in an age structure graph that Dr. Powers presented at trial:



(P. Ex. 218, p. 074217).

92. As Dr. Powers testified, “high bycatch and discards” are the likely causes of this age truncation because “[c]roaker and spot are routinely caught in high numbers in shrimp trawls and most of that catch is discarded with a high mortality rate.” (T. 1636). Dr. Daniel noted that “Atlantic croaker are the most abundant species taken in the shrimp trawl fishery, including shrimp,” and that the “shrimp trawl bycatch of Atlantic croaker in North Carolina estuaries greatly exceeds all known, coast-wide, commercial and recreational landings of Atlantic croaker combined.” (P. Ex. 211, pp. 36–37). As described more fully below in Section IV.C.1.c, Dr. Daniel calculated that in a single year alone, approximately 250 million Atlantic croaker have been harvested by estuarine shrimp trawlers as bycatch. (T. 1332–34).

93. Despite the historic importance of Atlantic croaker to North Carolinians and the unique issue of estuarine shrimp trawl bycatch in North Carolina, the State has declined to prepare a North Carolina Atlantic Croaker FMP, deferring management instead to the generic ASMFC interjurisdictional plan. (T. 131; P. Ex. 211, p. 48).

3. Spot

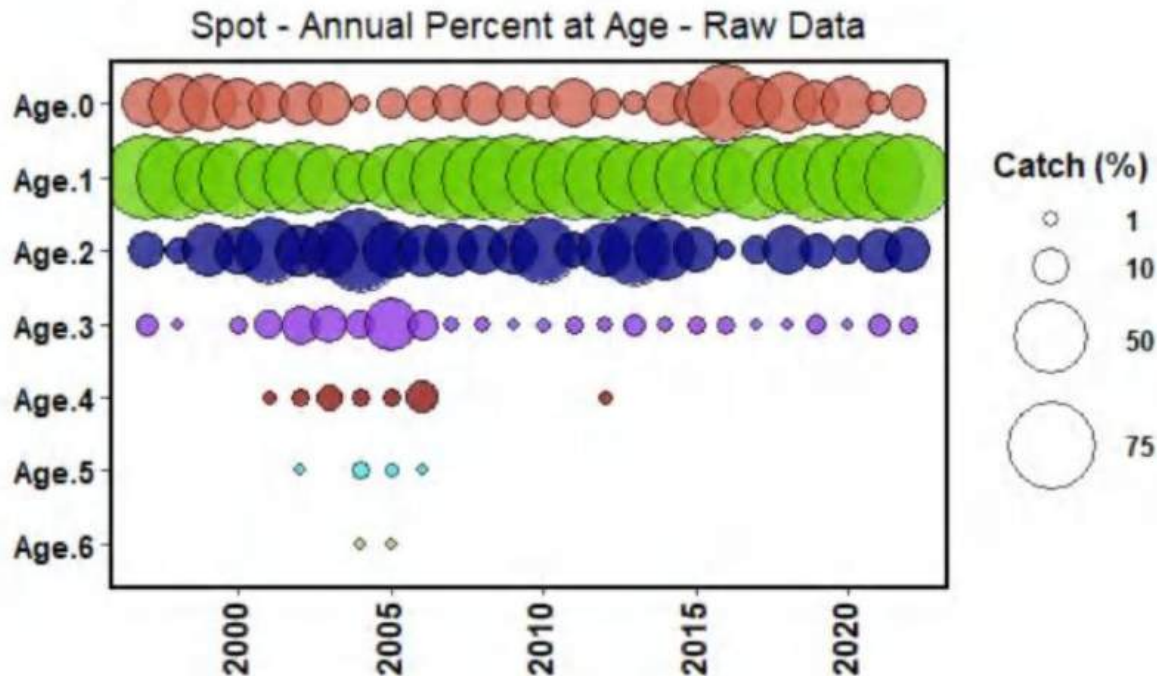
94. Spot is a recreational fishery of historic, special importance to North Carolinians. (T. 67–70). Dr. Nifong testified that in the 1950s and 1960s, “spot was a big deal in southeastern North Carolina,” and the “annual pilgrimage” of inland North Carolinians to the coast to fish for spot in the fall was a “cultural ritual” that transcended differences among North Carolinians, including race, age, and backgrounds. (T. 67–70). Multiple witnesses confirmed this cultural history. (T. 327 (Mumford); T. 548, 567–68 (Albea); T. 710 (Jernigan); T. 972 (Sasser)).

95. Dr. Daniel testified that spot was “incredibly valuable” to both the recreational and commercial fisheries—a “[c]ritically valuable, important [part] of the culture heritage and history and ecosystem of North Carolina.” (T. 1222). Dr. Powers testified that spot is particularly important because of its accessibility to citizens, as it can be caught from shore or boat, and can be harvested by anyone from age 2 to age 80. (T. 1615, 1620). Ecologically, spot is also one of the most important estuarine species because it serves as a foundational species in the food chain. (T. 1257–58). Spot were historically also a backbone of North Carolina’s

inshore commercial fisheries, with peak annual commercial landings averaging approximately 5 million pounds in the late 1970s. (P. Ex. 211, pp. 48, 73).

96. Today, spot lacks long-term viability. (P. Ex. 211, p. 72; P. Ex. 216, p. 10; T. 1624). Dr. Nifong testified that from 1998 through 2016, DMF determined that spot was viable in 9 of 19 management years, last assessing it as viable in 2006. (T. 1464–65). As Dr. Daniel testified, the spot fishery in North Carolina has “collapsed.” (T. 1231; P. Ex. 211, p. 72). Commercial landings of spot peaked at a three-year average of 7.5 million pounds in the late 1970s, but by 2018 had declined to 0.17 million pounds—a 98% decline. (T. 1231; P. Ex. 211, p. 72). Meanwhile, recreational landings declined from a peak of 4.5 million pounds to 0.37 million pounds in 2022—a 92% decline. (P. Ex. 211, p. 72). The State’s expert, Mr. Batsavage, confirmed that spot is “a stock that is in decline” and “a stock whose long-term viability as a fishery is in question.” (T. 3615–16).

97. Spot also shows “quite severe” age truncation. (P. Ex. 211, p. 73; T. 1617). Dr. Daniel notes that the historic maximum age of spot is age 6, but the current maximum age in North Carolina is only age 3, and that in 2022, the predominant age classes were ages 0 and 1, with few fish ages 2 or 3. (P. Ex. 211, p. 73). This is critical for spot, because females do not reach full reproductive maturity until age 3. (P. Ex. 211, p. 73). As Dr. Powers’ analysis found, before 2005, older age fish were present, but currently there are no fish ages 4 through 6 in the population. (T. 1616; P. Ex. 216, p. 10). This was reflected in an age structure graph that Dr. Powers presented at trial:



(P. Ex. 218, p. 074215). Dr. Powers testified that this age truncation in spot indicates that the stock is “not going to recover any time soon.” (T. 1617).

98. Dr. Powers opined that the “likely causes of [spot’s] decline are high bycatch mortality in shrimp trawls and in gillnet fisheries,” but “assessment of stocks in this regard is limited, because the State has not quantified the degree of this bycatch mortality.” (P. Ex. 216, p. 11). Dr. Daniel noted that bycatch of spot in the estuarine shrimp trawl fishery is the largest source of spot fishing mortality in North Carolina, and that shrimp trawl bycatch of spot exceeds all other sources of mortality combined, yet DMF does not estimate the annual magnitude of that mortality. (P. Ex. 211, p. 73; P. Ex. 212, p. 12). Moreover, because spot is a “generalist” in an ecological context, with broad environmental tolerance, the species should show resilience to any issues of habitat loss and climate change—

that is, a decline is all the more indicative of management failure. (P. Ex. 216, p. 11).

99. As described above with respect to Atlantic croaker, despite the historic importance of spot to North Carolinians and the unique issue of estuarine shrimp trawl bycatch in North Carolina, the State has declined to prepare a North Carolina FMP for spot, deferring management instead to the generic ASMFC interjurisdictional plan. (T. 131; P. Ex. 211, p. 48).

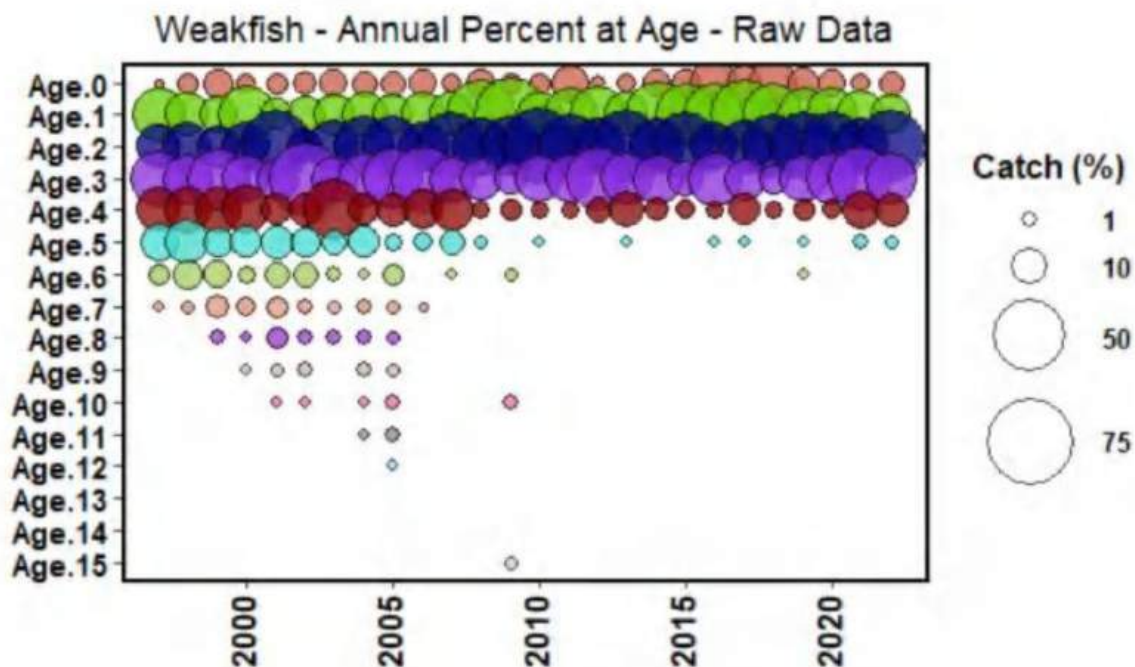
4. Weakfish

100. Weakfish, like Atlantic croaker and spot, has long been “[c]ritically valuable, important [to the] cultural heritage and history and ecosystem of North Carolina.” (T. 1222; T. 970–71). In the 1970s, there was a “tremendous fishery” for weakfish in the Pamlico Sound, where it was not unusual for an angler fishing from a boat to catch 15 to 40 fish in a day. (T. 966–68). Weakfish has also long been a major component of inshore commercial fisheries. (T. 1222).

101. Today, weakfish lacks long-term viability, and it meets the criteria for a “collapsed” fishery. (P. Ex. 211, pp. 54–56; P. Ex. 36, pp. 4–7; P. Ex. 216, p. 19; T. 1229–31). Since the FRA’s enactment, weakfish has experienced “decades-long declines.” (P. Ex. 216, pp. 19–21; T. 1636–38). Since 1997, commercial harvest has declined by 98%. (P. Ex. 39; T. 376–78; P. Ex. 211, Appendix 1, pp. 78, 87). Meanwhile, recreational landings fell to their lowest year on record in 2019. (P. Ex. 211, Appendix 1, p. 78). From 1998 through 2016, DMF determined that weakfish was viable in only 4 of 19 management years, with the last viable assessment

occurring in 2004. (T. 1465). This means that even before 2004, weakfish were likely not viable, because as Dr. Powers explained, if a stock's viability status fluctuates over a time series, that means it is not exhibiting long-term viability. (T. 1623–24).

102. Weakfish shows severe age truncation. (T. 1660; P. Ex. 218, p. 074216). The historic maximum age of weakfish is 17, but the current maximum age observed in North Carolina is only 5. (P. Ex. 211, p. 77). In 2022, the predominant age classes observed were ages 1 and 2, with greater than 99% of weakfish aged being less than 5 years old. (P. Ex. 211, p. 77). Dr. Powers testified that the degree of age truncation seen in weakfish is “[p]retty severe” (T. 1660), as reflected in an age structure graph that he presented at trial:



(P. Ex. 218, p. 074216).

103. Atlantic croaker and weakfish share the same historic maximum age of 17, and therefore, Dr. Powers' testimony concerning the critical importance of older age classes for Atlantic croaker applies to weakfish as well. (P. Ex. 211, pp. 63, 77).

104. As Dr. Daniel explained, the largest source of weakfish mortality in North Carolina is the bycatch of weakfish from estuarine shrimp trawling—a recurring loss of millions of pre-recruit and older juvenile weakfish that, as Dr. Daniel concluded, “is a loss the weakfish stock cannot withstand.” (P. Ex. 211, p. 78; P. Ex. 212, p. 2). Weakfish ranks among the top three species taken as juvenile finfish bycatch in North Carolina's estuarine shrimp trawls (T. 3624), and a 2016 DMF study confirmed that at-net mortality for weakfish from these trawls is 100%. (P. Ex. 101, p. 21; P. Ex. 104, p. ii).

105. Mr. Batsavage acknowledged, as he did for Atlantic croaker and spot, that management “improvements are needed,” and that “something needs to happen to get these fish back to an abundance that was seen historically.” (T. 3621–22).

106. As described above with respect to Atlantic croaker and spot, despite the historic importance of weakfish to North Carolinians and the unique issue of estuarine shrimp trawl bycatch in North Carolina, the State has declined to prepare a North Carolina FMP for weakfish, deferring management instead to the generic ASMFC interjurisdictional plan. (P. Ex. 211, p. 54).

5. River herring

107. River herring is believed to be the State's oldest fishery, both as a sustenance fishery and a commercial fishery. (T. 177). The original 2000 River Herring FMP notes that river herring "[f]ishing served largely subsistence, rather than commercial, purposes in colonial times," and that "[h]istorically, river herring have been taken for personal consumption in every major North Carolina coastal river system." (P. Ex. 41, pp. 50, 62). Dr. Nifong testified that this sustenance tradition persisted well into the twentieth century, with annual spring spawning runs supporting cultural celebrations by local citizens, including a festival in Jamesville that dates back to the late 1940s. (T. 177–78). Dr. Daniel concurred: "The river herring fishery in North Carolina was a historic and cultural icon. The spring runs of river herring were legendary." (P. Ex. 211, p. 58). Annual commercial landings were historically as high as 20 million pounds and remained at 12 to 14 million pounds for almost a century. (T. 177–79, 3489).

108. Today, river herring lacks long-term viability. (P. Ex. 211, p. 58). Dr. Nifong testified that the stock⁵ was found not viable in each of the 20 management years from 1998 through 2017. (T. 1465). A complete harvest moratorium has been in place since 2007, and yet the stock remains overfished. (P. Ex. 211, p. 58). Dr. Daniel testified that "the stock languishes at low levels to this day, and recovery to long-term viability may never occur." (P. Ex. 211, p. 58). Annual commercial

⁵ North Carolina's river herring stock is comprised of two species: blueback herring and alewife. (P. Ex. 41, p. 1 (Executive Summary)).

landings fell from a 1970s three-year average of 9.2 million pounds to approximately 110,000 pounds—a decline of more than 99%. (P. Ex. 211, p. 58; T. 3489).

109. Dr. Daniel identified a core reason for the collapse: The modern North Carolina commercial river herring fishery was primarily a “roe fishery”—a fishery in which spawning females are harvested for their eggs, rather than for table fare. (P. Ex. 211, p. 58). As he put it, “the fishery harvested the roe females and extracted the eggs before they could spawn and replace themselves.” (P. Ex. 211, p. 58). He also noted that the damage caused by river herring’s collapse extended beyond river herring itself because it was the preferred bait for many hook-and-line fishermen. (P. Ex. 211, p. 58; T. 375). In addition, multiple witnesses, including DMF’s expert on river herring, Charlton Godwin, testified about the importance of river herring as a primary food source for striped bass and many other species in the ecosystem. (T. 3548, 375, 810).

6. Estuarine striped bass

110. Estuarine striped bass has deep historical roots in North Carolina. (P. Ex. 61, p. 88). Fishing for estuarine striped bass can be traced back to Native Americans and early colonists, who fished the species for subsistence. (P. Ex. 61, p. 88). Much later, with the advent of outboard motors, “anglers began to seek striped bass with hook and line for both subsistence and recreation.” (P. Ex. 61, p. 88). Mr. Godwin, the State’s expert on striped bass, testified that striped bass are

highly prized fish for table fare and angling along the entire East coast. (T. 3485, 3512).

111. In the 1990s, a “tremendous increase in recreational effort for striped bass occurred.” (P. Ex. 61, p. 88). Mr. Mumford testified that when surveying recreational anglers as a DMF employee, “striped bass” ranked among the top four targeted species year in and year out. (T. 342–43). As to its commercial significance, the Albemarle Sound area striped bass fishery dates back to the 1870s and historically supported the largest year-round commercial fishery in the state. (P. Ex. 61, p. 8).

112. Today, estuarine striped bass lacks long-term viability. (P. Ex. 211, pp. 59–60; D. Ex. 180, p. iv; T. 3538). The Albemarle Sound-Roanoke River (“A-R”) estuarine striped bass stock was not viable from 2014 through 2017, and the Central/Southern Management Area estuarine striped bass stock (“CSMA,” which includes the Tar-Pamlico, Neuse, and Cape Fear rivers) was never assessed as viable in any year. (P. Ex. 24, pp. 93–150). Since January 2024, the species has been under a total harvest moratorium because of stock depletion. (D. Ex. 180, p. iv; T. 3538). Stock assessments of the A-R stock conducted in 2020 and 2022 showed the stock was overfished, with overfishing occurring. (P. Ex. 67, p. 1; P. Ex. 25, pp. 89–90; D. Ex. 187, p. 2; D. Ex. 182, p. 6). As Dr. Daniel noted, the stock has “collapsed.” (T. 1287; P. Ex. 36).

113. The status of the A-R estuarine striped bass stock has been cyclic, with improvements realized in the 1990s only to be lost when DMF dramatically ramped

up commercial harvest pressure after 1997. (P. Ex. 61). Coast-wide stock declines in the 1970s and federal intervention led to joint management efforts by the MFC and the North Carolina Wildlife Commission (“WRC”) that included imposing an 80% harvest reduction in 1990, which was incorporated into a 1993 DMF-WRC joint FMP. (T. 3512, 3515; P. Ex. 60). The plan to rebuild the stock was successful. (T. 802–03). After the ASMFC declared the species recovered in 1997 under a total allowable catch of 98,000 pounds, however, DMF increased the commercial total allowable catch in 1998, 1999, 2000, and 2003—nearly tripling it to 275,000 pounds in just six years. (T. 3564–65; P. Ex. 61, p. 82). Under the 2004 Estuarine Striped Bass FMP, the total allowable catch was then set at 550,000 pounds—a nearly six-fold increase from the quota that had enabled the stock’s recovery in the 1990s. (P. Ex. 61). Then, as the State’s expert in striped bass management confirmed, there was a “gradual declining trend in abundance from between the mid-2000s to 2013.” (T. 3519).

7. Spotted seatrout

114. Spotted seatrout has historically been an important fishery for North Carolinians. (P. Ex. 211, pp. 51–53, Appendix 1, pp. 13–15; P. Ex. 79, p. 12). The State currently characterizes the fishery as “predominately a recreational fishery,” with data showing that since 2012, recreational landings have accounted for approximately 86% of total landings. (P. Ex. 79, p. 12). As Mr. Mumford testified, with so many other recreational fisheries in severe decline or collapse, spotted seatrout has become one of the last remaining targets for citizens harvesting fish for

personal use: “[I]f it wasn’t for spotted sea trout, we would basically have very, very little to fish on. Hundreds of thousands of anglers would be without a target species.” (T. 402). Mr. Albea referred to spotted seatrout as currently being the “[o]nly act in town” for recreational anglers. (T. 596).

115. Spotted seatrout is one of only two estuarine stocks that the State manages primarily as recreational fisheries (the other being red drum), and both are in better condition than most other managed stocks. (T. 1291, 1465). Nevertheless, spotted seatrout does not exhibit long-term viability. (D. Ex. 102, p. iv; P. Ex. 24). The most recent stock assessment in 2022 found that spotted seatrout was experiencing overfishing—by definition, not viable under DMF’s own criteria. (D. Ex. 102, p. iv; P. Ex. 24). In addition, Dr. Powers’ analysis showed some “degree of age truncation” in spotted seatrout. (T. 1653–54). He testified further that management intervention is “critically needed to prevent the fishery from dramatic decline.” (P. Ex. 216, p. 26).

116. For his part, the State’s expert on spotted seatrout, Jason Rock, admitted that overfishing of spotted seatrout is occurring and that it took six years from the 2022 stock assessment’s terminal year to adopt new management measures, allowing commercial and recreational harvest to increase during that delay. (T. 3339–40, 3344, 3347, 3428–29).

117. As Dr. Daniel’s testimony showed, the spotted seatrout fishery also illustrates a systemic flaw in the State’s management approach. (T. 1187–88). Dr. Daniel testified that the dramatic increase in commercial effort to harvest spotted

seatrout beginning in 2021 corresponded directly to the State’s restrictions on the commercial harvest of Southern flounder. (T. 1187–88). This dynamic “illustrates the failure of the State’s species-by-species management paradigm, that fails to account for cross-species effort displacement.” (P. Ex. 212, p. 11). Indeed, DMF’s stock assessment showed commercial landings of spotted seatrout doubled from 2019 to 2022. (P. Ex. 212, p. 11; T. 1187–88). As Dr. Stunz explained, this is a textbook example of “fishing down the food chain”—a well-recognized phenomenon in fisheries science whereby, after desirable species like flounder are depleted to “economic extinction,” commercial fishing effort predictably shifts to alternative target species, such as spotted seatrout. (T. 1814–18; P. Ex. 220, pp. 7–8). This dramatic spike in spotted seatrout catch per unit effort following the 2019 flounder restrictions amounted to, in Dr. Stunz’s words, “red arrows flashing”—the sign of a potential problem requiring close monitoring. (T. 1817–18).

118. Dr. Daniel also testified about the recent 2025 amendment to the spotted seatrout FMP, noting that an upper slot limit was applied to the recreational fishery, but not the commercial fishery. (T. 1189–90). As Dr. Daniel testified, it is unclear from the FMP why protecting the larger adult females that are caught recreationally with hook and line is any more or less important than doing so for the same fish caught with commercial gear. (T. 1189–90).

8. Red drum

119. Red drum has long been a mainstay for North Carolina’s public anglers. (P. Ex. 211, pp. 41–43, Appendix 1, pp. 6–8) (D. Ex. 157, p. 38). The bulk of

total landings come from recreational anglers, and recreational landings have historically exceeded commercial landings. (D. Ex. 157, p. 38). By comparison, red drum is a relatively unimportant commercial fishery (D. Ex. 157, p. 30), and unlike the vast majority of North Carolina's other estuarine stocks, red drum is managed primarily as a recreational fishery. (D. Ex. 158, p. ii). According to the original Red Drum FMP, recreational landings averaged 275,579 pounds and accounted for approximately 60% of the total red drum harvested between 1994 and 1998. (D. Ex. 157, p. 34). During that period, red drum ranked as a top targeted species for public anglers. (D. Ex. 157, p. 34).

120. Red drum cannot be said to exhibit long-term viability because it is unknown whether it is overfished. (T. 1285–86; P. Ex. 211, p. 4; P. Ex. 24, p. 9). It does, however, represent a relative management success, owing to regionwide measures imposed in the 1990s. (D. Ex. 157, pp. 19–20; D. Ex. 158, p. 2). Under strict harvest controls, the age truncation previously seen in the red drum population has been reversed. (T. 1657–58). Dr. Powers described red drum as “a model case for how effective management can work and ensure long-term stock viability” because harvest is limited to a slot in all fisheries, thereby preserving older female spawners. (P. Ex. 216, p. 17).

121. Dr. Daniel concurred, but noted that because red drum are so long-lived, “it will require additional time to fully expand the stock's age structure to its full potential.” (P. Ex. 211, p. 42). Dr. Daniel also noted that red drum benefits from a natural advantage over other estuarine species: They “are rarely encountered in

the estuarine shrimp trawl fishery, as their preferred juvenile habitat is outside the open sound areas in which the shrimp trawl fishery primarily operates.” (P. Ex. 211, p. 69).

9. Blue crab

122. Among North Carolina’s commercial fisheries, none has been larger or more economically significant in recent decades than blue crab. (P. Ex. 68, p. 15; P. Ex. 211, p. 38). As Dr. Powers explained, however, blue crab is more than a commercial commodity: Beyond its commercial value, blue crab “represent[s] a recreational opportunity for North Carolina citizen enjoyment and ability to obtain high-quality seafood.” (P. Ex. 216, p. 13). The original 1998 Blue Crab FMP acknowledged as much, stating that “[e]stimates of the recreational harvest of blue crabs in North Carolina are not available but are thought to be significant.” (P. Ex. 68, p. 18). Multiple witnesses testified about the historic importance of North Carolinians harvesting blue crab. (T. 69, 324, 530).

123. Today, blue crab lacks long-term viability. (P. Ex. 211, pp. 38–40; T. 1466). Dr. Nifong testified that for each of the 20 management years from 1998 through 2017, DMF assessed blue crab as lacking long-term viability. (T. 1466). Commercial landings plummeted from 60.4 million pounds in 1998 to 9.1 million pounds in 2022—the lowest harvest on record. (P. Ex. 211, pp. 38–40). Dr. Daniel characterized the fishery as “collapsed” and “a textbook failure of fisheries management.” (P. Ex. 211, pp. 38–40). Dr. Powers testified that the data show blue crab is “a non-viable stock, long-term.” (T. 1642). As Dr. Daniel concluded: “It is not

conceivable, nor biologically possible, that a population that has declined as significantly as blue crab and currently produces less than 80% of historic high landings only requires a 2% harvest reduction to restore the stock to long-term viability or sustainable harvest in any reasonable time period.” (P. Ex. 211, p. 40). Indeed, DMF’s 2018 benchmark stock assessment, which formed the basis for Amendment 3 to the Blue Crab FMP, concluded that blue crab was overfished and that overfishing was occurring. (T. 3414–15; P. Ex. 71, p. 1; P. Ex. 216, p. 14).

124. Despite blue crab’s importance to citizens, the State manages blue crab primarily as a commercial fishery, virtually ignoring recreational harvest. (T. 1483; P. Ex. 211, p. 40). For commercial crab fishermen, there is no pot limit, with the exception of a 150-pot-per-vessel limit in the Newport River. (T. 3311). As Dr. Daniel explained, this is because the MFC has “always bowed to the commercial fishing [industry] and refused to adopt a pot limit.” (P. Ex. 211, p. 39). In 2015, the number of crab pots estimated in use reached as high as 16.4 million. (P. Ex. 211, p. 39).

125. The State’s witnesses only confirmed the management failures on blue crab, including that the State’s management of blue crab “had not been cautionary enough” for the better part of two decades, that the 2018 stock assessment found blue crab to be overfished with overfishing occurring, that despite these findings blue crab is still being managed to MSY, and that urgently needed action has been delayed multiple times by the MFC Chair for reasons known only to him. (T. 2329, 3320, 3331, 3415, 3424–26, 3437–38; P. Ex. 72, 73).

10. Bay Scallop

126. Bay scallops have sustained coastal North Carolinians since prehistoric times, when they were fished for subsistence. (D. Ex. 134, p. 35). A 1991 U.S. Fish and Wildlife Service survey estimated that 129,973 shellfishermen expended 1,009,000 days shellfishing in North Carolina in 1985, and that more than one million trips to harvest shellfish occurred in 1991. (P. Ex. 80, p. 67). DMF's bay scallop plan underscores the fishery's seasonal importance: "The bay scallop fishery . . . occurs in the winter months when few other fisheries exist[.] Throughout the 1970s and 1980s, fishermen . . . depended on bay scallops to buy Christmas presents and pay bills during December and January when finfishing and shrimp trawling was over." (D. Ex. 134, p. 39). In 1928, North Carolina led the nation in scallop production, and bay scallop landings peaked at approximately 1.4 million pounds of meat. (D. Ex. 137, p. 4).

127. Today, bay scallop lacks long-term viability. (P. Ex. 211, p. 82; T. 1466). Dr. Nifong testified that the stock was assessed as viable only in 1998 and 1999. (T. 1466). As Dr. Daniel noted, the stock has "collapsed." (P. Ex. 211, p. 82). Ms. Moore, the State's expert on bivalves, admitted that DMF's "statutory obligation [to ensure sustainable harvest] hasn't been met." (T. 3147). Ms. Moore also confirmed that bay scallop landings are at "less than one tenth of 1 percent of historic levels," with commercial landings at "essentially zero." (T. 3167). She acknowledged that "even when the season opens," DMF shows "no record of anybody catching anything," and that when the State opened the season in 2021, "there were no commercial harvest landings recorded" at all. (T. 3156, 3167).

128. Ms. Moore also conceded that DMF has never conducted a stock assessment for bay scallops. (T. 3105, 3154). Without such an assessment, DMF does not know whether bay scallops are overfished or whether overfishing is occurring. (T. 3106). Ultimately, she confirmed that there is not even a rebuilding plan for bay scallops because, as she put it, there is “no measure to build to.” (T. 3160, 3166).

11. Hard Clam

129. Hard clam, like the other bivalves, has long been a part of coastal North Carolinians’ diet and livelihood. (T. 72–73). Dr. Nifong testified that he and other citizens routinely harvested hard clam growing up in southeastern North Carolina. (T. 72–73). Despite its long-standing importance to citizens, the State manages hard clam primarily as a commercial fishery. (P. Ex. 82, p. 52). The commercial fishery has existed since the 1880s, and the highest annual economic value of commercial clam landings peaked at \$8.4 million in 1989. (P. Ex. 82, pp. 32–33, 53).

130. Today, hard clam lacks long-term viability. (P. Ex. 211, p. 82; T. 1466). Dr. Nifong testified that the stock was never assessed as viable in any year during the 20-year period from 1998 through 2017. (T. 1466). Landings have declined approximately 84% from historical highs, and stock status remains “unknown” because DMF lacks a stock assessment. (T. 3159–62). The 2001 Hard Clam FMP states: “Little data are collected on the recreational harvest of shellfish in general

and none is collected on the recreational harvest of hard clams specifically.” (P. Ex. 82, p. 52). As Dr. Daniel noted, the stock is “collapsing.” (T. 1223; P. Ex. 36).

131. As with bay scallop, Ms. Moore conceded that DMF has failed to meet its statutory obligation to ensure sustainable harvest for hard clam. (T. 3147, 3165–66). She further confirmed that DMF does not know whether hard clams are overfished, does not know whether overfishing is occurring, and cannot calculate sustainable harvest levels. (T. 3158–59). She admitted that the fishery-independent sampling for hard clams is “limited to Core Sound” and “has spatial limitations that apply to the entire population”—meaning the State’s data does not even cover the full range of the species. (T. 3161–62).

132. When asked about the hard clam FMP’s acknowledgment that the species is “currently considered overfished” and “experiencing overfishing,” Ms. Moore responded that “we have no stock assessment to determine whether that is correct.” (T. 3159–60). Despite this uncertainty, she confirmed that landings have fallen to approximately 16 percent of their historic peak, declining from 30.7 million clams to 4.9 million clams. (T. 3160–61). Ultimately, as with bay scallops, Ms. Moore admitted that no rebuilding plan exists for hard clam because DMF has “no measure to build to.” (T. 3160).

12. Eastern Oyster

133. Eastern oyster is historically important to North Carolina citizens both culturally and economically. (T. 1505, 1669). It has been “a critical protein source for coastal residents” where “subsistence harvest of that species by North

Carolínians has a long and rich cultural history.” (P. Ex. 211, pp. 57–58). Beyond food, oyster reefs also perform critical ecosystem functions: They filter pollutants, enhance estuarine water quality, stabilize shorelines, and provide habitat for many fish species—including many collapsed stocks. (P. Ex. 211, pp. 57–58). In 1902, North Carolina commercial oyster landings reached their highest level at 1.8 million bushels. (P. Ex. 80, p. 31).

134. Today, Eastern oyster lacks long-term viability. (P. Ex. 211, pp. 57–58; T. 1466). Dr. Nifong testified that the stock was never assessed as viable in any year during the 20-year period from 1998 through 2017. (T. 1466). As Dr. Daniel noted, the stock has “collapsed.” (T. 1287; P. Ex. 36). Ms. Moore confirmed that current, public-bottom oyster landings are 97% lower than the historic high, and that the 2022 stock status is “unknown but in decline.” (T. 3147–48).

135. Ms. Moore further confirmed that DMF has no stock assessment for Eastern oyster. (T. 3143). Without such an assessment, she acknowledged that DMF does not know whether Eastern oysters are currently overfished, does not know the current population biomass, and does not know “the rate at which oysters are being removed.” (T. 3144). She also confirmed that DMF’s management strategy for Eastern oyster in its original plan was to allow commercial harvest “to continue at current catch and trip limits without a harvest cap until available data indicate a change in harvest policy is necessary,” even though DMF lacks the stock assessment data to determine whether such a change is needed. (T. 3149–50).

136. As with bay scallop and hard clam, Ms. Moore conceded that DMF has “publicly admitted that its statutory obligation [to ensure sustainable harvest] hasn’t been met” for Eastern oyster, and that for 27 years the State has lacked the data to meet this obligation but has made no progress in obtaining it. (T. 3147, 3165–66).

C. The State has failed to meet specific Fisheries Management Plan objectives that are critical to preserving and protecting coastal fish stocks.

1. For multiple fish stocks, the State has failed to meet the 2-year statutory requirement to end overfishing.

137. Before 2010, the FRA did not specify any deadline or target to end overfishing or to rebuild a stock to achieve a sustainable harvest. In 2010, the FMP statute was amended to provide fisheries managers guidance on this issue and require FMPs to include maximum time frames for achieving these objectives. (T. 1209–10); S.L. 2010-13.

138. The definition of “overfishing” remained the same: fishing that causes a level of mortality that prevents a fishery from producing a sustainable harvest. N.C. Gen. Stat. § 113-129(12d). However, the time period to end overfishing set out in the FMP could not exceed two years from the date of adoption of the plan. N.C. Gen. Stat. § 113-182.1(b)(5); S.L. 2010-13, § 1. The only exception created was for instances in which the Fisheries Director determines the biology of the fish, environmental conditions, or lack of sufficient data make implementing this requirement incompatible with professional standards for fisheries management. N.C. Gen. Stat. § 113-182.1(b)(5). The reason for the two-year time period was to

allow any necessary restrictions to be phased in and, thus, minimize any impacts. (T. 1210).

139. The uncontroverted evidence showed that since this requirement was enacted more than 15 years ago, overfishing has occurred for multiple state-managed species for more than two years, including blue crab, Southern flounder, spotted seatrout, striped bass, and striped mullet. (T. 1211; P. Ex. 211, pp. 9–10). For Southern flounder, for example, successive stock assessments have shown that overfishing has been occurring since at least 1991. (T. 1217; P. Ex. 211, p. 10; P. Ex. 44, p. 3; P. Ex. 45, p. 21; P. Ex. 49, p. iv). Meanwhile, the State was unable at trial to point to a single instance in which overfishing was ended within the required two-year deadline.

2. For multiple species, the State has failed to meet the 10-year statutory requirement to reach a sustainable harvest.

140. “Sustainable harvest” is defined as “[t]he amount of fish that can be taken from a fishery on a continuing basis without reducing the stock biomass of the fishery or causing the fishery to become overfished.” N.C. Gen. Stat. § 113-129(14a). “[O]verfished,” in turn, is defined as “[t]he condition of a fishery that occurs when the spawning stock biomass of the fishery is below the level that is adequate for the recruitment class of a fishery to replace the spawning class of the fishery.” N.C. Gen. Stat. § 113-129(12c).

141. To achieve a sustainable harvest, the time period specified in the FMP cannot exceed 10 years from the date of plan adoption. *See* N.C. Gen. Stat. § 113-

182.1(b)(6). The same exception available for the two-year overfishing requirement—that is, the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementation incompatible with professional standards—also applies to this 10-year sustainable harvest requirement. N.C. Gen. Stat. § 113-182.1(b)(6).

142. The uncontroverted evidence showed that the State has failed to meet this requirement for multiple fish stocks: Southern flounder, river herring, and estuarine striped bass. (P. Ex. 211, pp. 9–10, 39–60; P. Ex. 216, pp. 13–14, 22; T. 1211–17, 1376–86, 3849–52).

143. The case of Southern flounder provides the most obvious example of the State’s failures to meet this requirement. In 2015, when the 10-year period to reach sustainable harvest was approaching, every stock assessment showed that the stock remained overfished. (T. 1214, 1217). Rather than address this, the Secretary of the Department directed the Fisheries Director (Dr. Daniel, who was serving at that time) to simply restart the 10-year clock. (T. 1213). DMF then extended the 10-year requirement to 2028, running from the amendment to the FMP enacted in 2018. (P. Ex. 51, p. 2; T. 1213–14). Indeed, every successive stock assessment since 2004 showed that the stock was overfished with overfishing occurring, yet the State failed to achieve a sustainable harvest within the 10-year period. (P. Ex. 211, pp. 45–47; T. 1217, 1376–86). As Dr. Daniel explained, his confidence level that Southern flounder would reach sustainable harvest by the

extended 2028 deadline was “zero” because “we’re still overfishing. We haven’t ended overfishing yet.” (T. 1384).

144. For river herring, the FMP was adopted in February of 2000. (P. Ex. 41). Thus, the State had until February of 2010 to use management measures to reach a sustainable harvest for river herring. *See* N.C. Gen. Stat. § 113-182.1(b)(6). The State allowed commercial landings to decline by 99 percent—from a historic high of over 20 million pounds annually to approximately 109,847 pounds in 2006—before implementing a moratorium in 2007. (D. Ex. 174, p. 17; P. Ex. 211, p. 58; T. 176–80, 3494, 3852). The 2005 stock assessment showed that the female spawning stock biomass was only 5% of the spawning ratio relative to an unfished stock. (D. Ex. 170, p. 235). Stock projections at the time of the moratorium estimated that recovery would take 20 to 30 years. (T. 3495). Nearly 20 years later, the stock remains under moratorium and has not recovered to sustainable harvest levels. (T. 202–03, 3461).

145. For the CSMA estuarine striped bass, the State has never found—in any plan adopted for that stock beginning in 2004—that it exhibits sustainable harvest. (P. Ex. 61, p. 119; P. Ex. 62, pp. 2–3; P. Ex. 66, p. 6; T. 3513–14). For the A-R stock, in November 2014, the State acknowledged that the harvest of the A-R stock was not sustainable. (D. Ex. 178, p. 3). That acknowledgement began the statutory clock for achieving sustainable harvest for the A-R stock (T. 3523–24), and the 10-year period to reach sustainable harvest was not met. (T. 3537; P. Ex. 67, p. 1). Stock assessments of the A-R stock conducted in 2020 and 2022 showed the

stock was overfished, with overfishing occurring. (P. Ex. 67, p. 1; P. Ex. 25, pp. 89–90; D. Ex. 187, p. 2; D. Ex. 182, p. 6). Today, both the A-R stock and the CSMA stocks are under harvest moratoriums. (T. 3537; P. Ex. 67, pp. 4–5; P. Ex. 66, p. 31).

3. The State has failed to meet the Fisheries Management Plan objectives on bycatch from estuarine shrimp trawling.

146. One of the primary goals of the original shrimp FMP, adopted in 2006, was to minimize the harvest of non-target species of finfish and shellfish. (P. Ex. 89, p. 1).⁶ As described below, quantifying that bycatch and reducing it to some quantifiable, significant degree remain unfulfilled, primary objectives under the shrimp FMP. (T. 2811).

147. DMF has long been cognizant of what it must do to quantify and address this bycatch problem. (P. Ex. 89, p. 148, P. Ex. 88, bates .0003). In both the original 2006 FMP and a 1999 report on impacts of shrimp trawling in estuarine waters, DMF explained that addressing bycatch is a two-stage process. (P. Ex. 89, p. 148, P. Ex. 88, bates .0003). First, the bycatch must be characterized in both magnitude and nature. (P. Ex. 89, p. 148, P. Ex. 88, bates .0003). Second, information obtained from characterization efforts must be applied to population

⁶ The State has attempted to address the long-standing problem of bycatch from estuarine shrimp trawling through its Shrimp FMP, rather than through species-specific FMPs for the finfish that constitute the majority of that bycatch: Atlantic croaker, spot and weakfish. Instead, the State has deferred to interjurisdictional management of those species under ASMFC plans for those species. That decision and its implications are discussed in Section IV.C.1 of these findings.

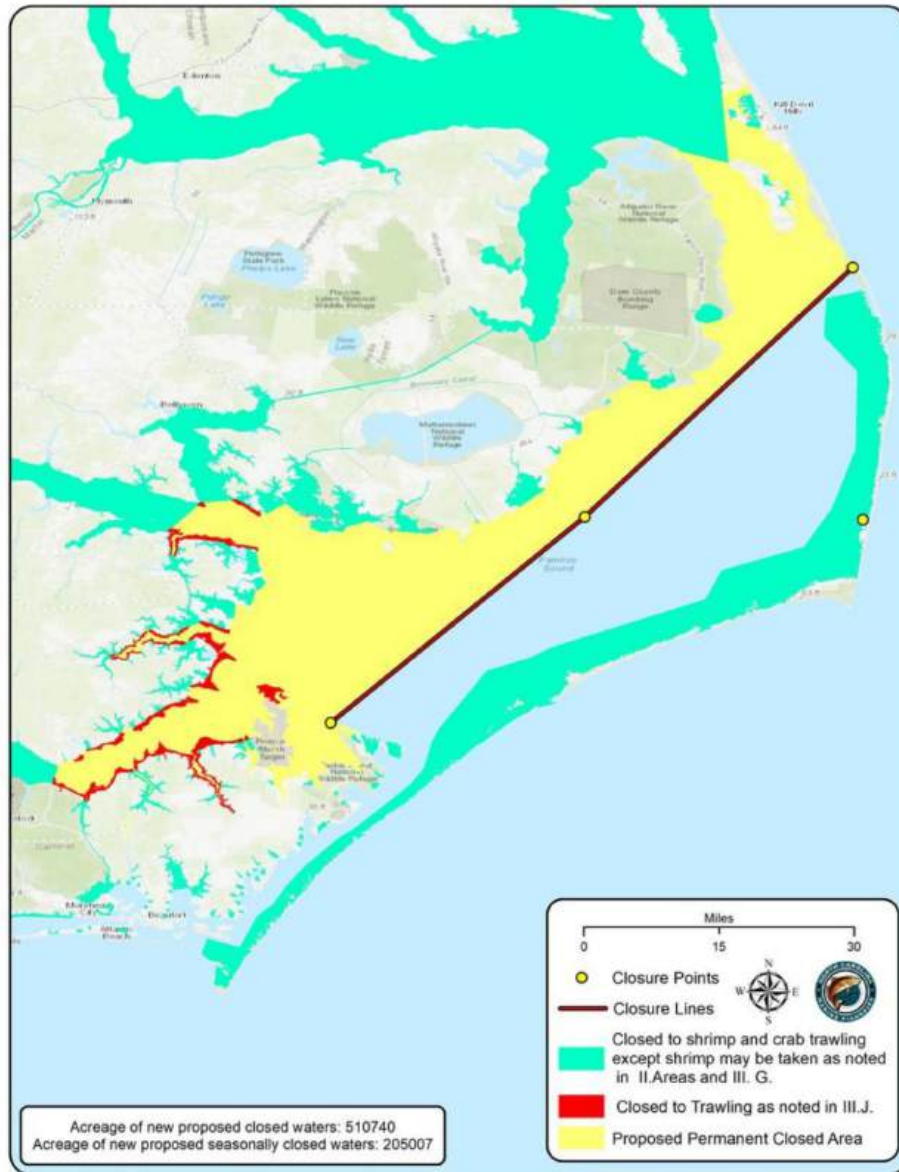
and ecosystem models to evaluate potential impacts at those levels. (P. Ex. 89, p. 148, P. Ex. 88, bates .0003).

148. By 1999, DMF had concluded that it was no longer acceptable to assume that discards represent an unimportant removal from a stock. (P. Ex. 88, bates .0004). Nevertheless, DMF has never completed any effort to complete that two-step process identified 27 years ago. (P. Ex. 115, p. 10).

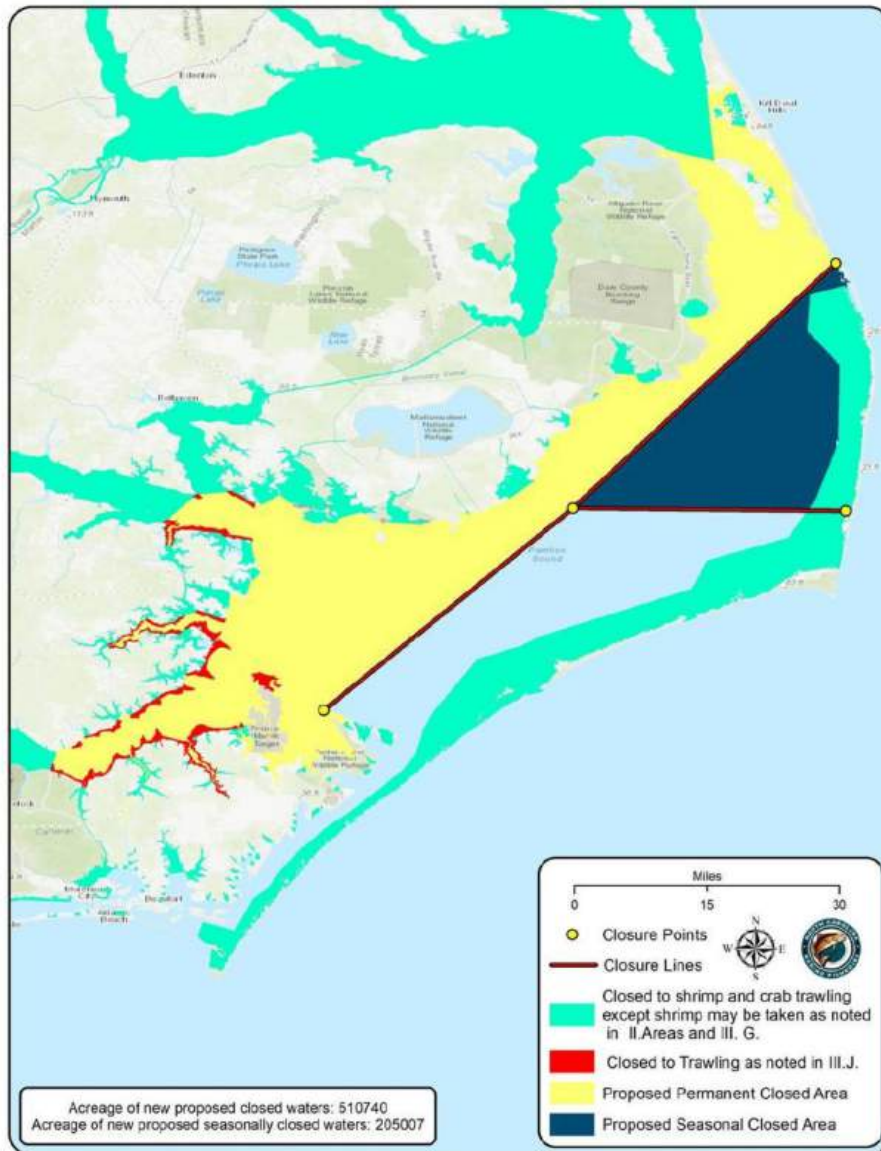
149. In 2021, DMF reported to the MFC that the total bycatch in the North Carolina shrimp trawl fishery and its population level impacts remains unknown. (P. Ex. 115, p. 10). The State's expert Daniel Zapf, who served as one of DMF's leaders on the shrimp FMP, acknowledged that DMF had identified as high priority the need to determine the cumulative impacts of shrimp trawl bycatch on individual species population dynamics, but had not done so. (T. 2808–09). As he admitted, “there's kind of a double issue . . . you don't know the total bycatch and then you don't know the impact on the stocks of that bycatch.” (T. 2811). Nevertheless, there are no plans for further study to fill this data gap on impacts of estuarine shrimp trawl bycatch. (T. 2811).

150. By 2022, even though DMF had informed the MFC that the status quo would not meet the stated objective of bycatch reduction, the MFC in the most recent amendment to the shrimp FMP (Amendment 2) essentially maintained the status quo for estuarine shrimp trawling. (P. Ex. 115, p. 11). Based on data that DMF has had for decades, which shows that many “hot spots” of finfish abundance

in the Pamlico Sound are open to trawling (P. Ex. 118, pp. 170–79; T. 2769–70),⁷ DMF published two examples of Pamlico Sound area closures reflected in the following figures:



⁷ That data, which comes from DMF's biannual juvenile abundance surveys, is discussed in more detail below. See Section IV.C.1.



(P. Ex. 118, pp. 180–81).

151. Although these additional area closures would have left many known juvenile finfish hotspots still open to trawling, they would have at least resulted in significant new area closures if they had been enacted by the MFC. (P. Ex. 118, pp. 170–79; T. 2769–70). Under DMF’s first example, an additional 510,740 acres would have been closed year-round. (P. Ex. 115, p. 16). Under the second example, those 510,740 acres would be closed year-round, with an additional 205,007 acres to

be closed seasonally. (P. Ex. 115, p. 16; P. Ex. 118, p. 181). However, these measures, as well as others that DMF had published, received stiff resistance from the MFC's advisory committees. (T. 3778).

152. Against that resistance, rather than recommending area closures similar to what it initially published, DMF drastically scaled back what it ultimately recommended on area closures to the MFC. (P. Ex. 118, Table 5.1, p. 312). Even then, most of DMF's drastically scaled back recommendations for general trawl area closures were ultimately rejected by the MFC, which enacted just a fraction of what DMF recommended. (P. Ex. 118, p. 23). DMF also made recommendations for area closures specifically to protect critical sea grass and shell-bottom habitat. (P. Ex. 118, p. 23). The MFC rejected all of them, as well. (P. Ex. 118, p. 23).

153. Ms. Rawls acknowledged that the decision of the MFC on Amendment 2 "left the outcome not far from the status quo," and that "it certainly wasn't in line with what [DMF's] recommendations were." (T. 3783). Mr. Zapf likewise admitted that "the vast majority of [DMF's] recommendations were not adopted by the commission." (T. 2830). In short, even though DMF had informed the MFC that maintaining the status quo on estuarine shrimp trawling would not meet the objective of bycatch reduction in the amendment (P. Ex. 115, p. 11), the MFC essentially maintained the status quo. (P. Ex. 118, p. 23; T. 3783).

D. A comprehensive January 2026 report from the UNC Collaboratory independently confirmed the State’s fisheries management failures.

154. In 2021, the General Assembly commissioned a study on the overall status of North Carolina’s coastal and marine fisheries. (T. 2915–16; P. Ex. 37A, p. 10). The study resulted in the UNC Collaboratory Report, the product of a research team of nine principal investigators across four UNC system universities, totaling approximately 20 researchers including graduate students, post-docs, and technicians. (T. 2863–64, 2919; P. Ex. 37A, p. 10).

155. The work spanned the better part of three and a half years and produced a data-rich document with several hundred figures and over 100 data tables. (T. 2866–68; P. Ex. 37A, p. 10). Dr. Joel Fodrie, a faculty member at the University of North Carolina at Chapel Hill’s Institute of Marine Sciences (IMS) in Morehead City, was the lead principal investigator from UNC-Chapel Hill. (T. 2864–65, 2919; P. Ex. 37A, p. 10). At trial, Dr. Fodrie was called to testify about the UNC Collaboratory Report, which was released to the public just days before the State presented its case at trial. (T. 2844–45).

156. The Collaboratory’s first key finding in its report was that “North Carolina’s fisheries are intensely managed”—a finding described more fully below. (T. 2921; P. Ex. 37A, p. 11).

157. The Collaboratory’s second key finding was that “despite a rigorous management structure, North Carolina continues to exhibit challenges in achieving the core goals of the FRA.” (T. 2924; P. Ex. 37A, p. 12). Specifically, the Collaboratory analyzed seven stocks managed under a North Carolina stand-alone

FMP for which quantitative information was available: blue crab, red drum, sheepshead, Southern flounder, spotted seatrout, striped bass, and striped mullet.⁸ (T. 2925–26; P. Ex. 37A, pp. 12–13). The result was that of those seven stocks, five are experiencing overfishing (i.e., the harvest rate is too high): Southern flounder, spotted seatrout, striped bass, striped mullet, and blue crab. (T. 2926; P. Ex. 37A, p. 13). The only two that are not experiencing overfishing are red drum and sheepshead. (T. 2927; P. Ex. 37A, p. 13). As Dr. Fodrie explained, however, sheepshead has no quantitative stock assessment, and therefore, when sheepshead is excluded from the analysis (because no quantitative stock assessment supports its status), the rate of overfishing among assessed stocks is actually five out of six (83%).⁹ (T. 2927–28; P. Ex. 37A, p. 13).

158. The Collaboratory also found that of the same seven stocks, four of them—Southern flounder, striped bass, striped mullet, and blue crab—are overfished (i.e., the stock biomass is too low relative to their applicable thresholds).

⁸ The UNC Collaboratory’s charge was to focus on 13 enumerated stocks and “analyze trends through the last few decades or longer and develop policy recommendations to better manage the overall health and viability of not just the [S]tate’s fisheries but also fisheries habitats.” (T. 2917; P. Ex. 37A, p. 10). Dr. Fodrie’s team voluntarily included Atlantic croaker, spot, and weakfish—three species not enumerated in the legislation—in the analysis where data were available, because of those species’ “historical importance” recreationally, commercially, and culturally. (T. 2916–17, 2940; P. Ex. 37A, p. 10).

⁹ This assessment is even more stark considering that the UNC Collaboratory did not include in its analysis four other state-managed stocks: river herring, which has been under a harvest moratorium since 2007 following its collapse, and three shellfish species (bay scallop, Eastern oyster, and hard clam), which, as described above in Section II.B., lack quantitative stock assessments but are known to have collapsed. (P. Ex. 37A, pp. 365, 461–462).

(T. 2928; P. Ex. 37A, p. 13). Excluding sheepshead for the same reasons described above, the overfished rate is actually four out of six (66%). (T. 2929; P. Ex. 37A, p. 13).

159. The Collaboratory further found that of the seven assessed stocks, once sheepshead is excluded, only a single stock—red drum—is neither overfished nor experiencing overfishing. (T. 2929; P. Ex. 37A, p. 13). Notably, red drum is the only stock managed by North Carolina under “strict harvest controls”—a one-fish recreational bag limit, an annual commercial harvest cap with a seven-fish trip limit, and a slot-limit to protect older fish. (T. 2929–30; P. Ex. 37A, p. 13). In other words, the Collaboratory found that the stock under the most restrictive harvest controls is the only one that is healthy on both the overfishing and overfished metrics. (T. 2931; P. Ex. 37A, p. 13).

160. The Collaboratory also found that since the FRA was enacted nearly 30 years ago, biomass has trended downward for five of the seven assessed stocks: Southern flounder, striped bass, striped mullet, red drum, and blue crab. (T. 2931–32; P. Ex. 37A, p. 14). For Southern flounder and striped bass, fishing mortality has actually increased since the FRA was enacted in 1997. (T. 2932; P. Ex. 37A, p. 14).

161. The Collaboratory found that compared to other states, North Carolina is tied for the second-highest percentage of overfished stocks (67%, behind only Florida’s Atlantic Coast at 80%) and has the highest percentage of stocks with an overfishing designation (65%). (T. 2932–33; P. Ex. 37A, p. 14).

162. The Collaboratory also compared State-level outcomes to federal fishery management councils, finding that only 9 to 35% of federally managed stocks are overfished compared to North Carolina's 57%, and only 18 to 28% are experiencing overfishing compared to more than 70% in North Carolina. (T. 2933–34; P. Ex. 37A, p. 15). The Collaboratory noted a key structural difference: Federal councils have independent science and statistical committees (SSCs), and North Carolina does not. (T. 2934; P. Ex. 37A, p. 15).

163. The Collaboratory also made findings on the Marine Patrol's enforcement deficiencies, describing how their limited staffing requires them to cover more estuarine and coastal water than in other states, and that if North Carolina is going to “achieve sufficient enforcement and support of [FRA] mandates, increased marine patrol staffing is warranted.” (T. 2935–36; P. Ex. 37A, p. 29).

164. The Collaboratory also conducted a statewide survey of commercial fishermen, recreational anglers, and non-fishing members of the public—recognizing, in Dr. Fodrie's words, that non-fishers (i.e., the public at large) have an interest in healthy coastal fisheries and ecosystems. (T. 2941–42; P. Ex. 37A, pp. 15–18). The survey data, which Dr. Fodrie described as “pretty compelling,” showed “a strong signal of discontent” with the management of fish stocks across both commercial and recreational sectors. (T. 2942; P. Ex. 37A, pp. 15–17). Both commercial fishermen and recreational anglers were dissatisfied with the speed of the decision-making process. (T. 2942; P. Ex. 37A, p. 17). Both groups were twice as dissatisfied with the MFC as with DMF. (T. 2942–43; P. Ex. 37A, pp. 16–17).

Commercial fishermen were more strongly dissatisfied with all elements of management and disagreed that managers make decisions based on the best available science. (T. 2944; P. Ex. 37A, pp. 16–17). Both commercial fishermen and recreational anglers identified fish stock status as one of their top concerns. (T. 2945; P. Ex. 37A, p. 17). Commercial fishermen and recreational anglers were the most distrustful of state officials of any group surveyed. (T. 2945; P. Ex. 37A, p. 18).

165. The Collaboratory’s fourth key finding was that “the management of fisheries stocks via the fisheries management plan process is relatively slow.” (T. 2946; P. Ex. 37A, p. 18). The Collaboratory found that the average time between an initial FMP and FMP amendments across all stocks is seven years, and even accounting for supplements to amendments, the average time between FMP actions across species is 5.2 years. (T. 2946; P. Ex. 37A, p. 18). As Dr. Fodrie testified, the original FRA had a three-year goal for an FMP cycle, and “we’re not yet meeting that standard.” (T. 2946–47; P. Ex. 37A, p. 18). The Collaboratory further found that the slow pace of management “potentially limits the efficacy of science and process-based public trust resource management,” which the Collaboratory identified as “[a] hallmark goal of the Fisheries Reform Act.” (T. 2946; P. Ex. 37A, p. 18).

166. The Collaboratory also documented decreasing consensus within the MFC, declining concurrence between DMF’s recommendations and MFC’s actions over time, declining influence of advisory committees, and waning frequency of MFC motions and DMF proclamations. (T. 2947–50; P. Ex. 37A, pp. 19–20).

167. After analyzing approximately 186 ecosystem indicators, the Collaboratory also concluded that “coastal North Carolina is experiencing a profound shift in its ecological state.” (T. 2951; P. Ex. 37A, p. 20). As Dr. Fodrie testified, the habitats and waters that the Collaboratory analyzed are part of the public-trust resources discussed throughout the report as being part of the “public trust resource management” framework. (T. 2952–53; P. Ex. 37A, p. 20). Consistent with this description, and noting that the original FRA directed the State “[t]o understand the functional relationship between habitats and fishery production” (T. 2953; P. Ex. 37A, p. 20), Dr. Fodrie agreed that “[c]ontrolling water quality and ensuring that those public trust resources . . . are healthy, that’s the State’s job.” (T. 2952; P. Ex. 37A, p. 20).

168. Nevertheless, the Collaboratory found that North Carolina’s benthic structured habitats—including marshes, submerged aquatic vegetation, and oyster reefs—are “severely degraded.” (T. 2954–56; P. Ex. 37A, p. 21). The Collaboratory cited published estimates reflecting losses of approximately 6.5% of total sea grass area between 2006 and 2013 alone, a decline of approximately 29% in oyster reef extent over 125 years, and a 50% reduction in state water quality monitoring effort over two decades. (T. 2955–57; P. Ex. 37A, pp. 21–22). Dr. Fodrie testified that this is “a nightmare scenario,” and that it was “extremely concerning” to discover. (T. 2959–60; P. Ex. 37A, pp. 21–22). When asked whether these outcomes satisfy the FRA’s directive that the State must understand the functional relationship

between habitat and fishery production, he answered: “It does not.” (T. 2959; P. Ex. 37A, pp. 21–22).

169. The Collaboratory’s seventh key finding concerned North Carolina’s primary nursery areas (PNAs). (T. 2960; P. Ex. 37A, p. 24). The Collaboratory concluded that PNAs “have not been managed adaptively over decade-old scales and they do not appear to be functioning as intended.” (T. 2960; P. Ex. 37A, p. 24). In an evaluation of Atlantic croaker, brown shrimp, blue crab, Southern flounder, and spot, the Collaboratory found that for four of them (all species except for brown shrimp), the long-term trend showed decreasing catch per unit effort¹⁰ in DMF juvenile finfish abundance surveys conducted in the PNA areas. (T. 2961; P. Ex. 37A, p. 24). The Collaboratory concluded that “with the exception of brown shrimp, there[’s] no clear evidence that PNAs [have] enhanced the abundance of juvenile nekton as anticipated when the nursery program began.” (T. 2961–62; P. Ex. 37A, p. 24). At trial, Dr. Fodrie summarized these findings as follows: a program “specifically designed to protect young fish isn’t working for four out of those five species studied.” (T. 2962; P. Ex. 37A, p. 24).

170. Based on its findings, the Collaboratory developed four core recommendations: (1) create an independent science and statistical committee following the federal model; (2) increase DMF staffing support, including

¹⁰ “Catch per unit effort” (CPUE) measures the amount of fish caught, either by weight or by number, relative to the amount of fishing effort exerted. (T. 120–21). CPUE is used as a proxy for stock health: a stable or increasing CPUE generally indicates a healthy stock, while a declining CPUE often signals overfishing. (T. 145).

competitively salaried stock-assessment scientists; (3) transition to management based on total allowable catch, with an independent science and statistical committee determining sustainable catch levels; and (4) impose a supermajority requirement for the MFC to override DMF's scientific recommendations. (T. 2964–67; P. Ex. 37A, pp. 26–29). The Collaboratory also recommended adopting an ecosystem-based management approach that accounts for water quality, habitat loss, and human population pressures. (T. 2967–68; P. Ex. 37A, pp. 31–33).

171. On cross-examination, when asked to summarize the Collaboratory's key findings above, Dr. Fodrie confirmed the following:

Q. [T]ake us back to the sum total of the findings . . . Tell me if this is a fair summary. North Carolina has intense management activity?

A. Yes, sir.

Q. But the management process is slow?

A. Yes.

Q. And it's losing consensus?

A. Yes.

Q. Stakeholders don't trust the system?

A. Correct.

Q. [F]ive of seven assessed stocks are experiencing overfishing?

A. Yes.

Q. Four are overfished?

A. Yes.

Q. And if we acknowledge . . . that there's no quantitative stock assessment for sheepshead in North Carolina, then it's really five out of six stocks that are experiencing overfishing—that 83% that we talked about, correct?

A. Correct.

Q. And it's really four out of six stocks—that 66% that we talked about that are overfished—correct? . . . And beyond those assessed stocks, six additional managed stocks don't even have stock assessments, correct?

- A. Correct.
- Q. So their status is unknown?
- A. In the context of the way stock assessments establish the status, correct.
- Q. Biomass is declining in stocks historically important for recreational and commercial fishing?
- A. In many cases, correct.
- Q. And even worse, it's been declining since the FRA?
- A. Correct.
- Q. Fish habitats are severely degraded and nursery areas don't function as they need to function?
- A. Correct.
- Q. That's what your report found?
- A. Correct.

(T. 2968–71).

172. In sum, as Dr. Daniel, Dr. Powers, and Dr. Stunz each testified without rebuttal, the UNC Collaboratory Report only supports, rather than refutes, their expert conclusions. (T. 1590–91 (Daniel); T. 1674, 1701–02 (Powers); T. 1826, 1885 (Stunz)).

III. Beyond the harm inflicted on North Carolina's coastal fisheries resources themselves, the State's management failures have caused significant harm to the general public.

- A. Declining and collapsed stocks have significantly impaired the general public's right to harvest fish.**
- 1. As a result of the State's management failures, citizen harvest for personal use has declined to an all-time low.**

173. As Dr. Powers noted, a recognized goal in fisheries management is ensuring the general public's opportunity to harvest their fisheries resources.

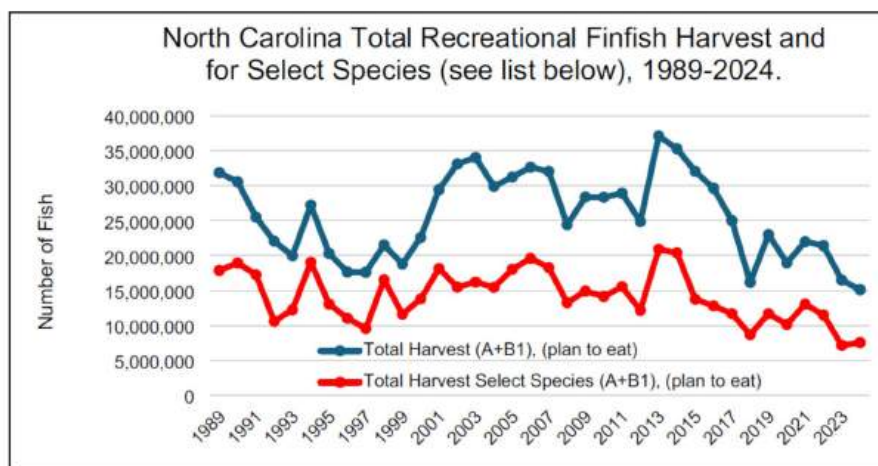
(P. Ex. 216, pp. 6–7). As described above in Section I.C., this was an overall

objective of the FRA in seeking to improve biomass of important stocks that had declined in abundance, thus benefiting the general public.

174. Yet in the nearly 30 years since the enactment of the FRA, citizen harvest for personal use has declined to an all-time low (P. Ex. 225; T. 395–402), and biomass has dropped for many species historically important to public anglers. (T. 2941–42); *see also* Section II.B. As Dr. Daniel noted, the decrease in abundance is reflected in the downward trend in recreational bag limits. (T. 1304–05).

Although some reduction in bag limits could be expected in early FMPs given the need to rebuild stocks, that trend has not reversed. (T. 1304–05).

175. Recreational harvest data also shows that those trends have been downward since 2013, as depicted in the following graph showing the overall total harvest trend in blue and the trend of certain select species (chosen because of their popularity) in red:



Select Species

Atlantic Croaker, Red Drum, Kingfishes, Flounders, Spot, Spotted Seatrout, Weakfish, Bluefish, Black drum, Sheepshead.

(P. Ex. 204; T. 396–401).¹¹ As this chart illustrates, overall recreational harvest fell to its lowest over a 35-year time series since 1989 for year 2024, the last year data is available. (P. Ex. 225; T. 400–01).

176. Species availability has also significantly deteriorated, as the data confirms. (P. Ex. 211, pp. 60–61; T. 1292–93). According to Dr. Daniel, today’s shore-based harvest is more likely to consist of lizardfish, pigfish, pinfish, and small sharks than the species described above that are historically significant to public anglers. (P. Ex. 211, p. 61). The evidence showed that nighttime flounder gigging has all but ceased given the one-fish limit, blue crab harvest from docks is “a thing of the past,” bluefish are limited to three per day, and the annual “spot runs” and festivals are gone. (P. Ex. 211, pp. 60–61; T. 531).

177. The Court also heard ample testimony about the deterioration in the quality of fish available to harvest. Ms. Fox testified that “I’ve seen an extreme decline in the size of fish,” noting spot and croaker as examples. (T. 2105–07). Mr. Jernigan testified that the only spot currently available are so small that it is not worth the effort to catch them. (T. 709). Other witnesses testified similarly as to various other species. (T. 733 (Andrews); T. 570 (Joe Albea); T. 528 (Hardison)).

¹¹ The source of this data is the Marine Recreational Information Program (or MRIP), a NOAA program through which recreational fisheries data is collected through two components: the Access Point Angler Intercept Survey (APAIS), which DMF conducts in the field, and the Fishing Effort Survey, which is conducted nationally by NOAA. (T. 2382–83). The catch data from APAIS is combined with the effort data from the Fishing Effort Survey to produce overall estimates of recreational impact to the fisheries. (T. 2382–83).

178. As Dr. Daniel noted, and as multiple witnesses described through their testimony, the failure to recover declined fish stocks has also inflicted cultural harm—for example, the loss of a cultural heritage where young North Carolinians grew up going to piers, which were full during fall fish runs. (T. 58 (Nifong); T. 64–65 (Nifong); T. 66–67 (Nifong); T. 69–70 (Nifong); T. 323–24 (Daniel); T. 325–26 (Daniel); T. 566–67 (Albea); T. 729 (Jernigan); T. 2106 (Fox); T. 2107–08 (Fox)). Dr. Nifong testified about the diversity of the public anglers on the piers—“people of all ages, all races, all backgrounds” fishing “shoulder to shoulder”—largely now a thing of the past. (T. 66–70). Several witnesses testified about festivals centered on certain fisheries like river herring, which are likewise a thing of the past. (T. 66, 176–78). A rich North Carolina heritage of families harvesting blue crabs, oysters, bay scallops, and hard clams is also in jeopardy as the stock continues to decline. (P. Ex. 216, pp. 14, 20).

179. In short, as Dr. Daniel explained, “[the] biomass of so many stocks important to citizens for personal harvest have fallen to [such] historically low levels of abundance [that] the right of North Carolinians to fish for personal not for profit use has become more of a theoretical than a realizable right.” (P. Ex. 211, p. 61).

2. The Court places no weight on the data cited by the State that is not directly related to the long-term viability of historically significant species.

180. The State does not deny that citizen harvest has declined to an all-time low over the nearly three decades since the FRA was enacted. (T. 2564–65; P. Ex. 225). Instead, at trial, the State pointed to other data that does not bear directly on “the stock status and the stock population trends of [the] certain fish species” discussed above in Section II that have been the core issue in this case for the past five years. *Coastal Conservation Ass’n v. State*, 285 N.C. App. 267, 280, 878 S.E.2d 288, 298 (2022).

181. First, the State pointed to what DMF’s License and Statistics Section head, Brandi Salmon, described as a “generic” calculation. (T. 2563). Based on MRIP data from 2014 to 2023, Ms. Salmon calculated that the average recreational angler harvested 1.29 pounds of fish per trip in North Carolina. (T. 2481).

182. The Court places no weight on this calculation. To arrive at this calculation, Ms. Salmon simply took all pounds harvested and divided it by all trips, regardless of the mode of the fishing trip or its location—inshore or offshore. (T. 2481, 2562). As she admitted on cross-examination, the calculation was “generic” and “didn’t include specifics.”¹² (T. 2562). She also confirmed Mr. Gentner’s testimony that the 1.29 pound figure must be cut by at least half to determine how

¹² For example, she made no distinction between how much a shore-based angler harvested on average compared to the near-shore small boat owner or the public angler on an off-shore fishing trip. (T. 2563). Nor did she account for the duration of a trip. (T. 2562). She also did not provide any benchmark for the Court to evaluate the 1.29 pound figure. (T. 2567).

much protein is actually available for consumption, as approximately 50-60% of a fish is lost from cleaning it after harvest. (T. 1972, 2481). Most importantly, neither Ms. Salmon nor any other witness testified that the type of calculation she made could be used as a proxy for—or even an indicator of—stock abundance, or could otherwise be used in any way by fisheries managers in the field. (T. 2563).

183. The State also pointed to the UNC Collaboratory’s findings on recreational harvest trends to suggest that North Carolina is not an outlier among other states. (SPF ¶ 90). Even assuming that other states’ harvest trends are appropriate for consideration, the Court does not accept the State’s proposed inference in light of unrebutted testimony that North Carolina compares poorly to its neighboring states on bag limits for recreational harvest. Dr. Daniel in his testimony compared the bag limits in North Carolina to those in South Carolina for the “grand slam” of desirable estuarine species: red drum, spotted seatrout, and Southern flounder. (T. 1305–06). For most of the year in North Carolina, an angler can only harvest a total of 4 of those fish: 3 spotted seatrout, 1 red drum, and zero Southern flounder because of the extremely limited season. (T. 1306). By contrast, in South Carolina, an angler can harvest a total of 17 of those fish year-round: 10 Southern flounder, 5 spotted seatrout, and 3 red drum. (T. 1307). In Georgia, that number is 35: 15 Southern flounder, 15 spotted seatrout, and 5 red drum. (T. 1307). Two recreational fishing guides in North Carolina, Mr. Jernigan and Mr. Vernon, testified about their clients asking them for referrals for fishing guides in South

Carolina because those clients wanted to travel to South Carolina where they could harvest more fish—in particular, Southern flounder. (T. 662, 726–27).

184. Next, the State pointed to other MRIP data, as presented in DMF’s annual “Big Book” of statistics. (T. 2384–85). In Ms. Salmon’s testimony, she focused heavily on gross recreational trip data, which covered all modes of fishing in all State waters, and tended to show that the general public continues to engage in recreational fishing notwithstanding the State’s management failures described above in Section II. (T. 2444). Based on that data, the State argued at trial that surely fish populations must be healthy or else North Carolinians would not be “flocking” to North Carolina’s coastal fisheries. (T. 50).

185. The Court places no weight on these recreational trip figures, and it rejects the inference that the State proposes. Given the extensive biological data and other scientific data in the record described above in Section II (i.e., the data that fisheries managers actually use in the field to determine the health of fish populations), as well as the uncontroverted expert testimony based on that data, the Court has no need to resort to gross recreational trip data as a proxy for actual biological data, including stock population data, that fisheries managers actually use in the field to determine the health of fish populations. Critically, moreover, there was no testimony at trial from any witness suggesting that fisheries managers in the field use trends in gross recreational fishing trip data for any

fisheries-management purposes, let alone as a proxy for stock health.¹³ To the contrary, the evidence showed why it would be inappropriate to do so: The number of fishing trips is a measure of human behavior, and the record reflects a spectrum of motivations to go fishing, ranging from pure recreation and catch-and-release, to targeted species pursuit, family tradition, fishing for food, or desired outdoor pursuits during the COVID pandemic. (D. Ex. 25; T. 425, 2093, 2103, 3689–90). Thus, as the evidence showed, there is no reliable correlation that can be drawn between trends in gross recreational trip data and trends in harvestable fish. By way of example, fishing trips increased from 2023 to 2024 by approximately 2.7 million, yet the fish harvested over the same one-year period fell by approximately 1.3 million. (T. 2564–65). For all of these reasons, the Court places no weight on this data, nor does it accept the inferences the State proposes.

186. Also through Ms. Salmon’s testimony, the State pointed to MRIP data on recreational catch (as opposed to recreational harvest). (T. 2407). According to Ms. Salmon, this catch data shows that recreational fishermen are still catching fish, and recreational catch has shown an overall increase over time, increasing

¹³ For the same reasons, the Court places no weight on Ms. Salmon’s views as to what fish are “commonly caught” in North Carolina waters (T. 2521–22), nor will the Court use Ms. Salmon’s views as a proxy for the extensive biological data and other data in the record that fisheries managers actually use in the field to determine the health of fish populations. As Ms. Salmon admitted on cross-examination, she did not use biological data or any peer-reviewed methodology to determine “availability,” and instead, “just used the dictionary”—ultimately defining “available” as whether a single stray fish of a particular species could be caught in North Carolina. (T. 2396–97; 2549–50). When asked if “commonly caught” is a fisheries-management term, she admitted that she did not know. (T. 2521–22).

after the 1990s. (T. 2407). The State similarly notes that catch data from the UNC Collaboratory showed that the average number of fish caught per year by anglers in North Carolina stayed at roughly 50 fish per year from 1981 to 2016. (SPF ¶ 91).

187. For similar reasons as those noted above with respect to trip data, the Court places no weight on this catch data, nor does it accept the inferences that the State attempted to draw from it. As discussed above in Section III.A., MRIP already provides data on recreational harvest. Thus, the Court has no need to resort to catch data as a proxy for harvest data. Moreover, as the evidence showed, it would be inappropriate to use catch data as a proxy for harvest data because the differences between catch and harvest can be significant, both in terms of numbers and quality of fish. As Mr. Mumford testified, an average of 35% of fish caught are “trash” fish (e.g., lizardfish, pinfish, sharks, skates, and rays)—i.e., fish that are caught, but are extremely unlikely to be harvested. (T. 399).

188. Also through Ms. Salmon’s testimony, the State at trial pointed to MRIP angler survey data indicating that most public anglers may not be targeting any specific species in particular. (T. 2419). The State then cited to this data for its argument that most North Carolinians “just want to catch a fish, any fish” (T. 48), no matter what species, and this desire to simply “catch a fish” is fully satisfied because there are certain species of fish available to catch *other* than the historically significant, “certain species” of fish and shellfish that have been the core issue in this case for the past five years. *Coastal Conservation Ass’n*, 285 N.C. App.

at 280, 878 S.E.2d at 298; *see also id.* at 280, 878 S.E.2d at 298 (referring to these species as “popular fish species”).

189. The Court places no weight on this survey data, nor does it accept the conclusion that the State attempts to draw from it. As a threshold matter, the Plaintiffs have the right under the public-trust doctrine and the North Carolina Constitution to *harvest* fish and shellfish, not just *catch* them. *See Coastal Conservation Ass’n*, 285 N.C. App. at 275, 878 S.E.2d at 295. Moreover, as the Court of Appeals made clear, the factual predicate for liability in this case is “the stock status and the stock population trends of *certain fish species*”—that is, the stock health of “popular fish species” that have historically been important to average citizens, not the stock health of other, less-desirable, historically insignificant species that have never been managed under an FMP. *Id.* at 280, 878 S.E.2d at 299 (emphasis added); N.C. Gen. Stat. § 113-182.1(a) (requiring state management of all “commercially or recreationally significant species or fisheries that comprise State marine or estuarine resources”); *see also* Conclusions of Law, Section I.C.

190. Furthermore, as the evidence at trial showed, the declines in North Carolina’s historically significant species are precisely what has caused anglers to change their desires and expectations, forcing them to shift to other species and accept whatever they can catch because they have no choice. As Dr. Daniel noted in his report, the typical harvest for the average citizen angler has deteriorated significantly over the last 40 years. (P. Ex. 211, pp. 60–61). As a result, anglers have had to find “replacement” species for depleted species. (T. 467–68). Mr. Mumford,

who tracked the MRIP data for 40 years at DMF, explained that for today's anglers to be able to harvest fish that can actually be eaten, they must—and do—"switch over to something they've never targeted before" by necessity. (T. 467–68). Mr. Albea gave a specific example: Alongside the decline of historically significant species such as Atlantic croaker, spot, and weakfish, "hundreds of thousands of anglers" switched to spotted seatrout because it became the "only act in town." (T. 596). No witness for the State rebutted this testimony from Dr. Daniel, Mr. Mumford, or Mr. Albea.

191. The State also pointed to the fact that other species (i.e., species other than North Carolina's 13 state-managed species) are caught in North Carolina waters for its contention that it has satisfied its fisheries-management obligations under the public-trust doctrine and the North Carolina Constitution. (SPC ¶ 64). Those other species fall into two categories: (1) species that are not managed by North Carolina at all, because they are not managed by any regulatory body whatsoever (T. 2534–35), or (2) species managed by federal or regional councils for which North Carolina has declared an interest. (SPF ¶¶ 50, 52, 160; SPC ¶ 64). As to the first category (unmanaged species), there was no evidence that the State does anything whatsoever to manage them or has even obtained critical information about their status.¹⁴ Thus, the State cannot assert that these species exhibit long-

¹⁴ As Ms. Salmon confirmed, the State does not even know whether these species are overfished, whether they are subject to overfishing, or what the spawning stock biomass of these species is. (T. 2533). The State therefore does not know whether these species are sustainable. (T. 2533).

term viability or, for that matter, that the State is doing anything to protect them. As to the second category, when the UNC Collaboratory compared North Carolina's outcomes with federal and regional management-council outcomes, it did not credit the State with "management" of any of those federally or regionally managed species. (P. Ex. 37A, p. 15). Neither does the Court. The fact that some regionally managed species lacking a state-specific FMP are caught in North Carolina waters does not excuse the State's management failures for Atlantic croaker, spot, and weakfish—three species of major historical significance to average citizens (Section II.B.2.-4)—let alone all of the management failures described above. *See generally* Section II.

192. Lastly, the State at trial pointed to the results of a limited, informal survey of a few hundred of CCA's members conducted in 2023, and summaries from papers on angler motivations that Mr. Gentner provided at the State's request. (D. Ex. 85; T. 2071–74). From the CCA member survey, the State pointed to the fact that a majority of respondents indicated they practice voluntary catch and release on a regular basis. (D. Ex. 85, p. 1; T. 3955–56). From Mr. Gentner's materials, the State cites to data suggesting that the most influential attribute of angler satisfaction is catch, with harvest close behind. (D. Ex. 25, p. 2; T. 2072). From these materials, the State then suggests that catching fish is more important to public anglers than harvesting fish. (SPF ¶¶ 12–14).

193. The Court places no weight on these materials, nor does it accept the conclusions that the State attempts to draw from them. Again, the right at stake in

this case is the right to *harvest* fish and shellfish, not just *catch* them. *See Coastal Conservation Ass’n*, 285 N.C. App. at 275, 878 S.E.2d at 295. Moreover, this right belongs to each Plaintiff and all other North Carolinians regardless of whether the State chooses to characterize them as “sport” fishers or subsistence fishers, or whether they fit into either of those categories at all. *Id.* Thus, whether some small subset of CCA members practice catch and release on a regular basis and some other North Carolinians may derive slightly more satisfaction from catching fish compared to harvesting fish is immaterial to the issues before the Court.

194. In sum, the Court places no weight on data cited by the State that is not directly related to the long-term viability of the historically significant species at issue in this case.

B. Failure to recover depressed fish stocks has resulted in significant lost economic benefits for the general public, as well as the commercial fishing industry.

195. The evidence at trial showed that North Carolina’s declining and collapsed fish stocks have caused the state to forego significant economic benefits. (T. 1958–59). This evidence included a 2017 bioeconomic report—a report completed by a stock assessment modeler, Dr. Genevieve Nesslage, and a fisheries economist, Dr. Christopher Dumas. (D. Ex. 12). Nesslage and Dumas aimed to estimate the range of economic benefits that the State has lost by not managing eight fish stocks sustainably. (T. 1959–60; P. Ex. 213, pp. 24–25; D. Ex. 12, p. 1). The report showed a range of economic consequences if those declining North Carolina stocks were subject to varying additional harvest restrictions to improve abundance.

196. Mr. Gentner, the Plaintiffs' fourth expert, and the only economist to testify in this case, was a project manager for that study. (P. Ex. 213, p. 12). Mr. Gentner is the founder of Gentner Consulting Group. (P. Ex. 213, p. 2 and CV; T. 1906–07). He holds a Bachelor of Science in Forestry from Northern Arizona University (1993) and a Master's degree in Agricultural and Natural Resource Economics from Oregon State University (1999). (P. Ex. 213, p. 2 and CV; T. 1906–07). He was employed by the National Marine Fisheries Service from 1999 to 2007, where he chaired the agency's national economic impact working group. (P. Ex. 213, p. 2; T. 1908–10). He has published approximately twenty-seven articles and reports on fisheries economics, and has served as an economist on the Science and Statistical Committee for the Gulf of Mexico Fishery Management Council. (P. Ex. 213, pp. 1–2, CV; T. 1910–16).

197. In forming his opinions, Mr. Gentner reviewed NOAA commercial landings statistics, NOAA recreational landings and effort statistics, North Carolina regulations and fishery management policies, the Annual Sea Turtle Interaction Monitoring reports, the Plaintiffs' expert witness disclosures, and various publications on fisheries economics and management. (P. Ex. 213, pp. 3–5). He was tendered and received as an expert in fisheries economics without objection from the State. (T. 1917). The Court finds Mr. Gentner's testimony, based in part on his 27 years of experience in fisheries economics, to be reliable and credible. In this order, anytime the Court recites to Mr. Gentner's testimony, it is finding his testimony true and finds it to be fact.

198. In presenting the results of the 2017 bioeconomic study to the Court, Mr. Gentner included a table in his expert report that identified the regulatory scenario study that had the highest economic benefits per species, along with the present values of those benefits. (P. Ex. 213, Table 2, p. 39; T. 1961). That evidence showed that if the economically most-productive scenarios for each species were followed—including reducing bycatch—the State could obtain a potential increase in benefits over the status quo (i.e., the State’s current management approach) of up to \$829.7 million in present economic value, \$4.2 billion in additional sales, and \$1.6 billion in additional labor income, supporting an additional 1,952 jobs. (P. Ex. 213, p. 28; T. 1962).

199. The State contends that these numbers are too high, and thus, the results of the bioeconomic study on the economic consequences of managing fisheries differently should be given little to no weight. (SPF ¶ 479). As Mr. Gentner explained in his unrebutted testimony, however, economics can serve as a valuable tool for allocating competing uses of resources within an ecosystem, and it is critical for incorporating human behavior into ecosystem management. (T. 1919). The bioeconomic study presented by Mr. Gentner was the only such study admitted in evidence. The State offered no alternative analysis or testimony from an economist, nor did it attempt to show that current management is serving the public interest from an economic perspective. Thus, the Court gives significant weight to the 2017 bioeconomic study, as well as Mr. Gentner’s testimony about the results of that study.

200. Although the State sought to show that a more realistic projection of the increase in present economic value from the bioeconomic study is \$191.7 million, not the high end of the range of \$829.7 million¹⁵ (T. 2045–46), the Court finds that \$191.7 million is hardly a trivial number in present economic value (the economically relevant metric). Thus, even if the Court were to accept the State’s critique of the bioeconomic study, the ultimate conclusion is that the State’s current management of coastal fisheries is forfeiting significant economic benefits to the public.¹⁶

201. Mr. Gentner also explained how the State has managed coastal fisheries under a “commodity-based model,” focused on maximizing harvest volume for a single stakeholder group (commercial fishing) rather than maximizing the overall benefit to the public. (P. Ex. 213, pp. 19–21; T. 1919–20). He described how this approach treats coastal fisheries resources like an agricultural commodity—volume over value—rather than as a scarce public trust resource that must be

¹⁵ As Mr. Gentner readily acknowledged, the high-end range of \$829.7 million was based on several prospective fisheries management scenarios that are potentially unrealistic today, nine years after the study. (T. 2041, 2046–48). He also noted, however, that the study did not account for factors that could also increase the present economic value. (T. 1669, 1977). For example, he testified that the study did not account for price increases in the value of fish since the completion of the study in 2017, the economic benefits that would result if more of the seafood caught in North Carolina stayed in North Carolina, and, more generally, how much additional revenue to the State would result under alternative management scenarios. (T. 1669, 1977).

¹⁶ The Plaintiffs are not seeking damages, and thus, the precise amount of the lost economic benefits is not a fact that the parties have asked this Court to determine.

managed in the public trust to maximize the benefit to all citizens. (P. Ex. 213, p. 20). “All citizens,” Mr. Gentner explained, includes all fisheries management stakeholders: consumers, sustenance fishers, sport fishers, commercial fishermen, and citizens focused on environmental concerns. (P. Ex. 213, p. 29). He concluded, however, that at present, North Carolina focuses nearly exclusively on commercial fishermen as the stakeholders. (P. Ex. 213, p. 29). He described this as “management paternalism”—a reflexive institutional commitment to protecting existing commercial fishing practices regardless of whether they actually serve the broader public interest. (T. 1933–36, 1958).

202. Mr. Gentner observed that the State’s fisheries managers have been focused on protecting commercial fishing over protecting the resource in the broader public interest. (T. 1933–36, 1958). Testimony from Mr. Mumford, whose career at DMF spanned 40 years, supported that observation. (T. 433). Mr. Mumford testified that early in his career, DMF had advocated for North Carolina’s commercial fishermen in fish allocation issues before federal councils, and this eventually evolved into a management philosophy to protect commercial fishing. (T. 433).¹⁷

203. Mr. Gentner also gave his un rebutted expert opinion that “everybody” would benefit from the move from a commodity model to a more value-oriented model, including the commercial fishing industry. (T. 1944–45; P. Ex. 213, pp. 4, 22). He testified that many commercial fishermen are barely eking out a living,

¹⁷ As discussed in Section IV.C.2, DMF’s efforts to keep commercial fishermen fishing, and gillnet fishermen in particular, has included obtaining several incidental take permits under the federal Endangered Species Act.

citing the example that between 2000 and 2017, commercial dockside revenues dropped by \$13.6 million and pounds landed dropped 94.2 million pounds—a 59% decline in landings. (T. 1939, 1941–43; P. Ex. 213, p. 25). He noted that with stocks and commercial fishing revenues declining for a long time, commercial fishermen under the current management model feel the ever-increasing restrictions that state fisheries managers must impose, resulting in the proverbial “death of a thousand cuts” for the commercial fishing fleet. (T. 1921; P. Ex. 213, p. 25).

204. Mr. Gentner testified that to maximize the overall economic benefit, the State should professionalize commercial fishing, allowing participants to earn more money catching fewer fish. (T. 1939, 1941–43). As the only economist who testified, Mr. Gentner explained that by recovering stocks and recognizing that bycatch mortality produces huge recruitment problems, commercial fishermen would be better off economically, as would consumers, recreational anglers, and sustenance fishers. (P. Ex. 213, p. 25).

IV. The State’s management failures are significant and numerous.

205. Plaintiffs’ experts testified without rebuttal that the outcomes described above in Section II of the Court’s findings were foreseeable, and that they could have been avoided by more aggressive and timely management intervention. (P. Ex. 216, pp. 1–2; P. Ex. 219, p. 1; P. Ex. 220, pp. 2–4; T. 1814, 1885–86). As described in this un rebutted expert testimony, North Carolina’s fisheries managers have had data sufficient to show the declines “for years”—for “decades in some

cases”—and “any fisheries scientist” reviewing them “ha[d] to see that there’s some problems there.” (T. 1830–31; P. Ex. 220, pp. 9–12). As Dr. Powers put it:

While it has long been clear for multiple managed fisheries that what the State was doing in terms of management was not working, coastal fisheries managers nevertheless failed to change course and take the more aggressive management steps necessary to restore the fisheries to long-term viability and protect them from harm, injury or destruction.

(P. Ex. 216, p. 21). Dr. Stunz concurred, testifying that the declining trends in stock health “were apparent” and “obvious,” and that “in a modeled system where you’re precautionary and adaptable, these could have been easily curbed so we’re not here where we are today.” (T. 1828).

206. To fully appreciate the gravity of the management failures that produced the current state of North Carolina’s coastal fisheries, an itemization of the State’s management failures is warranted. The State’s management failures, which are both significant and numerous, are discussed in turn below.

A. At the agency level, the State is not managing to the FRA’s long-term viability standard.

207. As noted above, the FRA mandates that “[t]he goal of the [fishery management] plans shall be to ensure the long-term viability of the State’s commercially and recreationally significant species or fisheries.” N.C. Gen. Stat. § 113-182.1(b). As noted above as well, DMF’s Fisheries Director, Ms. Rawls, confirmed that “long-term viability is the standard” for fisheries management in North Carolina. (T. 3762). Other witnesses concurred. (T. 2324 (Loeffler); T. 3638 (Batsavage)); *see also* Section I.C. There was no evidence to the contrary.

208. As Ms. Rawls acknowledged, long-term viability means more than just sustainable harvest. (T. 3762). She acknowledged that meeting the long-term viability standard requires a healthy age distribution (young and older fish with ages spread out in the age structure), and that age truncation (the loss of older age classes) bears on long-term viability. (T. 3762). As further described above, in recognition of the FRA's long-term viability standard, the State in 1998 developed and applied criteria to determine long-term viability in issuing annual reports for the public on the stock status of state-managed stocks. (T. 1093–101).

209. The evidence at trial, however, including from the State's own witnesses, confirmed that the State is not managing to long-term viability, and instead, is focused on processes, rather than outcomes measured by the long-term viability standard. (P. Ex. 216, pp. 8, 29; P. Ex. 220, pp. 9–11). In 2017, DMF stopped using its viability criteria altogether. (T. 1272–74, 3720–21). As DMF leadership and staff alike admitted on cross-examination, DMF “doesn't really talk about long-term viability as one of its metrics,” nor is long-term viability “something that's commonly said” at DMF. (T. 3639). Mr. Batsavage admitted that he does not even “think about [long-term viability],” and that despite being the standard under which the State's fisheries management is to be assessed, long-term viability is simply “not something that's germane to the day-to-day” work of DMF. (T. 3639–40).

210. At trial, Ms. Rawls admitted that DMF does not even currently maintain a document describing long-term viability criteria for a species, nor does it

maintain a guiding document to instruct staff how to apply the long-term viability standard. (T. 3763–65). She further testified that, to her knowledge, the MFC has never been specifically trained on what long-term viability means. (T. 3763–65). Nor had Ms. Moore, the State’s bivalve expert, been trained on long-term viability, stating: “I don’t know what [long-term viability] means, to be honest.” (T. 3165–66). She further suggested that whether a species exhibits long-term viability could be measured by whether “[t]hey still exist”—in other words, that long-term viability means only that a species is not extinct. (T. 3165–66).

211. As a result of the State’s abandonment of the long-term viability standard, it was unable to point to a single one of 13 state-managed stocks that exhibits long-term viability. (T. 3639–40; P. Ex. 207). Meanwhile, Dr. Daniel—applying the State’s own historical viability criteria to current data—gave unrebutted expert testimony that none of the 13 state-managed stocks currently exhibits long-term viability. (T. 1271–87; P. Ex. 24, p. 0111).

212. In sum, the State admits that “long-term viability is the standard” for fisheries management in North Carolina (T. 3762), but it has disregarded that standard and failed that standard for each and every species it manages—a 0-for-13 track record. These uncontested facts are case-dispositive, as the Court further concludes below. *See* Conclusions of Law, Section II.A.

B. Especially given the State’s failure to collect necessary data for all commercial fishing effort, the State has failed to follow the precautionary approach—a fundamental, widely accepted approach to fisheries management.

1. The State has failed to collect the necessary management data to fully account for commercial fishing removals.

213. Fundamental to fisheries management is knowing fishing removals—and knowing them well. (T. 1522). As Dr. Powers explained: “[T]he science is only as good as the data. So you can have the best scientific plan in the world, but if your data aren’t rigorously collected and good quantitative and qualitatively, then you’re going to have a problem achieving your goals.” (T. 1522).

214. Commercial landings are relatively easier to quantify than recreational landings because of the smaller universe of commercial fishermen and the “bottleneck” of licensed dealers that allow data collection at a relatively few locations. (T. 1525–26). Dr. Powers emphasized that if managers do not have a good handle on total commercial removals—and the uncertainty in those numbers changes from year to year—“then you shouldn’t trust the results of your stock assessment or analysis.” (T. 1525–26). Similarly, good quantification of commercial effort is essential; without it, “your solutions are uncertain” and “it’s really hard to derive management advice from [that] level of uncertainty.” (T. 1528–29).

215. Dr. Daniel concurred, testifying that DMF does not account for both harvested fish and discards in its management decisions for commercial fisheries. (T. 1105). Asked to explain, Dr. Daniel stated: “[T]he State doesn’t have a handle on the discards that are occurring in the commercial fisheries. So, any fishes that are

discarded and lost to the system are not counted towards . . . the fishing mortality caused by the commercial fishery industry.” (T. 1105).

216. Among the necessary management data that the State has failed to collect, the State lacks effort data by gear type (e.g., yardage of gillnet deployed per trip), reliable bycatch and discard data from commercial gillnet and trawl fisheries, and recreational commercial gear license holder harvest data (unavailable since 2008). (T. 1647–50). This lack of necessary data has resulted in stock assessments that have a risk of being too optimistic—that is, the potential to show fish stocks as doing better than they actually are—and has contributed to the chronic failure of management plans to rebuild stocks. (P. Ex. 216, pp. 24–25; T. 1366–67).

217. Dr. Stunz likewise testified that all sources of stock mortality must be accounted for, especially fishing mortality. (P. Ex. 220, p. 16). He testified that North Carolina’s data on bycatch from both estuarine shrimp trawling and gillnet fisheries is “poor,” (T. 1833, 1847), and that the gillnet bycatch problem in North Carolina does not exist in other states. (T. 1847). He characterized North Carolina’s data on shrimp trawl bycatch as a “very big concern of mine, because that capacity they have with those industrialized fleets are very great.” (T. 1846).

218. Dr. Powers provided Southern flounder management as an example of data gaps producing poor outcomes. The State imposed various harvest restrictions over time, such as reducing recreational bag limits and adopting quotas, but no improvement in stock abundance resulted, “so there’s something that is missing . . . [h]igh bycatch, disregarded mortality, unreported landings, uncharacterized . . .

unquantified bycatch.” (T. 1649–50). Dr. Daniel likewise discussed the unknowns in discards for Southern flounder in crab pots and shrimp trawls. (P. Ex. 211, pp. 15–17). He testified that estimating the amount of bycatch in the gillnet fishery “is very difficult if you don’t have the studies that show the amount of effort and the amount of catch and bycatch that’s occurring” in that fishery, and that “the result is stock assessments are too optimistic.” (T. 1366–67).

219. The bioeconomic study described above also independently corroborated the significance of cryptic mortality in North Carolina’s fisheries. (P. Ex. 213, pp. 26–27). That study noted that unknown levels of mortality—driven by unaccounted-for bycatch, unreported commercial harvest, and other unquantified sources—have had a significant and costly impact on the North Carolina coastal economy. (P. Ex. 213, pp. 26–27). As Mr. Gentner testified, the study highlighted that current management “is hamstrung by data uncertainty,” and that historically, seeing uncertainty as a wedge to bolster inaction, vested interests have lobbied to keep funding minimal for scientific data collection and resist efforts to increase monitoring, enforcement, and at-sea observing. (P. Ex. 213, p. 27).

220. The evidence at trial also showed an especially significant data gap. From the FRA’s enactment in 1997 until December 1, 2025, commercial fishermen were not required to report their unsold catch at all. (T. 910–11). If they chose to sell their catch, the only legal outlet was a licensed fish dealer who recorded the transaction on a “trip ticket” forwarded to DMF. (T. 910–11). If a commercial

fisherman did not sell through a licensed dealer, no trip ticket was filed and the catch was not reported. (T. 910–11).

221. That produced a significant data gap: For decades, and on an annual basis, approximately 60% of commercial fishing license holders reported no sales to a licensed dealer through the trip-ticket program—in other words, their licenses were “latent” with respect to any reported use. (P. Ex. 190; P. Ex. 191). At the same time, DMF has known since at least 2015, when it performed a survey of commercial-license holders, that some significant percentage of commercial-license holders were fishing with commercial gear and not selling their catch through the trip-ticket program: 20% of respondents who provided information on what they typically did with their harvest indicated they were fishing but not selling their catch, and 45% indicated they sold only part of their catch and kept the rest. (P. Ex. 188, p. 2).

222. Colonel Carter Witten, who served for 25 years in DMF’s Marine Patrol and who led the Marine Patrol as its highest commanding officer from 2019 until his retirement in January 2026, confirmed that all of this unreported catch “has been mortality on the fish population that hasn’t been counted,” and that this unreported mortality had gone on “for a long, long time”—at least as far back as his employment with Marine Patrol began 25 years earlier. (T. 915–16). As Dr. Stunz testified, non-reporting of harvest is a universal challenge, but the severity of this historical problem in North Carolina is “very severe.” (T. 1842–43; P. Ex. 220,

pp. 15–16). He could not identify another state in the nation “where that problem is more acute.” (T. 1842–43; P. Ex. 220, pp. 15–16).

223. Although Session Law 2023-137 created new mandatory reporting requirements effective December 1, 2025, the State presented no evidence at trial of how the new requirements had operated in practice or whether they would cure the decades-long reporting gap. (T. 917, 919–20). Dr. Stunz further testified that the new requirements may not ultimately solve the data gap, as studies have shown that mandatory reporting “might get you 30 percent” compliance, at best. (T. 1843).

224. Other examples of unavailable data also arose in the trial testimony. For example, Mr. Mumford testified that during his career at DMF, he sought to use the State’s trip-ticket program to survey commercial fishermen on the quantity of gear deployed but was rebuffed. (T. 351–52). Mr. Gentner further noted that estimates of removals from recreational gillnet license holders have not been available since 2008. (T. 1949).

225. Ultimately, as Dr. Powers explained, the lack of sufficient data on fishing removals ranks high among the causes of systemic management failure in North Carolina. (P. Ex. 216, pp. 24–25). Dr. Powers summarized this in his report as follows:

[I]n response to the critical question of why fisheries managers in North Carolina have not seen improvements (e.g., improved age structure) in their fisheries, this is a big part of the answer: the lack of complete and reliable information about commercial effort and discards. Removals must be known. If all removals are not quantified, stock assessments as a result are too rosy. The targets and thresholds for recovery they produce as a result are insufficient to meet the goals of ending overfishing or rebuilding a stock. In a sense, the effort at

recovery is doomed at the outset. Evidence that something is fundamentally wrong and removals are likely underestimated is the chronic failure of management plans to rebuild stocks, as is the case in North Carolina.

(P. Ex. 216, pp. 24–25).

2. The State has failed to follow the precautionary approach.

226. As Dr. Stunz testified, the precautionary approach is a “fundamental” tenet of fisheries management, which he summarized at trial as follows: “[W]hen we don’t have all the information that we need to manage fisheries, you exercise precaution”—that is, “[t]he more unknown we are” about a fishery, “the more buffer we put in.” (T. 1791, 1786; P. Ex. 220, p. 3). He testified that where significant data gaps exist in a fishery, the proper management response is to “exercise even more precaution,” not less. (T. 1833–34). Thus, fisheries managers can only “get a little bit closer” to MSY if they “know their fishery really well” and “have really, really good data.” (T. 1793).

227. As Dr. Stunz explained, however, managers “rarely have all the data and information they would prefer or need to best manage a fishery,” and therefore, allowable harvest is “routinely buffered below a maximum (harvest) threshold . . . to ensure caution is exercised in setting fishing mortality rates.” (P. Ex. 220, pp. 3, 15). Indeed, without reliable information on total removals, even standard harvest control buffers will not prevent overfishing. (P. Ex. 216, pp. 24–25). Moreover, as Dr. Stunz noted, model-based buffers not only account for uncertainties in management, but they also “optimize” harvest to provide pre-defined benefits that

include long-term economic and social benefits derived from the resource. (P. Ex. 220, p. 3; T. 1791–92).

228. As Dr. Powers described the precautionary approach, “if you do have uncertain data, if you don’t know your removals from commercial, recreational, discards, that really should mean that you’re very conservative or have lower targets as far as what you expect to harvest.” (T. 1530). It is essentially “quantifying your risk, knowing your risk, and guarding against that risk.” (T. 1674). He added that under the precautionary approach, “[i]f you’ve made a few wrong decisions or if you underestimate uncertainty, you have this reserve that gives you a buffer where you don’t have to be exactly right. You can deal with being wrong every now and then on it . . . but maintaining that buffer.” (T. 1607–08).

229. Critically, maintaining that biomass buffer enables the stock to capitalize on good recruiting years—which may come only every two to four years. (T. 1531–33, 1607–08). As Dr. Powers explained: “Generally you need a bunch of good things to line up or the environment to be conducive on a number of parameters to have a good year class. For a bad year class, all you need is one thing to not be aligned. So, the idea is that you have . . . a lot of additional reserve capacity of that fish population that once everything does hit, that it can really take advantage of that in terms of number of eggs that survive.” (T. 1532).

230. Dr. Stunz testified that the reasons for applying the precautionary approach are “[e]xceptionally compelling”—so compelling that, within the field of fisheries management, the precautionary approach “governs all of our decision-

making process” and is “mathematically built into the models” in modern fisheries management. (T. 1795). As he explained further, the precautionary approach is “full[y] consistent” with—and, in essence, demanded by—North Carolina’s standard of long-term viability, because “[i]f you’re not exercising precaution, you could compromise long-term . . . viability.” (T. 1792).

231. All four of Plaintiffs’ experts gave un rebutted testimony that the State has failed to apply the precautionary approach. (P. Ex. 216, pp. 27–28; P. Ex. 211, pp. 7–9, 29, 41, 47, 55–56; P. Ex. 220, pp. 2–4; P. Ex. 213, pp. 10, 13). Based on a comprehensive review of many thousands of pages of North Carolina fisheries-management materials described above in Section I.D.3., Dr. Stunz offered his un rebutted expert conclusion that the State’s fisheries managers have systematically failed to apply the precautionary approach. (T. 1797; P. Ex. 220, pp. 2–4). He testified that his comprehensive review confirmed that DMF had not incorporated buffers “in a meaningful way,” and that, by definition, managing to MSY means “no buffer”—resulting in “risk-prone” management that has produced the back-and-forth overfished designations the State has experienced. (T. 1848–50).

232. Dr. Powers concurred with Dr. Stunz’s conclusion:

A lot of it has to do with the fact that the populations have age truncation, that you’re not seeing those older fish in the population. The populations are declining. The fact that most of the decisions have erred on the risky side, allowing gillnets to continue for a lot of the fisheries, the shrimp trawling, not having more area protections or closures. All these decisions are inherently risky and it seems like almost at every turn [in North Carolina] we’re choosing . . . the riskier option. So that means that you really need a lot of precaution on that. And . . . start eliminating those risks.

(T. 1693–94).

233. Dr. Daniel concurred, as well. (T. 1158). When asked whether it is possible to achieve long-term stock viability by managing to the biomass threshold rather than a higher target, he testified that it is not, because managing to MSY does not allow for the precautionary buffers necessary for stock recovery. (T. 1158). As he stated in his expert report, “[m]anaging for MSY, in many cases, is a risk-prone approach, because harvesting right at the maximum yield . . . provides little room for management error.” (P. Ex. 211, p. 6). Dr. Daniel explained that if a fishery is managed only to threshold values—the floor beneath which a stock is being overfished—the stock will likely “vacillate around that number,” resulting in periods when it is “overfished again,” triggering repeated statutory requirements to end overfishing and rebuild the stock—a cycle that can be avoided by continuing to manage for target benchmarks. (P. Ex. 224; T. 1135–37).

234. Dr. Daniel testified to a particularly problematic example of the State’s failure to apply the precautionary approach with respect to Southern flounder. (T. 1380–81, 3851–53). When DMF presented the first Southern Flounder FMP in 2005, the 2004 stock assessment showed that the species had been overfished with overfishing occurring since at least 1991, and DMF recommended a 33% harvest reduction (the target)—with a 20% threshold harvest reduction being the absolute minimum needed to begin rebuilding the stock. (T. 1380–81). The MFC instead adopted a harvest reduction of only 17%—less than the minimum necessary to end overfishing, and with no precautionary buffer. (T. 1380–81, 3851–53). The approach, as Dr. Daniel put it, was in essence: “[W]e’re going to hope the [DMF] science is

wrong.” (T. 1380–81). As described above in Section II.B.1., the Southern flounder stock remains overfished to this day.

235. Mr. Gentner also gave un rebutted testimony that North Carolina’s fisheries managers, due to a lack of precaution, are failing to sustainably manage several important fisheries by allowing harvest exceeding MSY on declining stocks. (P. Ex. 213, p. 3; T. 1939). He gave un rebutted testimony that coastal fisheries management in North Carolina has “overshot” MSY in nearly all state-managed fisheries for decades. (T. 1976).

236. Dr. Stunz further testified that given how many fisheries “are overfished or overfishing’s still occurring,” the State actually needs to exercise “*more* than the average precautionary approach” and first bring fisheries back “to a sustainable state of viability.” (T. 1798) (emphasis added). He explained that “getting out of those situations can be very difficult,” and in some cases—as with cod in New England—“you may not be able to get out of it” at all. (P. Ex. 220, p. 6; T. 1798–99).

C. The State has tolerated destructive commercial fishing practices that are banned or severely limited in other states.

237. North Carolina’s tolerance for destructive gears is unique—and unmatched—among all southeastern states. (P. Ex. 211, p. 12). In Dr. Powers’ expert report, he noted that “[c]ompared to other southeastern Atlantic and Gulf coast states, North Carolina’s coastal fisheries managers appear to have a penchant for allowing enormous amounts and widespread usage of destructive commercial

gears that have been banned outright or severely restricted in those other states.” (P. Ex. 216, p. 25).

238. As Dr. Daniel noted in his expert report, North Carolina “allow[s] commercial gears that have been prohibited in other jurisdictions because of their extraordinarily high levels of bycatch”—most notably, estuarine shrimp trawling and gillnets. (P. Ex. 211, p. 12). That allowance has created a management problem virtually unique to North Carolina, making the State’s disregard of the high number of discards from those gears highly risk-prone and contrary to sound management principles. (P. Ex. 211, p. 12).

239. Referring to estuarine shrimp trawling and gillnets, Dr. Nifong described how the State is “burning the candle at both ends”—killing millions of juvenile finfish in shrimp trawls and eliminating their chances of entering the spawning stock, while simultaneously removing older fish from populations in gillnet fisheries that are now badly needed to rebuild stocks and reverse age truncation. (T. 212). Both of those destructive practices are discussed in turn below.

1. Estuarine shrimp trawling

a. Unlike other states, North Carolina allows trawling in critical estuarine nursery areas.

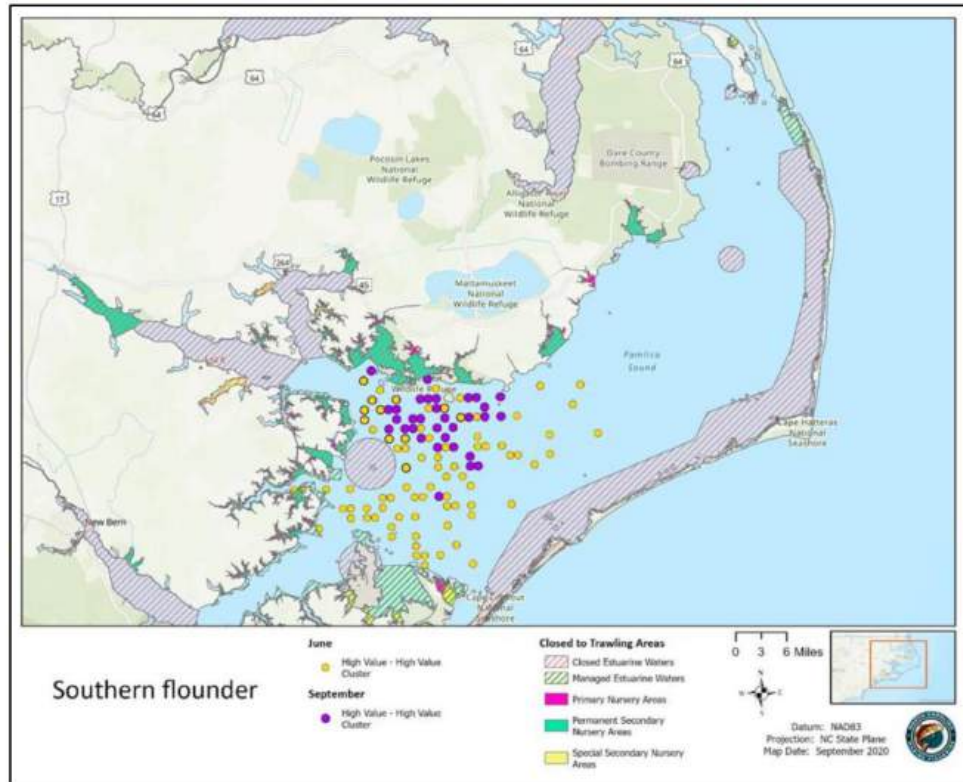
240. The State concedes that bycatch from estuarine shrimp trawling—mostly juvenile finfish—is uniquely a North Carolina issue. (T. 3623–24). As Mr. Batsavage put it, “we’re the only Atlantic state that allows this kind of extensive estuarine shrimp trawling.” (T. 3623–24). As Dr. Daniel noted, there is no state participating in regional plans for Atlantic croaker, spot, or weakfish that have

anything near the magnitude of North Carolina's estuarine shrimp trawling, and thus, unlike North Carolina, they have no need to characterize or try to reduce the bycatch from it. (T. 1586).

241. Although shrimp trawling is restricted in some estuarine waters,¹⁸ trawling remains permitted where juvenile finfish are known to congregate, particularly in the open waters of the Pamlico Sound. (P. Ex. 118, p. 123; T. 1017–18, 2769–70, 2825). During shrimp season, boats with headropes up to 220 feet are allowed to trawl those areas 24 hours a day, five days a week—even into the Fall, when fish are actively migrating toward inlets. (T. 1351). These areas, Dr. Daniel testified, include critical nursery habitats for species of concern. (T. 1351).

242. Dr. Daniel noted that when DMF originally defined primary nursery areas prior to 1990, it rejected juvenile spot as an “indicator species”—that is, a species whose presence and abundance can be used to differentiate between station groupings. (P. Ex. 125, p. 16; T. 1246–57). The reason was that spot were so ubiquitously distributed within the Pamlico Sound estuarine complex that it was “useless” to differentiate protected areas from areas that were open to shrimp trawling. (P. Ex. 125, p. 15; T. 1246). In other words, if juvenile spot were included

¹⁸ In 1988, the MFC adopted rules designating certain estuarine waters as either primary or secondary nursery areas. (P. Ex. 114, p. 8; P. Ex. 124). Trawling is prohibited in the 6.3% of State estuarine waters so designated. (P. Ex. 114, p. 8; P. Ex. 124). These designations and rules have not changed since then. As the UNC Collaboratory Report found, primary nursery areas “have not been managed adaptively over decade old scales and they do not appear to be functioning as intended.” (T. 2960; P. Ex. 37A, p. 24).



244. A synthesis of historical data from DMF's Pamlico Sound fisheries-independent surveys compiled by one of the Plaintiffs, Rick Sasser, and presented at trial, shows similar results. (P. Ex. 124).

b. The State has tolerated a 75-year-old data gap on bycatch impacts that its fisheries managers and experts acknowledge still exists.

245. The evidence showed that the biological and ecological impact of estuarine shrimp trawling in North Carolina is an unquantified, unresolved problem that dates back 75 years. (P. Ex. 84).

246. In 1951, a panel of scientists and the Chair of the U.S. Fish and Wildlife Service submitted a report to the ASMFC entitled, "The Destruction of Small Fish by the Shrimp Trawlers in Pamlico Sound." (P. Ex. 84). They noted a

significant decline in certain fish in the Chesapeake Bay and in North Carolina, and they focused on the shrimp fishery in the Pamlico Sound, citing the undisputed fact that large quantities of fish were caught by shrimp trawls as bycatch. (P. Ex. 84, p. 1). They recommended that a comprehensive study be conducted to determine the natural and fishing mortalities of certain species—including Atlantic croaker, spot, weakfish, spotted seatrout, and flounder—to determine and evaluate the bycatch of juvenile fish. (P. Ex. 84, p. 10).

247. 43 years later, in 1994, a study confirmed that the shrimp trawl fishery was the most significant bycatch contributor in North Carolina and the southeastern Atlantic region. (P. Ex. 87, p. vi). Based on a shrimp-to-fish weight ratio of 1:4 (four times as much fish as shrimp), the study concluded that the estimated bycatch was ten times larger than the reported landed bycatch of the flynet and long-haul seine fisheries at that time, when approximately 80% of annual North Carolina shrimp landings came from estuarine waters. (P. Ex. 87, p. vi).

248. In 1999, two years after the FRA's enactment, DMF issued a report on estuarine trawling. (P. Ex. 88). The report acknowledged that shrimp trawls generate more discards than any other fishery worldwide. (P. Ex. 88). That 1999 report, as well as the first shrimp FMP in 2006, described a two-step process for determining bycatch impacts on fish populations. (P. Ex. 88; P. Ex. 98, p. 148). First, the bycatch must be characterized in terms of magnitude and composition. (P. Ex. 88; P. Ex. 98, p. 148). Second, the resulting data must be applied to

population and ecosystem models to evaluate the potential impacts. (P. Ex. 88; P. Ex. 98, p. 148).

249. Notably, DMF's 1999 report stated that it was "no longer acceptable to assume discards (bycatch) represent an unimportant removal from a stock." (P. Ex. 88, bates .003–004). Seven years later, however, as the original 2006 shrimp FMP acknowledged, many of the research recommendations from DMF's 1999 report had not been acted upon, primarily due to lack of funding. (P. Ex. 98, p. 115).

Highlighting those concerns, the 2006 FMP made clear that the most pressing research need was to quantify and reduce the bycatch. (P. Ex. 98, pp. 2–3).

250. 15 years later, however, by 2021, the total bycatch from estuarine shrimp trawling—including its population-level impact on fish stocks—still remained unknown, as DMF acknowledged in a presentation to the MFC. (P. Ex. 115, p. 10). In that presentation, DMF stated that quantifying bycatch requires detailed effort and bycatch data. (P. Ex. 115, p. 10). That data gap—i.e., the need for additional studies on estuarine trawl bycatch based on trawl effort—is essentially the same data gap that has existed since at least 1951, as the State's expert, Dr. Fred Scharf, confirmed on cross-examination. (T. 3242–45; P. Ex. 84). In short, the State's fisheries managers have tolerated this data gap for 75 years, and have failed

to complete the two-step process for closing the data gap that DMF's report outlined more than 25 years ago.¹⁹

c. Juvenile finfish bycatch from trawling, measurable in the hundreds of millions, far exceeds the amount of shrimp harvested by trawling.

251. The most comprehensive modern characterization studies on the bycatch from estuarine shrimp trawling were a series of five studies from 2008 through 2017 that were conducted on board trawling vessels by DMF observers, led by Kevin Brown. (P. Ex. 92 (table), 93, 95, 101, 104, 108; T. 2576–80).

252. The study issued in 2015 covered two full shrimping seasons (for 2013 and 2014), and notwithstanding its limitations, was referred to by Dr. Daniel as the “gold standard”—the most comprehensive study characterizing any east coast shrimp fishery to date. (T. 1324–25; P. Ex. 211, p. 14). Dr. Daniel noted that for the full years covered by the 2015 study, the pounds of shrimp in the catch correlated with DMF's trip-ticket data, which gave him additional confidence in its reliability. (T. 1344).

¹⁹ The State contends that the “ratio method” (where catch of shrimp is compared to bycatch) is not a preferred method for quantifying bycatch, and it notes that an effort-based method was used to estimate shrimp trawl bycatch in the 2017 ASMFC stock assessments for Atlantic croaker and spot. (SPF ¶ 187). Regardless of which method is preferred, the need to quantify that bycatch was identified over 75 years ago (P. Ex. 84), giving the State ample time to select a method for characterizing and quantifying the magnitude of the bycatch, obtain effort data if necessary, and determine the impacts of estuarine shrimp trawling on populations of historically significant fish stocks. (T. 3244–45; P. Ex. 84). As described above, the State has failed to do so.

253. The Brown characterization studies had some limitations. (T. 1329–30). First, the survival method used to determine rates of bycatch mortality was relatively crude: fish were placed in a five-gallon bucket, and after about an hour, anything showing even slight movement was counted as “alive.” (T. 1329–30).

254. Second, the studies measured only “at-net survival,” even though a fish that was “alive” at the time it was placed in the bucket may not ultimately survive, and could die within days. (T. 2635). Thus, the study did not fully account for post-net mortality from encounters with a shrimp trawl. (T. 2635).

255. Mr. Brown noted in his testimony that “delayed mortality” can occur over an extended period after capture and release. (P. Ex. 108, p. 23; T. 2634). He also testified based on his many hours on trawling vessels that, as a practical matter, when bycatch is shoveled overboard, “birds and fish . . . and everything else feeding off of it” typically appear. (T. 2634).²⁰ It was because of this reason that Mr. Brown recommended in all his relevant reports that “delayed mortality” studies be conducted, because “you don’t know what that number is unless you study it.” (T. 2634, P. Ex. 93, p. 28, P. Ex. 101, p. 24, P. Ex. 102, p. 14, P. Ex. 104, p. 24). To date, however, no such studies have been undertaken, and as a result, total mortality from finfish encounters with shrimp trawls remains unknown. (T. 2633–34; P. Ex. 115, p. 10).

²⁰ The evidence at trial included a video taken recently in the Pamlico Sound depicting this scene. (P. Ex. 142).

256. Moreover, as Mr. Brown acknowledged at trial, mortality from discarded bycatch is likely much higher than the at-net mortality he observed during the study, particularly given the sorting time, physical injury from the net, and indirect predation from birds, sharks, and dolphins. (T. 2634). Dr. Daniel testified similarly that a fish thrown overboard after an encounter with a shrimp trawl is extremely unlikely to survive. (T. 1329).

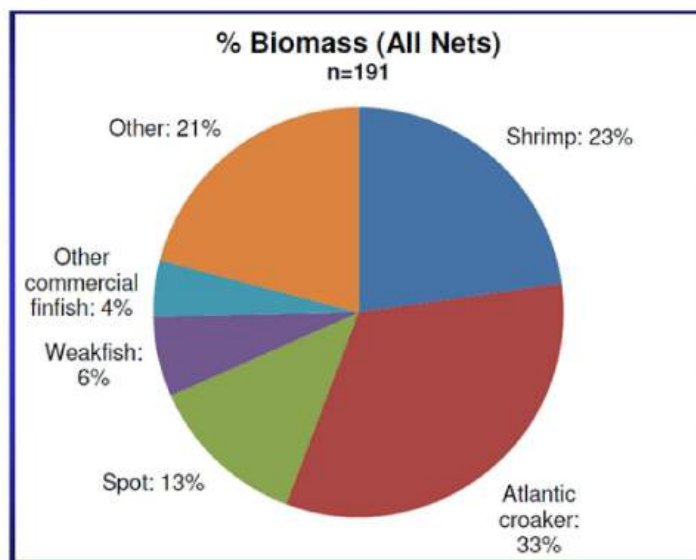
257. Third, the studies also did not account for the probability that a surviving juvenile finfish will be caught again in a subsequent trawl. (T. 2635).

258. Lastly, the Brown characterization studies were not designed to quantify bycatch at the fleet or population level. (P. Ex. 104, p. 22; P. Ex. 108, p. 16). The studies documented the percentage of trips that were observed in a given study period according to DMF's trip-ticket data, but they made no attempt to estimate fleet-level or population-level bycatch. (P. Ex. 104, p. 22; P. Ex. 108, p. 16).

259. Notwithstanding these limitations, the five characterization studies—in particular, the multi-year 2015 study—significantly advanced the understanding of the composition and magnitude of estuarine shrimp trawling bycatch in North Carolina, such that the data in the studies represents “the best available science” for understanding the bycatch. (T. 1332; P. Ex. 211, p. 15; P. Ex. 216, p. 27).

260. As Dr. Daniel explained, the results of the data were also “remarkable” and “disturbing.” (T. 1332; P. Ex. 211, p. 15). The data first showed that, consistent with the figure referenced in the 1994 study noted above, shrimp represent only 20–30% of the catch by weight, with juvenile finfish—predominantly Atlantic croaker,

spot, and weakfish—comprising much of the remaining 70–80%. (P. Ex. 101, pp. 13–14; P. Ex. 87, p. vi). The following chart from the first of the Brown characterization studies in 2009, conducted in the Pamlico Sound and its tributaries, illustrates this catch composition:



(P. Ex. 96, p. 82).

261. The later Brown studies showed similar results. In 2014, the last full year of the most comprehensive study and the year with the highest observer coverage (1.24% of the estuarine fleet), shrimp was found to represent a mere 18.2% of catch by weight, while Atlantic croaker accounted for 49.41%, spot for 13.75%, and weakfish for 5.20%. (P. Ex. 101, p. 14; Table 44). Collectively, those three species of finfish constituted 68.36% of catch by weight. (P. Ex. 101, Table 44). Two years later, in 2016, a study with 0.29% coverage of estuarine otter trawls (i.e., bottom-disturbing gear) found that shrimp represented 30.47% of catch by weight—a study that also found that at-net mortality for weakfish was 100%. (P. Ex. 104, p. ii). In 2017, a half-year study with 0.09% otter trawl coverage found that shrimp

was 30.50% of catch. (P. Ex. 108, p. ii). As Mr. Gentner put it, this data shows that estuarine shrimp trawling is, in reality, not a shrimp-harvesting operation inasmuch as it is a juvenile finfish bycatch operation. (T. 1937).

262. The evidence also showed that the magnitude of the bycatch problem is even larger than the State has characterized it to be. (T. 1335–36). As Dr. Daniel explained, when post-net predation is considered (i.e., fish escaping BRDs in a stunned or injured state subject to waiting predators, and losses after fish are shoveled overboard), the ratio of finfish lost to shrimp harvested is more likely than not to exceed 4 to 1. (T. 1335–36). No witness from the State offered any contrary conclusion.

263. Significantly, because of their scope, the Brown studies also revealed new information about the magnitude of the bycatch. In 2014, a year that involved a relatively high observer coverage of the estuarine fleet (1.24% of total trips), the Brown study documented 2,531,242 Atlantic croaker (49.41% of catch by weight), 838,454 spot (13.75%), and 232,170 weakfish (5.20%) in the bycatch—in total, nearly 4.5 million fish from these species alone, with just 1.24% coverage of reported shrimp trawl trips. (P. Ex. 101, Table 44). Similar numbers appear in the 2013 data, the other full year of the Brown 2015 study. (P. Ex. 101, Table 40).

264. At trial, Dr. Daniel testified about the implications of these findings, using basic math to extrapolate from the data, and using the findings about Atlantic croaker in 2014 as an example: If the 1.24% observer rate were rounded down to 1%, the linear extrapolation would result in a conclusion that roughly 250 million

Atlantic croaker—just that one species—were caught as bycatch from estuarine shrimp trawling in that single year alone. (T. 1334). Moreover, as DMF’s shrimp FMP manager admitted, the bycatch consists primarily of juvenile “age zero or age one fish,” because they are “approximately the same size as the shrimp.” (T. 2719, 2838–39).

d. For the three species most impacted by estuarine shrimp trawling, the State has no plan for addressing the bycatch problem, and instead defers to generic, interjurisdictional management plans.

265. The FRA requires that DMF “shall prepare proposed Fishery Management Plans for adoption by the Marine Fisheries Commission for all commercially or recreationally significant species or fisheries that comprise State marine or estuarine resources.” N.C. Gen. Stat. § 113-182.1(a). The State’s fisheries managers, however, have deferred management of Atlantic croaker, spot, and weakfish—the three finfish species comprising most estuarine shrimp trawl bycatch, as described above—to the ASMFC, a regional fisheries commission. (T. 3623–24, 1586). North Carolina participates in those regional plans, but it has no state-specific plan to manage these species, thus allowing estuarine shrimp trawling to continue without the State’s fisheries managers having complete information about bycatch quantity or its impact on fish populations in North Carolina waters. (T. 3623–24).

266. As noted above, through Mr. Batsavage’s testimony, the State conceded at trial that no other state participating in those regional plans has anything near the magnitude of North Carolina’s estuarine shrimp trawling. (T.

3623–24). Those plans, therefore, include nothing specific to the estuarine bycatch problem that is unique in North Carolina.²¹ (P. Ex. 211, p. 12). Although the State’s fisheries managers have relied on North Carolina’s shrimp FMP as a means of addressing estuarine shrimp trawl bycatch, they have yet to do so in a meaningful way, as described above in Section IV.C.1.

267. Dr. Daniel described the State’s choice not to develop a North Carolina FMP for Atlantic croaker, spot, and weakfish, even while it has done so with other interjurisdictional species (e.g., red drum), as “confounding,” and as a choice that does not serve the public interest given that Atlantic croaker, spot, and weakfish are critical components of North Carolina fisheries and the ecosystem as a whole. (P. Ex. 211, p. 41). Moreover, as noted above in Section II.B., the evidence showed that the regional ASMFC plans have not materially improved Atlantic croaker, spot, or weakfish populations in North Carolina waters, leaving Mr. Batsavage to concede that “something needs to happen to get these fish back to an abundance that was seen historically.” (T. 3621–24).

²¹ The State’s post-trial submission notes that the ASMFC used southeastern shrimp trawl bycatch estimates, including overall estimates of trawl bycatch from North Carolina, in 2017 coast-wide stock assessments for Atlantic croaker, spot, and other species—implying that as a result, North Carolina’s shrimp trawl bycatch is accounted for in the regional management of those species. (SPF ¶¶ 180–82). The evidence showed, however, that those bycatch estimates were based on a region-wide trawl observer program that occurred primarily in ocean waters, not in estuarine waters. (T. 2727, 3041–42). Furthermore, as Dr. Hightower acknowledged, the results of Mr. Brown’s shrimp trawl bycatch characterization studies were not used in the ASMFC stock assessments for Atlantic croaker and spot. (T. 3042–43). Thus, as Mr. Zapf acknowledged, the impact from estuarine shrimp trawling in North Carolina on Atlantic croaker, spot, weakfish, and other species remains unknown. (T. 2804–05)

e. The State has relied on bycatch-reduction devices to mitigate the impact of trawling, but there is no evidence that they provide any material benefit.

268. In 1992, following an ASMFC recommendation to reduce weakfish bycatch in shrimp trawl fisheries, the State began requiring bycatch reduction devices (“BRDs”) in the shrimp trawl fleet. (P. Ex. 211, p. 14; T. 1196–97). In 2015, when the shrimp FMP was amended, the State called for an MFC shrimp bycatch reduction workgroup and sought industry cooperation to test various gear configurations, with a target of reducing bycatch by 40%. (P. Ex. 98, pp. 16–17). Largely through Mr. Brown, the State presented the results of various BRD studies. (T. 2600–11; D. Ex. 48; D. Ex. 63; P. Ex. 106; P. Ex. 107; P. Ex. 109). As described below, however, the evidence established in several ways that BRDs have not benefitted fish stocks at the population level in any material way.

269. First, the State’s witnesses admitted as much: On cross-examination, Mr. Batsavage admitted that in the nearly 25 years since BRDs have been required, “we haven’t seen [BRDs] really yield the benefits we hoped to see.” (T. 3636–37). Consistent with that admission, the State was unable to cite to any evidence showing a rebound of the species significantly impacted by estuarine shrimp trawling, either in North Carolina’s waters or regionwide. To the contrary, as Dr. Daniel noted, no sign of recovery appears in the State’s juvenile abundance survey indexes, and in fact, those index numbers continue to decline. (T. 1319).

270. Second, the Brown 2015 characterization study—conducted two decades after BRDs were required—confirmed that the bycatch was enormous despite the use of BRDs. (T. 1324–27). Further to this conclusion, the shrimp-to-

finfish weight ratio in the Brown studies did not differ materially from the 1:4 ratio referenced in the 1994 study issued shortly after BRDs were first required.

(Compare P. Ex. 87, p. vi to P. Ex. 101, p. 14 and P. Ex. 96, p. 82).

271. Third, the Brown studies were “stand alone” studies, such that extrapolating the results to quantify bycatch reduction in the shrimp trawl fishery or characterize estuarine shrimp trawling at the fleet level would be inappropriate. (T. 2655). Dr. Daniel likewise noted in his report that observed BRD bycatch reductions are tow-specific, and cannot be extrapolated to a wider area or to overall finfish populations. (P. Ex. 211, p. 38).

f. The State cannot expect any recovery of Atlantic croaker, spot, or weakfish while the current degree of bycatch from estuarine shrimp trawling remains.

272. All three of Plaintiffs’ fisheries-management experts offered their un rebutted conclusion that estuarine shrimp trawling is significantly impacting the recovery of Atlantic croaker, spot, and weakfish. (P. Ex. 211, pp. 36–37; P. Ex. 216, p. 11; T. 1319, 1636).

273. As Dr. Daniel explained, the hundreds of millions of juvenile finfish in estuarine shrimp trawling bycatch represent critical recruits needed to replenish depleted North Carolina fish stocks. (P. Ex. 211, pp. 15–16). He described how, if allowed to spawn even once, they could insert critical biomass into their species’ spawning stocks. (P. Ex. 211, pp. 15–16). As he explained further, juvenile finfish subject to trawling in estuarine waters have already survived the biggest gauntlet of natural mortality and are at the point of starting to move from the estuary into

the ocean. (P. Ex. 211, pp. 15–16). He elaborated on this point in plain terms: “You’re going to kill all those recruits into collapsed fisheries for a few million pounds of shrimp.” (T. 1203).

274. Dr. Stunz and Dr. Powers agreed on these conclusions. (T. 1833, 1846–47; P. Ex. 220, p. 16). As Dr. Powers concluded:

Estuarine shrimp trawls may not be the only reason why North Carolina populations of [Atlantic croaker, Spot and Weakfish] have precipitously declined, but by removing potential recruits of those species to their respective populations on a continual basis, the current management policy regarding estuarine shrimp trawls will be a major impediment to the recovery of those stocks so long as it continues.

(P. Ex. 216, p. 27). This bottom-line conclusion of the Plaintiffs’ experts was left unrebutted.²² (P. Ex. 216, p. 27; T. 1636, 1833, 1846–47).

²² The Court heard conflicting evidence from the parties’ experts on the degree to which natural mortality has contributed to low weakfish abundance. *Compare* (T. 1163–66; 1663–64 (Powers), *with* T. 3617–18 (Batsavage) and T. 3017–18 (Hightower)). Ultimately, however, as Mr. Batsavage conceded, “there’s always uncertainty with natural mortality estimates,” and the cause of any increase in natural mortality estimates is “not fully understood.” (T. 3617–18).

Regardless, there is no need for the Court to attempt to resolve this “uncertainty” on natural mortality (T. 3617–18), because as noted above, the results of Mr. Brown’s characterization studies showed that estuarine shrimp trawling in North Carolina is a significant source of fishing mortality for weakfish. For example, in 2014 (year 3 in Brown’s 2015 study), for just 1.24% of reported estuarine otter trawl trips, the bycatch included 232,170 weakfish. (P. Ex. 101, Table 44). The vast majority of those fish were under the legal size limit for that stock. (P. Ex. 101, p. 18). As a result, weakfish represented the largest regulatory discard in the catch sorted by species: 99% of weakfish were classified as regulatory discards, and weakfish comprised 83% of all regulatory discards by weight. (P. Ex. 101, p. 20). None of the State’s experts disputed the Plaintiffs’ experts’ ultimate conclusion that this degree of mortality from estuarine shrimp trawling is an impediment to the recovery of weakfish. (P. Ex. 216, p. 27; T. 1636, 1833, 1846–47).

275. Dr. Daniel also noted in his report that shrimp, if not harvested as juveniles in estuarine waters, could serve an important ecosystem role as prey (i.e., as an important food source for rebuilding stocks). (P. Ex. 211, p. 16). Dr. Powers likewise testified that shrimp have an intrinsic value as forage in the ecosystem. (T. 3057). No witness for the State disputed that reducing juvenile fish mortality would significantly benefit North Carolina’s marine and estuarine resources. (P. Ex. 212, p. 5).

g. Estuarine shrimp trawls also have critical physical habitat and other environmental impacts.

276. The evidence also showed that estuarine shrimp trawling impacts bottom habitat. (T. 1357). Dr. Daniel testified that trawling gear continually dragged over estuarine bottoms year after year destroys colonizing animals that support vibrant nursery habitats, as well as submerged aquatic vegetation that is critical spawning and nursery habitat for imperiled stocks like blue crab and bay scallops. (T. 1357). As Dr. Daniel explained: “These fish aren’t looking for big flat open expanses of trawled bottom, they’re looking for structure. They want to be around things that they can hide in, sea grass meadows, oyster reefs, sponge beds, sea fan communities—all these types of bottom habitats that used to be out there before we start[ed] trawling and dredging the sound.” (T. 1357).

277. The UNC Collaboratory Report confirmed this as well, finding that North Carolina’s benthic structured habitats—including marshes, submerged aquatic vegetation, and oyster reefs—are “severely degraded.” (T. 2954–56; P. Ex. 37A, p. 21).

278. As Dr. Powers noted, the environmental impacts of estuarine shrimp trawling also extend beyond the immediate fishery. (P. Ex. 216, p. 31). There is a growing concern that commercial fishing trawls are releasing previously sequestered carbon from ocean sediments into the atmosphere in significant amounts—more than the carbon released by the entire aviation industry. (P. Ex. 216, p. 31). Although Executive Order 80, signed by the Governor in October 2018, requires all cabinet agencies (including DEQ, which oversees DMF) to “integrate climate adaptation and resiliency planning into their policies, programs, and operations,” (P. Ex. 144), DMF has still not assessed the climate impacts of permitting ocean-sized trawl vessels to trawl across estuarine bottoms continuously. (P. Ex. 118, p. 57; P. Ex. 37a, pp. 378–79).

279. The evidence thus showed that the biological and ecological costs of estuarine shrimp trawling are well-documented and extensive, involving far more than direct bycatch mortality, and encompassing the loss of critical prey, the destruction of nursery habitats, and unassessed environmental impacts.

h. The State cites to the shrimp industry as justification for the harm caused by estuarine shrimp trawling, but the State has yet to conduct a comprehensive cost-benefit analysis.

280. The State’s shrimp FMP cites the economic impact of the shrimp industry, touting it as one of the largest and most valuable commercial fisheries. (P. Ex. 118, p. 12). The only economist to testify at trial, however, explained that there is a difference between economic costs and benefits versus economic impacts. (T. 1930–32). As Mr. Gentner explained, under federal fisheries management

guidelines, managers first analyze the benefits *and* costs of an activity to determine its value. (T. 1930–32). Harvest control measures are therefore based on an economic analysis that accounts for not just the economic value the activity generates, but also its ecological and economic costs—in other words, not simply the revenue or economic impacts. (T. 1930–32).

281. As Mr. Gentner testified, a fundamental premise of the public trust is that the State “is managing a resource for everybody,” and thus, is “[m]aximizing the benefits for everyone who that resource belongs to.” (T. 1932). Therefore, he explained, it is only after management decisions are made that consideration should turn to minimizing impacts of new restrictions on small businesses and industry participants. (T. 1931–32).

282. At trial, the evidence showed that no such economic cost-benefit analysis has ever been conducted for any aspect of the shrimp trawl fishery in North Carolina, including the estuarine trawl fishery. (T. 1938–39, 2835). DMF’s economic discussion in Amendment 2 to the shrimp FMP, for example, addresses only the commercial shrimp industry’s economic impact, and makes no attempt to quantify what is lost economically from shrimp trawling bycatch or habitat impacts. (T. 2834). Nor does it calculate how much revenue bycaught finfish species would generate from recreational fishing or what their value would be from commercial fishing. (T. 2834–35). Instead, DMF refers in that discussion to the “hidden costs” of North Carolina shrimp harvest, without identifying or quantifying those costs. (T. 2833). In short, the evidence did not contain any economic analysis showing that

the biological and ecological costs of estuarine shrimp trawling, at its current scale, could be justified.

283. To the contrary, the Court heard un rebutted testimony that if such a cost-benefit analysis were undertaken—and Mr. Gentner confirmed that it could (T. 2835)—the biological and ecological costs of the estuarine shrimp trawling fishery could not be economically justified. (P. Ex. 211, p. 16; T. 1937–38). Dr. Daniel concluded in his expert report that if the nearly 1 billion juvenile finfish wasted annually from estuarine shrimp trawling were allowed to serve their normal ecosystem functions, they would be far more economically beneficial than the estuarine shrimp trawl harvest. (P. Ex. 211, p. 16). Dr. Stunz reinforced the point: Shrimp is a “relatively low cost commodity, particularly with the import pressure we see these days,” while the fish species that predominantly comprise the bycatch—Atlantic croaker, spot, weakfish—are “high value species” because of their recreational and commercial importance. (T. 1937). Mr. Gentner likewise noted that the finfish comprising the bycatch bring higher prices at the dock, and there is a compounding effect of recruitment overfishing (juvenile bycatch). (T. 1938). The State presented no contradictory economic analysis or testimony from any witness.

284. Mr. Gentner also testified that a cost-benefit analysis could be done for restoring the Pamlico Sound as a fishery destination. (T. 2835). Multiple witnesses described the unique geographic asset that the Pamlico Sound represents, and how, because of North Carolina’s unique and expansive estuarine waters, there is “no comparable body of water to Pamlico Sound anywhere on the east coast or in the

Gulf of Mexico.” (T. 2689). This is because an estuarine lagoon like the Pamlico Sound offers a unique habitat for juvenile finfish—as Dr. Daniel described it, a “fish factory.” (T. 700). Other witnesses likewise testified that the Pamlico Sound was once a renowned deeper, estuarine-water fishery, especially for Atlantic croaker and weakfish, but that fishery evaporated as those fish declined in abundance. (T. 547–48, 562–63, 569–72 (Albea); T. 524–27 (Hardison); T. 969–70 (Sasser)).

285. To summarize the Court’s findings on estuarine shrimp trawling: The evidence showed that North Carolina’s estuarine shrimp trawling—unique in its scope—has imposed enormous, largely unquantified biological, ecological, and economic costs on the State’s marine and estuarine resources for at least 75 years, wasting hundreds of millions of juvenile finfish annually and degrading critical nursery habitats. *See* Section IV.C.1.a–d. During these 75 years, the State has failed to close a fundamental data gap, relied on bycatch reduction devices that its own witnesses concede have not worked as intended, and deferred management of the most impacted species to regional plans that do not address North Carolina’s unique problem. *See* Section IV.C.1.e–g. The end result, as the unrebutted expert testimony confirms, is that recovery of Atlantic croaker, spot, and weakfish cannot reasonably be expected so long as the current magnitude of estuarine trawling continues, and that the juvenile finfish wasted as bycatch, if allowed to fulfill their ecosystem functions, would be far more valuable than the shrimp harvest itself. *See* Section IV.C.1.h.

2. Gillnets

a. Gillnets have indisputable, negative biological impacts relative to other commercial gears.

286. Like estuarine shrimp trawling, North Carolina's tolerance for gillnets is unique—and unmatched—compared to all other southeastern states. (T. 1857, 1868, 1870 (Dr. Stunz); T. 1365 (Dr. Daniel); P. Ex. 220, pp. 19, 21; P. Ex. 211, p. 12; P. Ex. 216, p. 25).

287. Gillnets are stationary panels of mesh webbing that extend across water. (P. Ex. 147, p. 1). Configurations and use of gillnets vary in North Carolina, and they can be anchored to the bottom with suspending buoys, used as a boat drifts across a larger body of water, or used to encircle and “strike” schools of fish. (T. 2195–97; P. Ex. 147, pp. 1–2; P. Ex. 161, pp. 22–23). The diameter of the mesh webbing also varies, depending upon the targeted species. (T. 2195–97; P. Ex. 147, pp. 1–2; P. Ex. 161, pp. 22–23).

288. In North Carolina, a general dichotomy exists between large-mesh nets and small-mesh nets. (T. 3353–56). Large mesh, anchored nets have historically been used to target species like Southern flounder. (T. 3353–56). Small mesh is used to target a variety of species. (T. 3353–56).

289. Relative to other commercial gears, gillnets have indisputable, negative biological impacts that stem from their effectiveness and indiscriminate nature. (T. 1857; P. Ex. 220, p. 19). This is particularly the case following the introduction of mass-produced nets made of monofilament in the latter part of the 20th century that are less visible to fish, which, along with the net reel, allowed

gillnets to be fished in significantly greater quantities. (T. 1360–61). Although mesh size can be altered to make a gillnet selective to certain size fish, gillnets are not selective as to species of fish. (P. Ex. 211, p. 18). Instead, they catch lots of species—not just the targeted species, but also non-targeted species. (T. 1685–86).

290. Dr. Powers, Dr. Stunz, and Dr. Daniel each testified about the enormous harm caused by gillnets, as well as the significant resource benefits of eliminating them. (T. 1685–90 (Powers); T. 1857–60, 1868–71, 1878–80 (Stunz); T. 1359–65, 1376 (Daniel); P. Ex. 216, pp. 25–26 (Powers Report); P. Ex. 220, pp. 19–21 (Stunz Report); P. Ex. 211, pp. 18–22 (Daniel Report)). As Dr. Stunz explained, gillnets are “very destructive, very indiscriminate, kill a lot of things you don’t want to catch,” and cause “high bycatch problems”—a type of extraction fundamentally different from and significantly more damaging than hook-and-line fishing. (T. 1857; P. Ex. 220, p. 19). Consistent with this testimony, a 2009 DMF report provided a breakdown on gillnet catch based on whether it was marketable, unmarketable, or constituted regulatory discards. (P. Ex. 141, Tables 9 and 10). For large mesh gillnets, only 48% was marketable (kept); 47% was unmarketable and 5% constituted regulatory discards. (P. Ex. 141, Tables 9 and 10).

291. The non-selectivity as to species is of particular significance in North Carolina’s estuaries, where fish of various species intermix and occupy the same waters. (P. Ex. 211, p. 18). Dr. Stunz testified that gillnets are especially destructive in estuarine waters because they harvest “large amounts of biomass at one time,” intercepting estuarine fish before they can “escape to their spawning stocks.” (T.

1858–59; P. Ex. 220). In addition, even as to mesh size, gillnet selectivity is lost if an anchored net is fished in shallow waters where the net folds on itself. (T. 720–21).

292. Given the significant harms described above, when asked whether, if the State continues to allow gillnets at current or any substantial level, North Carolina’s depleted finfish stocks could ever recover to long-term viability, Dr. Stunz testified that it would be “very problematic to move them out of [that] overfished or overfishing status as long as that level of gillnetting is in the fisheries.” (T. 1870–71). When asked just how difficult, he answered: “I would say probably not possible in the state we’re in right now.” (T. 1870–71). He likewise noted in his expert report that “in North Carolina I see no indication that fisheries managers have ever even recommended the State follow its southeastern sister states, and the Gulf coast states, in severely restricting or banning use of gillnets and reaping the resource benefits seen in all the states that have done so.” (P. Ex. 220, p. 21).

293. Dr. Daniel also gave unrebutted testimony that gillnet overcapacity was a significant cause of age truncation in state-managed stocks, and that North Carolina’s tolerance for gillnets explains why no state-managed stock exhibits long-term viability. (T. 1375). He described how the State has allowed gillnets to proliferate in estuarine waters without sufficient proactive controls, and that no other state allows the level of gillnetting in its estuarine nursery grounds that North Carolina tolerates. (T. 1365, 1367).

294. Dr. Powers likewise testified that discards from gillnets can slow recovery of a species. (T. 1687–88). He further explained that reducing or eliminating gillnet fisheries can improve ecosystem health, because fish caught as bycatch “aren’t being harvested for any economic value,” and instead, “they’re being released dead,” creating “overall wastage” that “limits the economic efficiency of your fishery” and “jeopardiz[es] the health of your ecosystem.” (T. 1686–87). Dr. Powers also testified that viable commercial fisheries can exist without gillnet fisheries, noting that many states have moved to alternatives such as gig fisheries and hook and line. (T. 1686).

b. All other southeastern states have banned or severely curtailed gillnet usage, with dramatic, documented benefits to fish stocks.

295. The experience of other states confirms the findings above. Dr. Stunz testified that after Texas banned gillnets in 1981, the state saw an “immediate positive response” in red drum, the principal targeted species—with increases in abundance of approximately 700 percent—as well as increases in spotted seatrout, black drum, and “the whole suite of species.” (T. 1859–60; P. Ex. 220, pp. 19, 21; P. Ex. 221, p. 3 and App. 1). His expert rebuttal report attaches a peer-reviewed paper, consistent with data that Dr. Stunz separately assembled, documenting “rapid changes in age structure, mortality and escapement accompanied stock recovery of estuarine red drum population of Texas.” (T. 1879–80; P. Ex. 221, p. 3 and App. 1). As Dr. Stunz testified, the “population kind of topped out to its carrying capacity and it remains stable to this day.” (T. 1879). Notably, Texas now supports even

higher fishing pressure and catch rates than it did during the commercial gillnet era, demonstrating that the gillnet ban did not merely shift extraction mode, but fundamentally improved the fishery. (T. 1864–65).

296. Other southeastern states have followed a similar path. In fact, most other Gulf and southeastern states have either banned gillnets outright or permit them only in very controlled circumstances. (T. 1857, 1859).

297. In Dr. Powers' home state of Alabama, all inshore gillnet fisheries are being phased out. (T. 1652). As a fisheries biologist, he applauded this change because it eliminates the discard and bycatch problem and gives the fisherman "a better quality fish to sell." (T. 1686–89). When asked to identify a model for transitioning away from gillnet fisheries, Dr. Powers pointed to Florida, where retraining allowed gillnet fishermen to stay in the fishing industry in clam aquaculture or as recreational fishing guides. (T. 1688–89). He emphasized that Florida "did an exceptional job of retraining those gillnet fishermen," thereby

“saving that culture and saving jobs.”²³ (T. 1688–89). This testimony was un rebutted.

298. Multiple other witnesses provided extensive testimony and evidence about the biological and ecosystem costs of gillnet fisheries in North Carolina—not only on fish, but also on other animals in estuarine waters, including and especially sea turtles. Mr. Jernigan, a life-long waterman and former gillnetter who ultimately stopped using gillnets because he “knew it wasn’t right” (T. 747), described encountering dead bycatch in gillnets that included sea turtles, alligators, birds, raccoons, sharks, and even a manatee. (T. 747). He recorded these encounters on videos that were introduced at trial, which depicted dead bycatch tangled and scattered across slack gillnets. (P. Ex. 153, 154, 155, and 156; T. 758–59).

299. Mr. Hardison likewise testified about years of observing bycatch from gillnet fishing in front of his home near the Pamlico Sound, including watching commercial fishermen use a bat to knock off crabs attracted by the netted fish.

²³ The State characterized other states’ decisions to ban destructive gears as “political” rather than “scientific.” (T. 65–66). The Court finds this characterization irrelevant. The people of those states—acting through their legislatures and referenda—decided that the biological and ecological costs of these destructive gears outweighed their economic benefits. (T. 1859–60; P. Ex. 220, pp. 19, 21). The people of North Carolina likewise acted—through their representatives in enacting the FRA, and most recently in ratifying Article I, Section 38—to mandate sustainable management and preservation of coastal fisheries. *See* S.L. 1997-400; N.C. Const. art. I, § 38. The State’s failure to bring its management in line with these directives, while other states have done so through equivalent democratic processes, is not a policy choice that the State may insulate from review, but rather, a deficiency. *See Coastal Conservation Ass’n*, 285 N.C. App. at 277, 878 S.E.2d at 297 (reaffirming that “the State can no more abdicate” its duty to preserve and protect North Carolina’s coastal fisheries “than it can abdicate its police powers”).

(T. 533–34). Mr. Andrews presented video evidence of dead juvenile red drum—too small to keep legally, and bearing mesh marks—that were discarded after strike netting for mullet. (P. Ex. 158; T. 685–88). Mr. Vernon testified to his personal observations of watching strike nets operating “like a vacuum cleaner,” removing “whole year classes of fish out of the ecosystem in minutes.” (T. 641–42).

c. In North Carolina, gillnet effort was allowed to proliferate without proactive controls, resulting in overcapitalization and unknown but massive bycatch.

300. Unlike in other states, North Carolina allowed gillnet effort to expand dramatically in estuarine waters beginning in the last part of the 20th century. (T. 2278). Mr. Loeffler confirmed the increase in the use of monofilament gillnets in North Carolina in the 1980s, and that it “really took off” in the early 1990s. (T. 2278). By 1994, gillnets overtook pound nets as the primary commercial gear for harvesting Southern flounder, the primary target of the large mesh gillnet fishery. (P. Ex. 44, p. 34). When a very liberal gillnet-yardage limit (2,000 yards) was later imposed, it resulted in even more capacity in the gillnet fisheries, as commercial fishermen maxed out on the yardage they could fish to “compete with everyone else.” (T. 1362).

301. Today, no other state allows anywhere near the level of gillnetting in its estuarine nursery grounds as North Carolina does (T. 1365, 1367), making North Carolina “very much an outlier” among coastal states. (T. 1857; P. Ex. 220, pp. 19, 21). Unlike all other southeastern Atlantic and Gulf states, North Carolina has not

made any meaningful changes to restrict gillnets, leaving it as “one of [the] last states that are still carrying out gillnetting at this level.” (T. 1868).

302. The amount of gillnet being fished at any given time in North Carolina’s estuarine waters is unknown. (T. 1362–63). Dr. Daniel testified, however, that in 2008, when he was Fisheries Director, he made a reasonable estimate, based on the number of participants and the maximum yardage limit, that North Carolina had 44 million yards of gillnets in its waters—roughly 25,000 miles, which is approximately the circumference of the Earth at the equator. (T. 1362–63). Dr. Stunz described that as a “jaw dropping number” that, as a fisheries manager, was “very disturbing.” (T. 1870; P. Ex. 220, p. 21 n.7). Moreover, 80% of the estimated 25,000 miles of gillnets are, by DMF estimates, believed to be in estuarine waters. (T. 1362–63).

d. Gillnet fisheries impose significant regulatory burdens that the State has struggled to meet, further diverting scarce enforcement resources.

303. The testimony at trial also established the unique burden of regulating North Carolina’s various gillnet fisheries. The first is the challenge of obtaining important, reliable bycatch or discard data from gillnets, which negatively impacts stock assessments. (P. Ex. 211, p. 18; T. 1366–67). As Dr. Daniel explained:

[T]rying to estimate the amount of bycatch associated with that fishery is very difficult if you don’t have the studies that show the amount of effort and the amount of catch and bycatch that’s occurring [the] fishery. Then add latent licenses, [and] the result is stock assessments are too optimistic.

(T. 1366–67).

304. Dr. Stunz similarly noted that the State's data on bycatch from gillnets was "poor," and that the State does not have sufficient information on the health of its managed species to make the appropriate management decisions, similar to the dearth of data on shrimp trawling's population-wide impacts. (T. 1847).

305. The other unique burden imposed by gillnets in North Carolina involves compliance with an incidental take permit ("ITP") under the federal Endangered Species Act. (P. Ex. 211, pp. 19–21; P. Ex. 216, p. 26; T. 931–32, 943–47, 1371–75, 2267–68, 3389–90). Several species of sea turtles and sturgeon that are listed as federally protected endangered or threatened species are found in North Carolina's estuarine waters. (P. Ex. 161, pp. 5–6). Under the Endangered Species Act, fishing gear may only interact with protected species under the terms of an ITP issued by the National Marine Fisheries Service. An ITP only allows for a certain number of "takes" (interactions with fishing gear), and it requires, among other things, that a certain percentage of fishing trips must be observed. (P. Ex. 162, pp. 3–7). Commercial fishermen are also required to self-report takes under the ITP. (P. Ex. 161, p. 163).

306. Dr. Daniel testified about having to address the issue of protected sea turtle interactions with gillnets during his first few years as Fisheries Director, and that this issue presented itself on two fronts. (T. 1368–71). First, the National Marine Fisheries Service had observed what it considered to be extraordinary numbers of unpermitted sea turtle gillnet interactions around this time. (T. 1369). Second, DMF had been sued by the Karen Beasley Sea Turtle Rescue and

Rehabilitation Center over unpermitted turtle interactions with gillnets. (T. 1369). In discussing the agency's options with the Secretary of DEQ, Dr. Daniel raised the option of simply phasing out the large mesh gillnet fishery entirely, especially given that Southern flounder was still overfished. (T. 1370–71). Dr. Daniel was told: “[W]e don’t want to go there. We want to protect these [commercial] fishermen.” (T. 1370–71). Dr. Daniel was then directed to seek a statewide ITP from the National Marine Fisheries Service that would allow the large mesh and other gillnet fisheries to continue to operate. (T. 1371). DMF settled the Beasley lawsuit in 2010 (P. Ex. 46), and, in accordance with the settlement terms, sought and obtained a statewide ITP. (P. Ex. 160–62).

307. Since the ITP's inception, DMF has faced significant challenges meeting the minimum observer coverage requirements because of the lack of cooperation from commercial gillnet fishermen. (T. 1374–75). Internal DMF emails presented at trial showed that DMF and the North Carolina Fisheries Association (North Carolina's commercial fishing industry association) “fully agreed” that commercial fishermen's non-compliance with the ITP observer program “is a problem.” (T. 933–35; P. Ex. 169). The National Marine Fisheries Service issued multiple non-compliance notices to DMF documenting the State's failure to meet the required minimum 7% coverage of large-mesh gillnet trips and 1% coverage of small-mesh trips across multiple seasons. (P. Ex. 165, 172; T. 1374–75). Despite this persistent non-compliance, DMF data for 2021 reflect that only ten infractions were issued statewide for failing to cooperate with an observer. (T. 935–36).

308. In addition, very few interactions with turtles have been self-reported by gillnet fishermen, as required. (P. Ex. 211, p. 19). Dr. Powers noted in his report that, according to extrapolations of observed takes of sea turtles, as well as DMF modeling of expected takes, commercial gillnetters should be taking (and, thus, reporting) hundreds of sea turtles each year, yet over a 10-year period that the ITP was in effect, unobserved commercial fishermen reported only a handful of sea turtle takes. (P. Ex. 216, pp. 31–32). Dr. Daniel likewise testified that compliance with the self-reporting requirement has been virtually zero. (P. Ex. 211, p. 19).

309. To meet the coverage requirements for the observer program in the face of persistent lack of cooperation from commercial gillnetters, DMF devised what it refers to as an “alternative platform” program.²⁴ (P. Ex. 170; T. 939–43, 2350). This program uses Marine Patrol officers to conduct observer trips—in some years close to 2,000 trips—further diverting the State’s already insufficient enforcement resources from general patrol duties. (P. Ex. 170; T. 939–43, 2350). As DMF’s internal emails and documents confirm, this new program has been “unable to observe fishing operations at night or early mornings,” and “complete fishing trips are often not observed.” (T. 944–45; P. Ex. 170). DMF’s internal emails also confirm that “to ensure compliance with the ITP,” DMF “would need more marine patrol enforcement.” (T. 944–45; P. Ex. 170).

²⁴ No evidence indicates that DMF considered simply forfeiting the ITP, leaving the non-cooperative gillnetters to deal with the National Marine Fisheries Service themselves.

310. As Fisheries Director Rawls put it during an MFC meeting when discussing the burdens related to the ITP, “we have bent over backwards to keep [commercial gillnet fishermen] fishing.” (P. Ex. 185). Nevertheless, in 2022, DMF applied for another consolidated statewide ITP for sea turtles and sturgeon, which was renewed in October 2024. (P. Ex. 161; D. Ex. 108; T. 947). The evidence showed that in seeking renewal of the ITP, the State did not seriously consider any other course of action. As Mr. Rock put it, “we have to have the ITP for anchored gillnets to continue to be fished.” (T. 3403).

e. Despite the biological and regulatory costs of gillnets, there is no economic or public-interest justification for maintaining them at their current scale.

311. As with estuarine shrimp trawling, despite the significant biological and administrative burdens that North Carolina’s gillnet fisheries pose, no cost-benefit analysis of the gillnet fisheries in North Carolina has ever been undertaken. (T. 3397, 1933–34). Nor have the total administrative costs to manage the commercial gillnet fisheries ever been calculated and presented to the public. (T. 3397). The population of North Carolina exceeds 11 million, but the significant costs and burdens of the ITP described above, including the observer program, have been borne so that fewer than approximately 1,000 people can continue to use gillnets commercially. (T. 3402).

312. In Mr. Gentner’s un rebutted testimony, he characterized this as a management choice to allow gillnet fisheries instead of what would bring the most overall economic benefit in the public interest. (T. 1933–34). As he explained, “no

one to my knowledge has looked at the costs and benefits [of gillnets] to other fisheries, including commercial fisheries,” particularly given the bycatch problems. (T. 1934). Mr. Gentner testified that if all the costs of the use of gillnets were actually considered—including but not limited to gillnet bycatch—gillnets would be eliminated, because the costs are simply too great. (T. 1935–36). He further testified that the costs of observer coverage to obtain legitimate, verifiable information on discards from North Carolina’s gillnet fisheries would likely exceed the value of the commercial gillnet fishery itself. (T. 1950). The State offered no rebuttal from an economist or other qualified witness as to these conclusions.

313. Notably, DMF has never proposed a phase-out of any gillnet fishery. (T. 2335–36, 3766). In March 2021, the MFC charged DMF with evaluating the elimination of large mesh gillnets as a management option for the Southern flounder fishery. (P. Ex. 54, p. 160). The paper DMF produced in response includes a discussion of “Economic Impacts,” noting that the large mesh gillnet fishery accounted for a total of \$22,293,674 in ex-vessel value over the preceding ten years, and that up to 808 participants on average could be affected. (P. Ex. 53, p. 160). DMF acknowledged that “if large mesh gillnets are no longer allowed to harvest southern flounder these values may shift to another gear.” (P. Ex. 53, p. 160).

314. Mr. Gentner concluded that this analysis was inadequate for reasons similar to his conclusions on the limited economic considerations involving shrimp trawling. He testified that the real question is “whether North Carolina fisheries as a whole would be better off by moving from gillnets”—that is, a comprehensive cost-

benefit analysis, not merely a discussion of economic impacts on one user group. (T. 1954, 1956–57). He further testified that gillnets produce inferior-quality fish compared to every alternative gear—i.e., pound nets, hook and line, gigging, all of which produce higher-quality fish commanding higher prices—because fish caught in gillnets die during long soaks and sustain physical damage that reduces their market value. (T. 1951–52). The State offered no rebuttal to this testimony.

315. The State’s own advisory bodies have also recognized the need to address gillnets. In 2020, the DEQ Secretary directed DMF to conduct a thorough review of the small mesh gillnet fishery to simplify regulatory complexity, reduce bycatch, and sustain stocks important to both recreational anglers and commercial fishermen. (P. Ex. 147, p. 1; P. Ex. 226). DMF formed a working group that produced an information paper with management options, which was presented to the MFC’s advisory committees in July 2021. (P. Ex. 147, pp. 1–2; P. Ex. 226). The Southern Advisory Committee voted to recommend that “the Marine Fisheries Commission consider the prohibition of small mesh gillnets in all Internal Coastal Waters.” (P. Ex. 147, p. 8; P. Ex. 226). The MFC voted to reject this recommendation, consistent with the pattern, discussed below in Section IV.D, of conservation measures recommended by DMF staff or advisory committees being defeated at the MFC level. (P. Ex. 148).

316. To summarize the Court’s findings on gillnets: The evidence showed that North Carolina’s tolerance for gillnets—unmatched among southeastern states, all of which have banned or severely curtailed their use—has caused indisputable

biological harm to the State's marine and estuarine resources, driven gear overcapacity and age truncation in state-managed stocks, generated massive and largely unquantified bycatch that includes interactions with federally protected species, and imposed significant regulatory and enforcement burdens on the State, all without the benefit of a comprehensive cost-benefit analysis, and for fewer than approximately 1,000 commercial participants. *See* Section IV.C.2.a-e. Critically, the unrebutted expert testimony established that recovery of North Carolina's depleted finfish populations is likely impossible so long as gillnetting continues at its current level. *See* Section IV.C.2.a.

D. The State makes management decisions through a commission that elevates the short-term desires of the commercial fishing industry over the long-term viability of coastal fisheries.

317. North Carolina manages fish and game under a "two commission" model. (T. 784–85, 829). The WRC manages inland fish and game, and the MFC (along with DMF) manages coastal fisheries. (T. 784–85, 829). The composition and appointment authority of the two commissions, however, differ significantly.

318. The WRC is a board with members appointed mostly geographically, with only a few at-large seats. (T. 789). The sole criteria for appointment is that candidates must be "knowledgeable and interested in fish and wildlife conservation." (T. 789). Membership is open to everyone, such that members are not required to be part of a user group. (T. 789). Commissioners represent the people of the state at large, and "their duty is to manage the resources for the benefit of the

people [and] manage for the maximum benefit of the greatest number of people for the greatest good.” (T. 789–90).

319. The MFC, by contrast, is a nine-member board with members appointed based on designated categories: two members actively engaged in or recently retired from commercial fishing; one member connected to the seafood industry (dealer, processor, or distributor); two active recreational sports fishermen; one member actively engaged in the sports fishing industry; one fisheries scientist; and two members having general knowledge of and experience related to subjects and persons regulated by the Commission. *See* N.C. Gen. Stat. § 143B-289.54(a), (d). Thus, at least three of the nine seats—a full one-third—are reserved for individuals with a direct financial interest in the private, for-profit harvest of coastal fisheries resources, even though commercial-license holders comprise less than one-tenth of one percent of the State’s citizens. (P. Ex. 209).

320. The testimony of Fred Harris, who retired as Deputy Director of the WRC after 36 years on its staff, provided perspective on the failures of the dual-commission model and the consequences of having interested stakeholders make final management decisions. (T. 779–80). In his long tenure with the WRC, Mr. Harris gained decades of firsthand knowledge of both the WRC’s fisheries-management approach and the MFC’s fisheries-management approach, in part

because of their overlapping jurisdiction,²⁵ and also from his service on the MFC's Shrimp Advisory Committee. (T. 785–86, 817).

321. Mr. Harris testified that the WRC maintains a “resource-first” approach, whereas the MFC maintains “an industry-first approach and a resource second approach.” (T. 824–25). He elaborated on that description in describing the MFC: “[I]f a rule is going to . . . negatively affect the commercial fishermen, that seems to trump the resource and the rules they eventually enact are rules that protect commercial fishermen.” (T. 792–93). In contrast with the outcomes set forth in Section II of the Court’s findings, the results of the WRC’s resource-first approach, Mr. Harris testified, are that “there are no depleted or collapsed populations of inland fish. They are all, to my knowledge, healthy and robust.” (T. 795).

322. Mr. Harris further testified that the MFC’s process results in “inaction” (T. 793), whereas the WRC “tend[s] to rely on their staff” and uses temporary rules that can be implemented within “weeks or months” (T. 793–94). He explained how the consequences of the MFC’s delays are severe: “[I]f a resource is determined to be overfished and you have a population collapsing, then you need to protect that resource quickly so [it] can rebuild. And if you go through a long

²⁵ In joint waters, there is overlapping jurisdiction: the WRC has jurisdiction over hook-and-line fishing and inland gamefish wherever found, including in marine or coastal waters. (T. 785). The MFC has regulatory authority over commercial fishing and, in coastal waters, jurisdiction over all fishing except for inland gamefish. (T. 785).

bureaucratic process that can take years, you may pass the threshold where you can't rebuild that resource." (T. 794).

323. Dr. Nifong, who served on the MFC from 1998 to 2001, corroborated these concerns. (T. 205). He testified that the MFC "doesn't function very well" and "the way it's currently structured," is "set up for failure." (T. 205). He explained that "because it is an interested commission," voting tends to be "constituency based," such that "commercial fishermen tend to vote for measures that they think help the commercial fishing industry." (T. 205). Dr. Nifong testified that over the period from 1989 to the present, "commercial fishermen always vote[d] as a block," and that he had "never seen an instance, except for one," where they did not do so. (T. 205–06). Dr. Daniel likewise testified that during his tenure as Fisheries Director, "you could pretty much count on the three commercial commissioners voting against any substantive regulations." (T. 1166).

324. Mr. Boltes, who was a member of the MFC from 2018 to 2020, confirmed this stakeholder-oriented approach of the MFC. (T. 856, 880). Mr. Boltes was appointed to occupy the recreational fishing industry seat on the Commission. (T. 856). He testified that "after getting on the MFC, I saw (a) how hard it was to move the needle and (b) that we weren't really getting a lot done in what we were called to do [to] protect the resource." (T. 857). He explained that this allocation focus manifested as disputes over "which user groups are going to get the fish, is it going to be rec[reational] or is it going to be commercial," with "a lot less about . . . what's going to be best long term for the resource that will really ultimately affect

both the rec[reational] and the commercial [because] . . . a healthy resource benefits both.” (T. 858).

325. Mr. Boltes testified that commissioners largely voted according to the user-group seat they occupied, and that they prioritized their sector over making informed decisions based on the science and resource-protection materials provided before official meetings: “[T]he thing that I think got cloudy is at the end of the day, we were all hoping to protect the resource and at times, I think the lens of the seat you were trying to fill became more important than the resource.” (T. 869–70). He witnessed a few commissioners having not even reviewed briefing materials prepared by professional staff at DMF before an official meeting: “[I]t wasn’t about what was being presented . . . it was just . . . I’m just going to do whatever my sector needs and I’m not even going to worry about what information’s being presented.” (T. 871).

326. The evidence at trial also included numerous examples of instances in which the MFC’s structural defects caused management failures, including where a conservation-oriented measure was recommended by DMF and was defeated at the MFC—for example, Amendment 2 to the Shrimp FMP (*see* Section IV.C.1), rules on small-mesh gillnets (*see* Section IV.C.2), and harvest reductions for Southern flounder (*see* Section II.B.2.).

327. The evidence also included examples of conflicting or divergent regulations for shared species jointly regulated by the MFC and the WRC (for example, Southern flounder and striped bass, which often swim between inland and

coastal waters), creating management inconsistency and undermining conservation efforts. (T. 787–89).

328. As described more fully above, the UNC Collaboratory Report was also critical of the MFC’s stakeholder-membership structure. (T. 2963; P. Ex. 37a, pp. 26–28). In its report, it made two related recommendations: (1) reconfiguring the MFC, and (2) creating a Scientific and Statistical Committee. (T. 2963; P. Ex. 37a, pp. 26–28).

329. Not one witness was produced by the State who testified in support of the current structure of the MFC.

E. The State has focused on following lengthy processes, rather than achieving results.

330. As Dr. Powers explained, coastal fisheries management in North Carolina has become excessively process-oriented—wedded to formal, inefficient procedural requirements that prevent timely, quick intervention to remedy readily identifiable problems in managed species. (P. Ex. 216, p. 29).

331. Dr. Powers testified that this problem has two components. (T. 1886; P. Ex. 37a, p. 14). First, DMF has over-relied on model-based stock assessments, which take years to complete, when more timely means to reliably assess stocks are available. (T. 1886; P. Ex. 37a, p. 14). Second, North Carolina’s fisheries managers follow a unique, cumbersome process for formulating management recommendations, obtaining public input, and enacting any new management measures, thus foregoing more timely intervention. (T. 1886; P. Ex. 37a, p. 14). Both of these issues are discussed below.

1. DMF has over-relied on formal, modeled stock assessments in managing fisheries.

332. Stock assessments can take various forms, and the FRA does not prescribe a particular type of stock assessment or how it should be conducted. (T. 1598–1600; P. Ex. 216, p. 8). Model-based stock assessments—what Dr. Powers referred to as “benchmark” assessments—use age-structured models to indicate whether a stock is overfished or whether overfishing is occurring. (T. 1598–1600; P. Ex. 216, p. 8). There are much simpler alternatives, however, to monitoring various trends in fisheries data. (T. 1602–03). These simpler, alternative approaches include using catch-at-age data, fishery-dependent or fishery-independent data, or some combination thereof. (T. 1602–03).

333. Notwithstanding the availability of these simpler approaches, and despite the fact that there are states that manage fisheries without any model-based stock assessments whatsoever, DMF has relied almost exclusively on model-based stock assessments for making management recommendations, and at times has used the lack of a peer-reviewed benchmark stock assessment as justification for inaction. (T. 1802; P. Ex. 220, pp. 4–5, 9–10).

334. Dr. Stunz noted that in some cases, DMF “has essentially given up and determined that despite the poor condition of the stock, additional harvest restrictions are unthinkable because the State lacks data with which to perform a stock assessment, and thus, it cannot make any conclusions on whether the stock is overfished or if overfishing is occurring.” (P. Ex. 220, pp. 9–10). He described how DMF has fallen into what he called an “activity trap,” where the focus is on

producing stock assessments for the sake of producing them, rather than actually taking action to produce outcomes. (T. 1831). Dr. Stunz noted that stock assessments can be very useful, but fisheries managers cannot “wait around” for a stock assessment while fisheries are headed in an undesirable direction. (T. 1831). He testified that waiting five to seven years from the terminal year of a stock assessment instead of using a simple trends analysis to inform management is “completely unacceptable” in the field of fisheries management, and that “no one in the field” would recommend such an approach. (T. 1832).

335. Dr. Powers likewise testified that the lack of a peer-reviewed benchmark stock assessment does not justify inaction. (T. 1637–38). Even if a benchmark stock assessment is ultimately needed to determine whether the stock is overfished or subject to overfishing, in the interim, fisheries managers can still manage the species to a biomass target, and thresholds and targets for biomass can be derived from landings and harvest data. (T. 1637–38). For example, Dr. Powers noted that federal fisheries councils update stock assessments only every five or six years, but for stocks of concern, they perform annual health checks using landings or other indices to monitor management progress. (T. 1598–99).

336. Dr. Powers also explained that reliance on “overly parameterized” models creates delays that exacerbate recognizable problems in the fishery. (T. 1596–1600, 1664–65; P. Ex. 216, p. 8). Because assessments take 18 to 24 months to complete, by the terminal year (the last year of data used), managers may be operating on information that is three years old. (T. 1600). Dr. Powers also noted

that stock assessments can obscure potential concerns through assumptions and mathematical suppressions, making trends analysis a necessary “reality check.” (T. 1610). He testified that given the long delays and high uncertainty in benchmark assessments, relying solely on modeled fishing mortality estimates is not effective management. (T. 1694).

337. Citing the above reasons, Dr. Powers explained that effective fisheries management employs both benchmark model-based assessments and interim trends analysis. (T. 1598–99). That is because interim trends analysis indicates whether managers are headed in the right direction, and waiting for another model-based assessment may mean “it might be too late and the recovery time will take even longer.” (T. 1598–99).

338. Dr. Stunz concurred, noting that stock health can be assessed through a suite of techniques ranging from a simple trend analysis to complex multi-year models. (T. 1799; P. Ex. 220, pp. 4–5). He also cautioned that more “complex” analyses do not guarantee better management, citing North Carolina stock assessments that failed peer review. (T. 1799–1800).

339. Like Dr. Powers, Dr. Stunz testified that a trends analysis using benchmarks such as multi-year averages allows managers to take immediate corrective action. (T. 1802–03; P. Ex. 220, pp. 5, 7). Analogizing this relatively simple, quick analysis to an initial vitals check at a doctor’s office, he explained that fisheries managers can use a quickly prepared trends analysis to the same effect to quickly check on the health of a fishery. (T. 1800).

340. Dr. Stunz described how Texas relies on these approaches for the same species that North Carolina manages and, as a result, is able to make management decisions “almost in near real time.” (T. 1802). By contrast, the evidence showed that North Carolina has waited for the results of a benchmark stock assessment rather than acted on available data. (T. 1662–63).

2. The State’s process for formulating management options, obtaining public input, and implementing new measures is uniquely lengthy and cumbersome.

341. Once a stock assessment is completed, the process of getting to the eventual implementation of management action is unique to North Carolina, and it is substantially slower than both the federal model and other states. (P. Ex. 216, p. 29). This process involves seeking input from three layers of advisory committees: (1) species-specific FMP advisory committees that meet with the plan development team in workshops; (2) regional advisory committees (Northern and Southern); and (3) standing advisory committees (Finfish, Shellfish/Crustacean, and Habitat and Water Quality). (T. 2172–74; P. Ex. 37a, pp. 57–58).

342. Ample testimony in the record reflects frustration with the committees, as well as a perception that negative outcomes from committee deliberations over new harvest restrictions are predetermined. Describing his experience as Fisheries Director, Dr. Daniel testified that when DMF made recommendations based on problems with a fishery, there was a very concerted effort to discredit DMF and its science at the committee level. (T. 1162–63). He testified about the frustration (“a kick in the gut”) when the resource ultimately was

not protected simply because of anecdotal information relayed at the committee level. (T. 1166). Both Mr. Albea and Mr. Harris testified about their frustrations with outcomes based on their service on MFC advisory committees. (T. 634 (Albea); T. 820 (Harris)). Meanwhile, no evidence was presented justifying the need for three layers of advisory committees to review and comment on a proposed FMP or its amendment.

343. The UNC Collaboratory independently criticized North Carolina's uniquely lengthy process, finding that the average time between FMP actions is 5.2 years—far exceeding the original FRA's three-year goal. (T. 2946–47; P. Ex. 37A, p. 18). As a point of comparison, in Alabama, a stock assessment that Dr. Powers conducted led to temporary rules, advisory committee review, and permanent management action in just over one year. (T. 1697).

344. As Dr. Powers testified, North Carolina's uniquely lengthy timeline “almost ensures that the State will fail in meeting its management goal of long-term viability.” (P. Ex. 216, p. 29; T. 1697–98). As an example, he pointed to the recent spotted seatrout plan amendment, where the stock assessment was completed in 2022 (with a terminal year of 2019), yet management action was not taken until 2025—three years later—based on data that was six or seven years old by then. (P. Ex. 23; T. 1695–96). While that three-year post-assessment amendment process occurred, catch per unit effort for commercial harvest had been increasing dramatically (T. 1187), worsening the rebuilding timeline by extending it further. (P. Ex. 23; T. 1695–96). Dr. Stunz concurred, testifying that the spike in catch per

unit effort during this period had “red arrows flashing” and constituted a readily apparent problem. (T. 1817–18).

F. The State has failed to focus on overall ecosystem health and sustainability.

345. As Dr. Powers explained, the goal of protecting ecosystem health and sustainability is “a necessary long-term prerequisite for achieving any other goals or objectives.” (P. Ex. 216, p. 6). Recognizing that most fisheries species fill one or more critical niches in a functioning ecosystem requires that species be managed “in such a way to keep their populations free from harm, injury or destruction.” (P. Ex. 216, p. 6). In turn, ecosystem quality—including habitat quality and quantity, as well as water quality—impacts those populations’ fates. (P. Ex. 216, p. 6). Dr. Powers emphasized that this goal is paramount: without a healthy ecosystem, no other fisheries management objective can be achieved in the long term. (P. Ex. 216, pp. 6–7; T. 1518–19).

346. At trial, Dr. Powers elaborated on why ecosystem health is so important to long-term viability, explaining that the protection of ecosystem integrity must be satisfied before any stock can achieve the sustainable, self-sustaining condition that long-term viability requires:

[T]he first goal usually is ecosystem health, integrity, sustainability. Making sure you recognize that those fish that we may choose to harvest have a role in the ecosystem. And that really needs to be considered first, that some of those fish species might serve as prey for other fish that need to eat it. Some of them, like oysters, may be an ecosystem engineer that have a foundational role in that environment that needs to be taken into account. So at the very, very top level is the ecosystem integrity and ecosystem health.

[A]t the next level, but reliant on that first overall one is you have the populations of the fish that we need to look at. We want to make sure those are sustainable those are managed in a viable way that allow maximum public use.

(T. 1518–19).

347. Dr. Powers' unrebutted expert conclusion was that the State's fisheries managers have failed to adopt or implement an ecosystem-based approach to management, and instead have treated stocks in isolation, rather than as parts of an interconnected ecosystem. (P. Ex. 216, pp. 6–7; T. 1518–20). In doing so, Dr. Powers explained, the State has disregarded the interconnected roles that different species play within the coastal ecosystem. (P. Ex. 216, pp. 6–7; T. 1518–20).

348. Consistent with Dr. Powers' unrebutted conclusion, Dr. Daniel provided a concrete example of the interconnected impacts: estuarine shrimp trawling kills nearly a billion juvenile finfish annually, including species like Atlantic croaker, spot, and weakfish that could potentially serve as critical prey for important predators and other commercially and recreationally important species. (P. Ex. 211, p. 16; T. 1202–03). Likewise, the evidence showed that oysters serve as ecosystem engineers, providing critical habitat for other fish species and water filtration, yet the State has not managed them for their ecosystem value. (P. Ex. 213, p. 27; T. 1519–20).

349. As described above in Section II.D., the UNC Collaboratory likewise found that the State had failed to manage on an ecosystem level, recommending that the State adopt an “ecosystem-based management approach” that accounts for water quality and habitat loss. (T. 2958–59, 2967–68).

G. The State has failed to adequately enforce coastal fisheries laws.

350. The enforcement of North Carolina's coastal fisheries laws is the responsibility of DMF's Marine Patrol. (T. 891–94). Marine Patrol's jurisdiction covers approximately 2.5 million acres of water spanning more than 20 counties, and it has the responsibility to enforce the State's fisheries laws with respect to approximately 4000 standard commercial license holders, 1,500 recreational commercial gear license holders, and over two million public anglers each year. (T. 891–94). Marine Patrol enforces more than a thousand rules and statutes, and is also responsible for inspecting fish houses, fish dealers, seafood houses, vehicles transporting seafood, and restaurants statewide. (T. 895–96, 900–01).

351. Given the importance, scope, and breadth of these enforcement obligations, Dr. Powers concluded that the State does not adequately enforce its coastal fisheries laws, in large part because it lacks the enforcement staffing needed to do so. (P. Ex. 216, pp. 30–31; T. 1699–700). Dr. Powers' report described how “the chances of an individual violating North Carolina coastal fisheries laws and rules being caught and charged with the violation are miniscule, at best.” (P. Ex. 216, p. 31). He further noted: “Fisheries management rules may be the best possible, more than adequate to maintain a viable fishery, but if fishermen ignore those rules out of the belief that they will not be caught, the rules become essentially meaningless.” (P. Ex. 216, p. 31). This expert opinion was un rebutted.

352. The UNC Collaboratory Report independently confirmed Dr. Powers' conclusion on the inadequacy of Marine Patrol staffing. (T. 2935–36; P. Ex. 37a,

p. 29). The report noted that each officer covers more acres of estuarine and coastal waters than officers in any other southeast or Gulf State, and that to “achieve sufficient enforcement and support of [FRA] mandates, increased marine patrol staffing is warranted.” (T. 2935–36; P. Ex. 37a, p. 29).

353. Other witnesses corroborated this conclusion based on their own personal experiences. Mr. Vernon, who spends 200 days per year on the water, testified that on-the-water encounters with Marine Patrol are essentially concentrated around holidays only, and that calling Marine Patrol about a violation means “several hours before someone is dispatched.” (T. 649). Mr. Albea testified similarly that he had hardly seen Marine Patrol “compared to the amount of time I’ve spent on the water” over the years. (T. 609–10).

354. The most persuasive evidence of the State’s inadequate enforcement, however, came directly from Colonel Witten, who served for 25 years in the Marine Patrol, ultimately becoming its highest commanding officer. (T. 889–90). Colonel Witten testified that over his long tenure with the Marine Patrol, officers “saw violations regularly,” including gillnets in closed areas, unattended gillnets, commercial fishermen fishing in closed waters or out of season, and untagged commercial gear, but that because of Marine Patrol’s severely limited staffing, it lacked the capacity to meaningfully ensure that North Carolina’s fisheries laws were not being violated—particularly at night, when “a lot of commercial fishing occurs” and enforcement is “a lot more difficult.” (T. 923, 925–27). He further testified that in instances when Marine Patrol caught violators of fisheries laws,

those violators remarked “[n]ever seen you out here before,” or words to that effect. (T. 920–21).

355. Describing Marine Patrol’s severe staffing limitations, Colonel Witten testified that Marine Patrol “has been badly short-changed” for decades. (T. 897–905). He confirmed that as of January 2026, Marine Patrol had only 58 sworn officers. (T. 898–99). By contrast, the WRC had 224 officers, and it received 16 additional officers in the 2023 budget alone. (T. 898–99). As a further comparison, the State Highway Patrol has more than 1,600 officers to cover 78,000 miles of highway, whereas the Marine Patrol’s 58 officers are responsible for covering 2.5 million acres of water. (T. 961–62).

356. As Colonel Witten acknowledged, the “[b]ottom line is Marine Patrol doesn’t have the officers and resources it needs” to enforce North Carolina’s fisheries laws to “make sure there aren’t violations happening.” As he put it: “Something has got to change.” (T. 962).

* * *

357. As described in Sections I through IV above, based on the overwhelming evidence of the State’s management failures, and based on well-accepted principles of fisheries science and management applied in the field, Plaintiffs’ fisheries-management experts presented the Court with their conclusions that the State has not “kept our fisheries safe from injury, harm, and destruction for all time” or managed our fisheries “so as to forever preserve them for the benefit of the public.” (T. 1691, 1792, 1889–90; P. Ex. 220, pp. 9–10; P. Ex. 216, pp. 8, 29; P.

Ex. 211, pp. 9–10). The State did not present any fisheries-management expert to rebut those conclusions.

358. Dr. Stunz put these conclusions in perspective. Using a comparative analysis based on his decades of experience managing some of the highest-stakes fisheries in the nation, and based on his comprehensive review of North Carolina fisheries-management data and materials, he compared the State’s fisheries management to well-accepted norms in the field. (T. 1761–1883, 1889–90). His conclusion was that the State’s fisheries management is, “for sure,” “the worst” he has “ever seen” in the United States. (T. 1889, 1891–92; P. Ex. 220, pp. 9–10, 21). As Dr. Stunz explained, only “drastic management changes” and “significant reductions in mortality” would be able to restore North Carolina’s coastal fisheries to long-term viability. (T. 1891; P. Ex. 220, pp. 20–21).

359. Critically, though, Dr. Stunz explained that “it’s not too late.” (T. 1890; P. Ex. 220, p. 20). As he concluded in his un rebutted testimony, North Carolina’s fisheries could return to their once-abundant levels “if they’re just given the proper management and opportunity.” (T. 1890; P. Ex. 220, p. 20).

CONCLUSIONS OF LAW

I. In reaching its conclusions, the Court has followed the decision of the Court of Appeals without variation or departure.

A. The Court of Appeals' decision

360. The public-trust doctrine, “established by the common law of this State,” requires the State to hold public-trust resources “in trust for the people of the State.” *Coastal Conservation Ass’n*, 285 N.C. App. at 275, 878 S.E.2d at 295 (quoting *Town of Nags Head v. Richardson*, 260 N.C. App. 325, 334, 817 S.E.2d 874, 882 (2018), *aff’d*, 372 N.C. 349, 828 S.E.2d 154 (2019) and *Shepard’s Point Land Co. v. Atl. Hotel*, 132 N.C. 517, 526, 44 S.E. 39, 41 (1903)) (citing *State ex rel. Rohrer v. Credle*, 322 N.C. 522, 526, 369 S.E.2d 825, 827 (1988)). As the Court of Appeals observed, “[a]lthough the doctrine arises from the common law, it is perhaps best understood as ‘an implied constitutional doctrine’—one that ‘springs from a fundamental notion of how government is to operate with regard to common heritage natural resources.’” *Id.* at 274, 878 S.E.2d at 295 (quoting Harrison C. Dunning, *The Public Trust: A Fundamental Doctrine of American Property Law*, 19 *Envtl. L.* 515, 523 (1989)).

361. Addressing the public-trust doctrine in this case, the Court of Appeals reaffirmed that North Carolina’s coastal fisheries resources “belong to the people of the State as a whole,” *Coastal Conservation Ass’n*, 285 N.C. App. at 275, 878 S.E.2d at 295 (citing N.C. Gen. Stat. § 113-131(a)), and that “protecting fisheries falls within the purview of the public trust doctrine.” *Id.* at 277, 878 S.E.2d at 297 (citing *State v. Stewart*, 40 N.C. App. 693, 695, 253 S.E.2d 638, 640 (1979), and *Shepard’s*

Point Land Co., 132 N.C. at 526, 44 S.E. at 41). Thus, the State must hold these public-trust resources “in trust for the people of the State,” *id.* at 275, 878 S.E.2d at 295 (quoting *Shepard’s Point Land Co.*, 132 N.C. at 526, 44 S.E. at 41) (citing *Credle*, 322 N.C. at 526, 369 S.E.2d at 827), and “[t]he State can no more abdicate this duty than it can abdicate its police powers.” *Id.* at 277, 878 S.E.2d at 297 (quoting *Shepard’s Point Land Co.*, 132 N.C. at 528, 44 S.E. at 42). The Court therefore held that under the public-trust doctrine, Plaintiffs may pursue this action “directly against the State for an alleged breach of its obligation to manage and protect fisheries for the benefit of the general public.” *Id.* The Court further noted that because “the State may sometimes act contrary to the public interest,” *id.* at 278, 878 S.E.2d at 297 (citing *Gwathmey v. State ex rel. Dep’t of Env’t, Health & Nat. Res.*, 342 N.C. 287, 293, 464 S.E.2d 674, 677 (1995)), the public-trust doctrine serves as an important “tool for judicial review of the State’s actions as trustee of [North Carolina’s coastal] fisheries.” *Id.* at 278, 878 S.E.2d at 297.

362. Article I, Section 38 of the North Carolina Constitution provides:

The right of the people to hunt, fish, and harvest wildlife is a valued part of the State’s heritage and shall be forever preserved for the public good. The people have a right, including the right to use traditional methods, to hunt, fish, and harvest wildlife, subject only to laws enacted by the General Assembly and rules adopted pursuant to authority granted by the General Assembly to (i) promote wildlife conservation and management and (ii) preserve the future of hunting and fishing. Public hunting and fishing shall be a preferred means of managing and controlling wildlife. Nothing herein shall be construed to modify any provision of law relating to trespass, property rights, or eminent domain.

363. Addressing Article I, Section 38, the Court of Appeals held that the right to fish “belongs to the people” and that the provision creates “an affirmative duty on the State to preserve the right of the people to fish and harvest fish.” *Coastal Conservation Ass’n*, 285 N.C. App. at 282, 878 S.E.2d at 299–300. That duty “necessarily includes some concomitant duty to keep fisheries safe from injury, harm, or destruction for all time” and “includes some duty to preserve fisheries for the benefit of the public.” *Id.* at 282, 878 S.E.2d at 300. The Court held that “it is the judiciary’s responsibility to guard and protect those rights,” and that Plaintiffs’ allegations, “if proven, may tend to show the State did not properly manage the fisheries so as to forever preserve the fish populations for the benefit of the public.” *Id.* at 282–83, 878 S.E.2d at 299–300.

364. Article XIV, Section 5 of the North Carolina Constitution provides, in relevant part:

It shall be the policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivisions to acquire and preserve park, recreational, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this State its forests, wetlands, estuaries, beaches, historical sites, openlands, and places of beauty.

365. Addressing Article XIV, Section 5, the Court of Appeals held that this provision “task[s] the State with a constitutional duty to not only protect the public lands, but also the public trust rights attached thereto,” and “mandates the conservation and protection of public lands and waters for the benefit of the public.” *Coastal Conservation Ass’n*, 285 N.C. App. at 280, 878 S.E.2d at 298. The Court

noted Plaintiffs’ allegations that the State engaged in “permitting, sanctioning, and even protecting” destructive harvesting methods, “refusing to address and remedy chronic overfishing,” and “tolerating a lack of reporting” by commercial license holders, as further evidenced by “extensive data points documenting the stock status and the stock population trends.” *Id.* The Court held that these facts “support Plaintiffs’ contention the State did not protect the harvestable fish population ‘for the benefit of all its citizenry.’” *Id.* at 280, 878 S.E.2d at 298–99 (quoting N.C. Const. art. I, § 5).

366. The Court of Appeals’ decision is the law of the case and binds this Court on remand. *See, e.g., Bodie v. Bodie*, 221 N.C. App. 29, 34, 727 S.E.2d 11, 15 (2012); *Lea Co. v. N.C. Bd. of Transp.*, 308 N.C. 603, 611–12, 304 S.E.2d 164, 170 (1983). This Court has, therefore, followed and applied the Court of Appeals’ holdings without variation or departure.

B. The State’s newly proposed legal standard is untenable.

367. Three months after trial, the State for the first time in this litigation proposed a new legal standard: whether the State “acted in good faith” and “with ordinary prudence.” (State’s Proposed Conclusions of Law ¶ 10) (hereinafter “SPC”). In more than five years of litigation, the State has never proposed that standard (or any standard like it), including at the Court of Appeals, where the governing legal standards for this case were thoroughly briefed, argued, and ultimately decided. *See* Conclusions of Law, Section I.A.

368. Nor did the State propose this standard (or any standard like it) at trial. To the contrary, the State asked the Court to apply a completely different standard,²⁶ asserting that “[n]o other standard makes sense.” (T. 3958).

369. Yet three months later the State now insists that the Court must apply its new “good faith and ordinary prudence” standard, and that the Plaintiffs must prove that the State has acted in “bad faith” or “without ordinary prudence.” (SPC ¶¶ 10, 14, 53, 56, 60, 62, 64, 65, 67, 74).

370. The State’s newly proposed standard pervades nearly every aspect of its post-trial submissions: 43 paragraphs explicitly reference or apply the State’s newly proposed “good faith and ordinary prudence” standard, and virtually all of the State’s proposed findings operate under the notion that the State’s newly proposed standard is the applicable standard. (SPC ¶¶ 8, 10–14, 17, 19, 21, 32, 37, 41–42, 46–47, 50–58, 60–67, 70–71, 73–74; *see also* SPF ¶¶ 202, 211).

371. As discussed below, the State’s newly proposed standard is untenable.

²⁶ The standard that the State proposed at trial was “whether the general public has a meaningful opportunity to fish recreationally”—a standard that, as described above in Section I.A., and as the Plaintiffs noted in their closing argument, is contrary to the decision of the Court of Appeals in this case. (T. 4047) (referencing slides comparing the State’s proposed standard with the Court of Appeal’s decision); *see also Coastal Conservation Ass’n*, 285 N.C. App. 267, 281–83, 878 S.E.2d 288, 299–300 (“The State contends the language of this provision places no affirmative constitutional mandate on the State to preserve the right of the people to hunt, fish, and harvest wildlife for the public good. We disagree . . . The State’s duty necessarily includes some concomitant duty to keep fisheries safe from injury, harm, or destruction for all time . . . In this case, Plaintiffs’ have alleged facts, which if proven, may tend to show the State did not properly manage the fisheries so as to forever preserve the fish populations for the benefit of the public.”).

1. The Court of Appeals’ decision, not the law of private trusts, is the law of the case.

372. As noted above, the Court of Appeals’ decision is the law of the case, and therefore, this Court must follow that decision on remand without variation or departure. *See, e.g., Bodie*, 221 N.C. App. at 34, 727 S.E.2d at 15; *Lea*, 308 N.C. at 611–12, 304 S.E.2d at 170. In applying that decision without variation or departure, the Court notes, as a threshold matter, that the words “good faith” and “ordinary prudence” appear nowhere in the Court of Appeals’ decision. Instead, the Court of Appeals’ decision provides a comprehensive analysis of the three legal theories underlying Plaintiffs’ claim, setting forth the controlling legal standards for each, as discussed above. *See* Conclusions of Law, Section I.A. Thus, the Court of Appeals has provided this Court with ample, case-specific guidance on how to apply the law of North Carolina to this very case—appellate guidance that, in the absence of an interlocutory appeal, a trial court would not typically have at the time of trial.²⁷

²⁷ In arguing for its newly proposed standard three months after trial, the State suggests that the Court of Appeals’ conclusions discussed above in Section I.A. “do not address the question the Court must answer.” (SPC ¶ 15). The Court disagrees with that criticism. When the Court of Appeals provided its comprehensive analysis of all three underlying theories of Plaintiffs’ claim, it specifically provided this Court with guidance on resolving the question of liability in this liability phase of the case, including when a finding of liability would be warranted. *See Coastal Conservation Ass’n*, 285 N.C. App. at 283, 878 S.E.2d at 300 (“Plaintiffs have alleged facts, which if proven, may tend to show the State did not properly manage the fisheries so as to forever preserve the fish populations for the benefit of the public.”); *see also id.* at 280, 878 S.E.2d at 298–99 (concluding that “extensive data points documenting the stock status and the stock population trends of certain fish species . . . support Plaintiffs’ contention the State did not protect the harvestable fish population ‘for the benefit of all its citizenry’” in violation of the Constitution).

373. Against the weight of that case-specific guidance from the Court of Appeals, the State now asks this Court to apply private trust law instead. (SPC ¶ 10). According to the State, private trust law controls here, and it should control the Court’s proposed findings and conclusions. (SPF ¶¶ 8, 10–14, 17, 19, 21, 32, 37, 41–42, 46–47, 50–58, 60–67, 70–71, 73–74; *see also* SPC ¶¶ 202, 211).

374. The State’s recent representations about private trust law are notable, because for years now, the State has represented that it would be reversible error for the Court to apply private trust law. As the State has apparently forgotten, it repeatedly and explicitly argued to this Court that **“the public trust doctrine has nothing to do with private trust law.”** Def.’s Brief in Support of Motion to Dismiss (hereinafter “Def.’s Br.”), p. 8 (quoting 2 Waters & Water Rights § 30.02(a)) (emphasis added). As the State further represented in its previous filings:

- a. “The [public trust] relationship . . . was not created under the general law of trusts. The law of trusts has never been applied in a rote fashion, if at all, to the public trust doctrine in this state.” (Def.’s Br., p. 8).
- b. “The public trust doctrine has been part of the common law of this State for over 250 years and never have the courts applied the law of ordinary trusts to determine the relative rights, duties and privileges of the State and the public.” (Def.’s Br., p. 10).

- c. “The body of law that governs the public trust doctrine . . . is unique and developed on its own path, separately from and not in tandem with ordinary trust law.” (Def.’s Br., p. 10).
- d. “The public trust doctrine is a unique common law doctrine that has developed entirely separately from the law that governs ordinary trusts.” (Def.’s Br., p. 2).
- e. “[Nothing] suggests that the law simply borrows concepts that govern garden variety trusts to apply them to the public trust doctrine.” (Def.’s Br., p. 10).
- f. “[T]he common law public trust doctrine in this State does not create duties for the trustee akin to an ordinary trust.” (Def.’s Br., p. 21).

375. In response to these representations about North Carolina law, the Plaintiffs expressed their general agreement, stating that “Plaintiffs have never suggested that private trust principles control here” and noting that, at most, “the private trust relationship is simply a metaphor” that can be useful in explaining the concept of the public-trust doctrine. *See* Pls.’ Brief in Opposition to Motion to Dismiss p. 15 n.5.

376. The State’s prior representations to this Court were compelling, and given the Plaintiffs’ general agreement with them, the Court has been presented with no basis for disputing those representations. Although the State now, three months after trial, has asked the Court to apply the law of private trusts, the State has not provided the Court with any reason why it should do so. At most, the State

has simply suggested that its newly proposed “good faith and ordinary prudence” standard was once applied historically to trustees (i.e., trustees of private trusts) “at common law” (SPC ¶ 10), without any explanation of why a 150-year-old common law rule for private trusts would apply to this case. Nor is there one, as described more fully below. *See* Conclusions of Law, Section I.B.2.

377. Accordingly, based on the State’s representations above, the Court declines to replace the case-specific legal standards set forth by the Court of Appeals with the law of private trusts. Even if the Court were to apply private trust law, moreover, the Court would still decline to apply the State’s newly proposed standard, as discussed below.

2. The State’s newly proposed standard is a 150-year-old, long-since-abrogated, standard for trustees who invested in the Confederacy during the Civil War.

378. In support of its “good faith and ordinary prudence” standard, the State cites two North Carolina decisions: *Robertson v. Wall*, 85 N.C. 283 (1881) and *Bason v. Harden*, 72 N.C. 287 (1875). The State contends that these two cases established a general, “common law” rule in North Carolina about when and how a trustee can be held “liable for losses caused by ‘unwise management,’” and that this standard still controls today, 150 years later, so the Court must apply it. (SPC ¶ 10).

379. The Court disagrees. Neither *Bason* nor *Robertson* set forth a generally applicable standard, let alone a currently applicable one. To the contrary, those two Reconstruction-era cases addressed the narrow question of whether, following the Civil War, a trustee of a private trust could be held liable for investing in bonds or

currency of the Confederacy. See *Robertson*, 85 N.C. at 287–89; *Bason*, 72 N.C. at 288–89. With former Confederate officers writing for the Court,²⁸ these two cases applied what can only be characterized as a uniquely lenient standard for trustees who invested in the Confederacy: a “good faith and ordinary prudence” standard that was, at most, loosely based on the “prudent man” standard of pre-Civil War trust law, but adapted to make it more lenient as a means of insulating Confederate investors from liability.²⁹ See *Bason*, 72 N.C. at 288–89 (excusing the trustee because “everything around him was crumbling to pieces under the shock of arms”); *Robertson*, 85 N.C. at 287–89 (excusing the trustee in light of “the overthrow of the Confederate government”). Apart from these (and other) 150-year-old decisions involving trustees who invested in the Confederacy, there appear to be no reported decisions—and the State cites none—applying this “good faith and ordinary prudence” standard to trustees in the modern era.

380. Nor does the State’s Reconstruction-era standard have any place in the modern law of private trusts. In the 150 years since *Bason* and *Robertson*, the law of

²⁸ Justice Bynum, who authored *Bason*, had fought for the Confederate Army. See John L. Bell, Jr., *Bynum, William Preston*, State Library of North Carolina *NCpedia*, Department of Natural and Cultural Resources (UNC Press 1979). Chief Justice Smith, who authored *Robertson*, had been a member of the Confederate Congress. See William N.H. Smith, *Slavery Restriction in Conflict with Judicial Authority* (Lemuel Towers 1860).

²⁹ As *Robertson* noted, this lenient standard was adopted in *Cummings v. Mebane*, 63 N.C. 315, 317 (1869), to address the “numerous cases before the court involving the management of trust estates during the [recent] civil war, and the personal responsibility incurred by trustees in converting funds into Confederate securities.” *Robertson*, 85 N.C. at 287–88 (quoting *Cummings*, 63 N.C. at 371)).

private trusts in North Carolina has evolved to enforce rigorous standards that demand active, cautionary, particularized monitoring and management of trust assets—trustee obligations that, if applied to fisheries management, would resemble the precautionary approach described in the unrebutted testimony of Plaintiffs’ experts.³⁰ See, e.g., N.C. Gen. Stat. § 36C-8-804 (Uniform Trust Code provision codifying the Restatement (Third) of Trusts § 77 and requiring that the trustee act with “reasonable care, skill, and caution”).³¹ These modern-day obligations of trustees under private trust law bear little resemblance to the 150-year-old standard from *Bason* and *Robertson*. Compare *id.* with SPC ¶ 13 (relying on and quoting *Robertson* for the notion that the State, as trustee, would have “no liability even where the ‘trust estate has been almost wholly destroyed’”).

³⁰ Thus, if the modern-day law of private trusts were applied, the State would fare no better than under the law as set forth in the Court of Appeals’ decision.

³¹ The State’s proposed findings and conclusions also contain a reference to the requirement, proposed by the 1959 Second Restatement of Trusts, that a trustee must act with “ordinary prudence [and] use reasonable care and skill to make the trust property productive.” (SPC ¶ 10 (citing the Second Restatement)). Although that 65-year-old formulation of the private trust law standard is much closer to modern-day standards than the standard from *Bason* and *Robertson* that pervades the State’s proposed findings and conclusions, the State’s outdated, Second Restatement standard has also long since been abrogated.

North Carolina never codified the Second Restatement of Trusts. In 2005, however, North Carolina codified the more rigorous standard for trustees from the Third Restatement of Trusts. See S.L. 2005-192 (adopting the Uniform Trust Code). Among other things, that heightened standard from the Third Restatement requires a trustee managing trust assets to manage with “caution,” as noted above. N.C. Gen. Stat. § 36C-8-804 (Uniform Trust Code provision codifying the Restatement (Third) of Trusts § 77).

381. The Court could go further, but it suffices to conclude that even if the Court were to apply private trust law instead of the law as set forth by the Court of Appeals in this case, the Court would not accept the State’s invitation to apply a long-since-abrogated, standard for trustees who invested in the Confederacy. The Court declines the State’s invitation to apply that standard, as well as the State’s proposal that the Court rely on and apply that standard across its findings and conclusions.³²

382. In sum, the Court will not apply the law of private trusts—a body of law that, in the State’s words, “has nothing to do with” this case. The Court will apply the law as set forth by the Court of Appeals, and it will do so without variation or departure.

C. The Court reaffirms its prior rulings on the State’s renewed legal arguments from summary judgment.

383. At summary judgment, the State made a number of legal arguments. *See* Def.’s Brief in Support of Summary Judgment (hereinafter “Def.’s S.J. Br.”). These included the State’s arguments that: (i) the availability of certain other, historically insignificant species that have never been managed under an FMP would satisfy the State’s obligations under the public-trust doctrine and the North Carolina Constitution; (ii) the State’s only obligations are to current North

³² The Court is particularly unpersuaded by the State’s argument that, based on the 150-year-old standard from *Bason* and *Robertson*, the State has satisfied its obligations under the public-trust doctrine and the North Carolina Constitution even if North Carolina’s coastal fisheries are “wholly destroyed.” (SPC ¶ 13).

Carolínians, without regard for future generations; (iii) as long as North Carolínians can catch a fish—any fish—the State has no obligation to provide harvestable fish; (iv) the State has an “adequate remedy” defense despite the Court of Appeals’ express holding that the Plaintiffs lack an adequate remedy; and (v) notwithstanding that the sole remedy requested by the Plaintiffs is declaratory and prospective, injunctive relief, the Plaintiffs’ Article I, Section 38 claim seeks improper retroactive relief.

384. The Plaintiffs responded that these arguments were inconsistent with the Court of Appeals’ decision, and in most instances, amounted to an express invitation to defy the Court of Appeals. *See* Pls.’ Brief in Opposition to Summary Judgment (hereinafter “Pls.’ S.J. Br.”), pp. 35–56.

385. Following a January 21, 2025 hearing on the motion, and after careful consideration of the relevant law—including the Court of Appeals’ decision in this case and the governing standards set forth above in Section I.A. of the Court’s Conclusions of Law—the Court on March 7, 2025 denied the motion in its entirety.

386. At trial, at the close of the Plaintiffs’ evidence, the State had the opportunity to renew its legal arguments from summary judgment under Rule 41(b), which allows a defendant in a bench trial to “move for a dismissal on the ground that upon the facts and the law the plaintiff has shown no right to relief.” N.C. R. Civ. P. 41(b). The State declined to do so, however, even after the Court specifically inquired as to whether the State wished to do so. (T. 2128).

387. In closing arguments, after Plaintiffs’ counsel recounted and addressed the State’s various legal arguments, including those from summary judgment, the State renewed some of those arguments in its closing, as well as in its post-trial submissions—namely, the five arguments listed above.

388. The Court notes that the parties thoroughly briefed each of these issues at summary judgment, providing the Court with nearly 100 pages of briefing and over 5,000 pages of related materials, and that the parties argued these issues extensively at the hearing on the motion. The State’s closing arguments and post-trial submissions renewing these same arguments simply repeat the same arguments from the State’s briefing and argument at summary judgment—in most instances, offering even less than what the State presented at summary judgment, and in every instance, offering nothing new or different beyond what the State argued at summary judgment.³³ Accordingly, for the same reasons the Court rejected those arguments a year ago, the Court likewise rejects them again now.³⁴

³³ Compare Def.’s S.J. Br. pp. 26–28, *with* (T. 3949–53, 3993), SPF ¶ 160, SPC ¶¶ 20, and Pls.’ S.J. Br. pp. 35–46 (availability of other species); *compare* Def.’s S.J. Br. pp. 32–35, *with* (T. 3936–37), SPC ¶ 20, and Pls.’ S.J. Br. pp. 38–46 (no obligation to future generations); *compare* Def.’s S.J. Br. pp. 20–26, *with* (T. 3946–49, 3958), SPF ¶ 48, SPC ¶ 20, and Pls.’ S.J. Br. pp. 38–46 (any-fish standard); *compare* Def.’s S.J. Br. pp. 16–19, *with* (T. 3809–11), SPC ¶¶ 24–29, 40, and Pls.’ S.J. Br. pp. 50–56 (adequate remedy); *compare* Def.’s S.J. Br. pp. 32, 35, *with* (T. 3936–37), SPC ¶¶ 31–32, and Pls.’ S.J. Br. pp. 36–37, 38 n 22 (prospective, injunctive relief).

³⁴ If anything, the evidence at trial, as described in the Court’s Findings of Fact above, has only further underscored why the State’s legal arguments from summary judgment were without merit.

II. The uncontroverted evidence at trial established liability on multiple, independent grounds.

A. The State was forced to concede, as the uncontroverted evidence showed, that not a single species managed by the State exhibits long-term viability.

389. As described above, the State acknowledges—and the Court likewise concludes—that “long-term viability is the standard” for assessing the State’s management of North Carolina’s commercially and recreationally significant species or fisheries. (T. 3762 (Rawls); T. 2324, P. Ex. 207 (Loeffler); T. 3638 (Batsavage)); *see also* N.C. Gen. Stat. § 113-182.1(b).

390. As described above, however, the State has effectively abandoned that standard to such a degree that DMF does not even “think about it,” and does not even regard it as “something that’s germane to the day-to-day” work of the agency. (T. 3639–40); *see also* Section IV.A.

391. As described above, the State’s abandonment of the long-term viability standard left it unable, across six weeks of trial, to point to a single one of 13 state-managed stocks that exhibits long-term viability. *See* Section IV.A. Meanwhile, Dr. Daniel, applying the State’s own historical viability criteria to current data, gave unrebutted, data-backed expert testimony that none of the 13 state-managed stocks currently exhibits long-term viability.³⁵ (T. 1271–87; P. Ex. 24, p. 0111).

³⁵ The State characterizes these 13 stocks as “a handful” of “historically popular recreational species.” (SPF ¶ 159). The species at issue are not “a handful”; they are every single one of the State’s state-managed species—all 13 state-managed stocks—and not one exhibits long-term viability. (T. 1284; P. Ex. 24, p. 11; P. Ex. 25).

392. That 0-for-13 track record is dispositive here. The long-term viability standard is not merely a statutory floor against which the State’s management must be assessed under the FRA, but rather, as the uncontroverted testimony on long-term viability from Plaintiffs’ experts confirmed (*see* Section I.D), that standard is, in all material respects, the same standard that the public-trust doctrine, Article I, Section 38, and Article XIV, Section 5 demand—namely, the State’s affirmative duty “to manage and protect fisheries for the benefit of the general public” as required under the public-trust doctrine, *Coastal Conservation Ass’n*, 285 N.C. App. at 277, 878 S.E.2d at 297, to “keep fisheries safe from injury, harm, or destruction for all time” as required under Article I, Section 38, *id.* at 282, 878 S.E.2d at 300, and to “protect the harvestable fish population ‘for the benefit of all its citizenry’” as required under Article XIV, Section 5, *id.* at 280, 878 S.E.2d at 298–99. Thus, given the State’s admissions and the uncontroverted expert testimony that not a single one of the 13 state-managed stocks exhibits long-term viability, the State has necessarily failed to meet those affirmative duties.

393. The Court acknowledges the State’s argument, made for the first time three months after trial in its post-trial submissions, that the legal standards set forth by the Court of Appeals and discussed above in Section I.A. of the Court’s Conclusions of Law “do not provide [a] measuring stick to determine whether the State has met [its] obligation.” (SPC ¶ 15). Leaving aside the fact that those legal standards as set forth by the Court of Appeals are no more challenging to apply than countless other legal standards applied by judges and juries in North Carolina

on a regular basis (e.g., “objectively reasonable,” “reasonably foreseeable,” etc.), the State’s “measuring stick” criticism overlooks the fact that, at trial, the State’s own witnesses provided that measuring stick themselves: long-term viability. Given the State’s admissions that long-term viability “is the standard” (T. 3762 (Rawls); T. 2324, P. Ex. 207 (Loeffler); T. 3638 (Batsavage)), the State’s documented use of long-term viability as the standard for two decades (P. Ex. 24; 1270–72), the unrebutted testimony of Plaintiffs’ fisheries-management experts that long-term viability is the standard for assessing fisheries management in North Carolina (*see* Section I.D.), and the fact that for nearly 30 years, the entire purpose of North Carolina’s fisheries management plans has been “to ensure . . . long-term viability,” N.C. Gen. Stat. § 113-182.1(b), the Court need not embark on a search for a new “measuring stick” for fisheries management in North Carolina. Even if the Court were to embark on such a search, moreover, the State is conspicuously silent on what an alternative “measuring stick” would be. To that end, the State did not present any witness at trial who even so much as suggested an alternative “measuring stick” other than long-term viability.

394. In sum, given the State’s undisputed 0-for-13 track record on long-term viability, both independently and in combination with the Court’s findings and conclusions herein, the Court concludes, based on the preponderance of the

evidence,³⁶ that the State has breached its obligations under the public-trust doctrine, Article I, Section 38 of the North Carolina Constitution, and Article XIV, Section 5 of the North Carolina Constitution.

B. Plaintiffs’ experts’ conclusions on the State’s management failures were entirely un rebutted.

395. As the State argued in its pre-trial motions in limine and at trial (*see, e.g.*, T. 1017, 1466), and as the Court concluded in granting the State’s motion in limine, expert testimony from qualified fisheries-management experts is required to establish the sufficiency of the State’s coastal fisheries management.

396. At trial, Plaintiffs presented three fisheries-management experts: Dr. Daniel, Dr. Powers, and Dr. Stunz. The State raised no objection to their qualifications, and the Court received all three as experts in fisheries management. As noted in Section I.D., their qualifications in the field of fisheries management

³⁶ As the State requested in its post-trial submissions, the Court has weighed the evidence under a preponderance-of-the-evidence standard (SPC ¶¶ 47, 49, 53, 55–56, 58, 61–65), including with respect to Article I, Section 38 and Article XIV, Section 5. (SPC ¶ 37) (urging the Court to find that “the plaintiffs have not carried their burden” under Article I, Section 38 based on proposed findings applying a “preponderance of the evidence” standard); ¶ 42 (urging the Court to find that “the plaintiffs have not carried their burden” under Article XIV, Section 5 based on proposed findings applying a “preponderance of the evidence” standard). However, even weighing the evidence under a heightened standard—for example, the “clear and convincing evidence” standard that the State initially suggested at trial (T. 48), or the “plain and clear” standard that applies when a Plaintiff asks the Court to “strike down an Act of the General Assembly,” *N.C. State Conf. of Nat’l Ass’n for the Advancement of Colored People v. Moore*, 382 N.C. 129, 146, 876 S.E.2d 513, 526 (2022), which is relief that the Plaintiffs have not sought here (*see, e.g.*, Finding of Fact No. 47; T. 3816–17)—the Court would reach the same conclusions herein under those heightened standards given the overwhelming evidence described in the Court’s Findings of Fact above.

are above reproach. Based on their comprehensive review of many thousands of pages of the State's fisheries-management records and data, each prepared comprehensive expert reports and rebuttal reports that were admitted into evidence. (T. 1340 (Daniel); T. 1704 (Powers); T. 1883 (Stunz)).

397. Over a combined eight days of trial, Dr. Daniel, Dr. Powers, and Dr. Stunz testified to a number of central, uncontradicted expert opinions described above, including:

- a. The State has failed to manage for long-term viability, and as a result, not a single one of North Carolina's state-managed stocks currently exhibits long-term viability.³⁷
- b. Particularly given the State's failure to collect the necessary management data to fully account for commercial fishing removals, the State has failed to apply the precautionary principle that is widely accepted across federal and state fisheries-management bodies.³⁸
- c. The State has continued to tolerate and protect indiscriminate and destructive commercial fishing gear—most notably, estuarine shrimp trawling and gillnets—that cause high, uncharacterized bycatch

³⁷ (T. 1239, 1275, 1449–66 (Daniel); T. 1656, 1662, 1676–77 (Powers); T. 1814–15, 1872–73, 1888–89 (Stunz); P. Ex. 211, p. 30 (Daniel Report); P. Ex. 216, p. 21 (Powers Report)).

³⁸ (T. 1103–25 (Daniel); T. 1519–20, 1659, 1678, 1692 (Powers); T. 1776–80, 1783, 1790–97, 1832–34 (Stunz); P. Ex. 211, p. 8 (Daniel Report); P. Ex. 216, p. 24–25 (Powers Report); P. Ex. 220 (Stunz Report)).

mortality and well-documented adverse impacts on non-target species and the ecosystem.³⁹

- d. The State has failed to take aggressive and timely management action to rebuild stocks in the face of data showing that more timely action was needed.⁴⁰
- e. The State's failures are not the product of any one decision, but rather, are the product of a systemic, decades-long pattern of risk-prone management dominated by short-term commercial-industry considerations to the detriment of North Carolina's coastal fisheries and the general public.⁴¹
- f. The State's significant and numerous management failures are the cause of the demonstrated decline in North Carolina's coastal fisheries, and based on the State's management approach, were both foreseeable and predictable.⁴²

³⁹ (T. 1345, 1376, 1386 (Daniel); T. 1666, 1669, 1680, 1683–84 (Powers); T. 1817, 1832, 1846–47, 1855, 1871 (Stunz); P. Ex. 211, pp. 25–28 (Daniel Report); P. Ex. 216, pp. 22–27 (Powers Report)).

⁴⁰ (T. 793–94, 1372, 1382 (Daniel); T. 1662, 1676, 1682, 1696–97 (Powers); T. 1806, 1813–14, 1817, 1828, 1831 (Stunz); P. Ex. 211, pp. 25–30 (Daniel Report); P. Ex. 216, pp. 21, 29 (Powers Report); P. Ex. 220 (Stunz Report)).

⁴¹ (T. 1229, 1239, 1376, 1386 (Daniel); T. 1659, 1663, 1673, 1677, 1690, 1704 (Powers); T. 1813–14, 1827–28 (Stunz); P. Ex. 211, p. 30 (Daniel Report); P. Ex. 216, pp. 21–32 (Powers Report)).

⁴² (T. 1376, 1386 (Daniel); T. 1656, 1662, 1676 (Powers); T. 1814, 1828, 1888–89 (Stunz); P. Ex. 211, p. 30 (Daniel Report); P. Ex. 216, p. 21 (Powers Report)).

398. In contrast, the State did not present any expert who testified as to the sufficiency of the State’s management at the system level (i.e., the agency level or commission level)—a dispositive issue that Dr. Powers, Dr. Stunz, and Dr. Daniel addressed at length over the course of eight days of trial.⁴³ Instead, the State took an unusual approach: Rather than retain independent, qualified, outside experts in fisheries management,⁴⁴ the State simply designated seven of its DMF employee fact witnesses as experts, then sought to elicit various expert conclusions from them about their employer.⁴⁵ (T. 2143–44). Under Rule 702, that approach was self-

⁴³ The State tendered Mr. Loeffler as an expert in “fisheries science and management,” but following Plaintiffs’ voir dire of Mr. Loeffler (T. 2135–50), and following the Court’s rulings on Plaintiffs’ Rule 702 objections (T. 2180, 2233, 2253), Mr. Loeffler testified only as a fact witness about DMF data and management history, and did not offer expert conclusions or opinions about the adequacy of the State’s fisheries management. (T. 2150–2364).

⁴⁴ The State retained three outside experts, Dr. Hightower, Dr. Scharf, and Dr. Garrity-Blake, but none of them offered management-adequacy opinions on the adequacy of the State’s fisheries management. As to Dr. Hightower, the Court sustained the Plaintiffs’ objections to any proffered management-adequacy opinions, declining to consider them as expert testimony. (T. 3030). As to Dr. Scharf, the Court declined to qualify him as an expert in fisheries management (T. 3190), and ultimately, his testimony was limited to specific, narrow concepts of fisheries science—not fisheries management, and not management adequacy. (T. 3188–90, 3197, 3222–28). As to Dr. Garrity-Blake, who was tendered as “an expert in cultural anthropology with a focus on fisheries and maritime communities,” the Court found that she was highly qualified in her field (T. 3668), but her proffered testimony was not relevant to the liability issue before the Court. (T. 3674–75).

⁴⁵ In seeking to justify this approach, the State argued: “[W]e do it all the time in these cases, we rely on our employees that are employed specifically with knowledge of what they’re doing.” (T. 2147). The State did not cite to any other “cases”—whether in the Office of Administrative Hearings, North Carolina Superior Court, or otherwise—in which the State’s approach has ever been sustained under Rule 702, nor is the Court aware of any such instances.

defeating: Although the Court found that each DMF employee-witness satisfied the threshold “knowledge, skill, experience, training, or education” criteria of Rule 702, in virtually every instance they were unable to satisfy the remaining requirements of Rule 702: that “(1) The testimony is based upon sufficient facts or data; (2) The testimony is the product of reliable principles and methods; [and] (3) The witness has applied the principles and methods reliably to the facts of the case.” N.C. R. Evid. 702(a).⁴⁶

399. As a result of the State’s approach, the sum total of the State’s expert testimony on fisheries management was limited to four witnesses who were received as experts on the management of particular species only: Tina Moore (bay scallop, Eastern oyster, and hard clam), Christopher Batsavage (red drum), Charlton Godwin (striped bass and river herring), and Jason Rock (spotted seatrout and blue crab). The State did not tender any of them as an expert on the State’s fisheries-management approach, methodology, or system as a whole—that is, at the agency level—and, as a result, they did not testify on those issues. More

⁴⁶ For example, the State tendered Mr. Zapf as an expert in Atlantic croaker management and spot management, but the Court sustained Rule 702 objections to his expert opinions or conclusions—for example, his opinions on climate change. (T. 2755). Ultimately, he testified about these species as a fact witness only, simply reading raw data and materials from documents into the record, “without injecting any personal opinion or analysis.” (T. 2772–73).

Likewise, although Mr. Loeffler was received as an expert, he was limited to testifying about Southern flounder as a fact witness, without offering expert conclusions or opinions. (T. 2129–2364). Moreover, in his fact-witness testimony, he acknowledged the State’s failed management over the course of decades, referring to it as “a learning experience.” (T. 2246).

importantly, none of them provided any rebuttal to the expert testimony from Dr. Powers, Dr. Stunz, and Dr. Daniel about the State’s agency-level management failures set forth above. To the contrary, each of the State’s species-specific experts only confirmed a number of the management failures that Dr. Powers, Dr. Stunz, and Dr. Daniel identified:

- a. Mr. Batsavage testified to the State’s “ineffective management” despite data that was “really clear,” various “missed opportunities,” and that, for multiple species, “improvements are needed.” (T. 3620, 3630, 3632).
- b. Ms. Moore confirmed the State’s management failures for all three bivalve species on which she testified, including that Eastern oyster is “unknown but in decline” and yet the State has no rebuilding plan, that the FMP for hard clam admits that stock is “currently considered overfished and experiencing overfishing” and yet the State has no rebuilding plan, that commercial landings of bay scallop are “essentially zero” and are at less than one tenth of 1 percent of historic levels, and that for all three species, the State has failed to satisfy its statutory obligation to manage to a sustainable harvest. (T. 3146, 3148, 3160, 3162, 3167).
- c. Mr. Godwin admitted that under the State’s management, both striped bass and river herring have collapsed, resulting in no-harvest moratoriums—in the case of river herring, for nearly 15 years. (T. 3537, 3634).

- d. Mr. Rock admitted that overfishing of spotted seatrout is occurring and that it took six years from the 2022 stock assessment's terminal year to adopt new management measures, allowing commercial and recreational harvest to increase during that delay. (T. 3339–40, 3344, 3347, 3428–29). As to blue crab, he admitted that the State's management "had not been cautionary enough" for the better part of two decades, that the 2018 stock assessment found blue crab to be overfished with overfishing occurring, that blue crab is nevertheless still being managed to MSY, and that urgently needed action has been delayed multiple times by the MFC Chair for reasons known only to him. (T. 2329, 3320, 3331, 3415, 3424–26, 3437–38; P. Ex. 72, 73).

400. In sum, the State presented no expert to rebut Plaintiffs' fisheries-management experts—one of whom served as DMF's Fisheries Director for nearly a decade, and the other two of whom rank among the nation's leading experts in fisheries management. *See* Section I.D. That deficiency in the State's defense weighs heavily, because as the State itself affirmatively argued to this Court in its motions in limine, the sufficiency of the State's coastal fisheries management is an issue that calls for expert testimony from qualified fisheries-management experts. Without such testimony, "there is no proper foundation for a finding by the trier [of fact]." *Gillikin v. Burbage*, 263 N.C. 317, 325, 139 S.E.2d 753, 760 (1965); *Hawkins v. GE*, 199 N.C. App. 245, 249, 683 S.E.2d 385, 389 (2009) (same); *see also, e.g., Click v. Pilot Freight Carriers, Inc.*, 300 N.C. 164, 167, 265 S.E.2d 389, 391 (1980)

("[O]nly an expert can give competent opinion evidence" on subjects beyond the common knowledge of non-experts); *Norris v. Drexel Heritage Furnishings, Inc.*, 139 N.C. App. 620, 623, 534 S.E.2d 259, 262 (2000) (holding that findings on subjects requiring expert competence "must ordinarily be based upon expert . . . testimony").

401. The State's closing-argument suggestion that the Court is "not bound" by Plaintiffs' experts' opinions does not meaningfully cure the deficiency in the State's defense. (T. 4013). Although it is true that a factfinder need not accept expert testimony, the State's argument presupposes both that the testimony of Plaintiffs' experts was neither credible nor persuasive and that it was rebutted by persuasive, credible, contrary evidence against which to weigh it. That was not the case here. As noted above, Plaintiffs' fisheries-management experts were credible and compelling in their testimony about the State's management failures. Meanwhile, in three weeks of presenting its case, the State presented no contrary expert testimony to rebut the conclusions of Plaintiffs' fisheries-management experts, and in its closing argument, essentially asked the Court to analyze many thousands of pages of FMP documents to reach conclusions on its own, contrary to Plaintiffs' experts' conclusions that were left unrebutted. (T. 4013).

402. As discussed above, the Court found Plaintiffs' experts to be credible and persuasive on all material issues on which they testified. Their expert opinions were independently corroborated by the UNC Collaboratory and Dr. Fodrie's testimony, as well as by multiple senior DMF witnesses who admitted to the State's management failures and "ineffective management" over many decades, continuing

to this day. (T. 3806–07). Particularly given the complete absence of any expert testimony from the State as to its agency-level management failures set forth above, the uncontroverted expert testimony from Plaintiffs’ experts is the only compelling evidence of record here.

403. In sum, Plaintiffs presented qualified, credible, persuasive, un rebutted expert testimony from three experts on the material aspects of the State’s fisheries-management approach, methodology, and outcomes. That expert testimony, including evidence that not a single one of the 13 state-managed coastal fish stocks exhibits long-term viability, established that the State has failed to meet its “obligation to manage and protect fisheries for the benefit of the general public” as required under the public-trust doctrine, *Coastal Conservation Ass’n*, 285 N.C. App. at 277, 878 S.E.2d at 297, failed to “keep fisheries safe from injury, harm, or destruction for all time” as required under Article I, Section 38, *id.* at 282, 878 S.E.2d at 300, and failed to “protect the harvestable fish population ‘for the benefit of all its citizenry’” as required under Article XIV, Section 5, *id.* at 280, 878 S.E.2d at 298–99.

404. For this reason, both independently and in combination with the Court’s findings and conclusions herein, the Court concludes, based on the preponderance of the evidence, that the State has breached its obligations under the public-trust doctrine, Article I, Section 38 of the North Carolina Constitution, and Article XIV, Section 5 of the North Carolina Constitution.

C. On the full trial record, the evidence overwhelmingly established that the State breached its obligations under the public-trust doctrine and the North Carolina Constitution.

405. The Court's Conclusions of Law in Sections II.A. and II.B. each support independent grounds for liability. As the Court's findings above reflect, however, because the evidence at trial overwhelmingly favored Plaintiffs on the merits, the Court would reach the same conclusion on the full trial record.

406. As the Court of Appeals concluded in remanding this case, "Plaintiffs have alleged facts, which if proven, may tend to show the State did not properly manage the fisheries so as to forever preserve the fish populations for the benefit of the public." *Coastal Conservation Ass'n*, 285 N.C. App. at 283, 878 S.E.2d at 300. The Court of Appeals further concluded that Plaintiffs' allegations, "containing extensive data points documenting the stock status and the stock population trends of certain fish species . . . support Plaintiffs' contention the State did not protect the harvestable fish population 'for the benefit of all its citizenry'" in violation of the Constitution. *Id.* at 280, 878 S.E.2d at 298–99. Stated differently, if Plaintiffs proved what they alleged, liability would follow.

407. That is the case here. On this trial record reflecting approximately six weeks of evidence, and after carefully weighing all of the evidence presented, the Court concludes, based on the preponderance of the evidence, including the evidence described in the Court's extensive findings above, that the State has failed to meet its "obligation to manage and protect fisheries for the benefit of the general public" as required under the public-trust doctrine, *id.* at 277, 878 S.E.2d at 297, failed to "keep fisheries safe from injury, harm, or destruction for all time" as required under

Article I, Section 38, *id.* at 282, 878 S.E.2d at 300, and failed to “protect the harvestable fish population ‘for the benefit of all its citizenry’” as required under Article XIV, Section 5, *id.* at 280, 878 S.E.2d at 298–99. The State argues that Plaintiffs have the burden of proof and cannot carry that burden due to the substantial gaps in crucial data. That argument is specious at best. It is the State’s duty to manage our public trust fish. The evidence is overwhelming that one of the critical aspects of that duty is to collect adequate data. The data gaps the Court has found in this case are themselves evidence of management failures by the State and not lack of evidence from Plaintiffs.

408. On that same trial record, moreover, the State would fail even a less exacting standard than the one set forth by the Court of Appeals—including the State’s newly proposed standard based on private trust law. As Dr. Stunz summarized the evidence in this case, the State’s fisheries management is, “for sure,” “the worst” he has “ever seen” in the United States (T. 1889, 1891–92; P. Ex. 220, pp. 9–10, 21). Multiple senior DMF witnesses likewise admitted to the State’s “ineffective management” over many decades, continuing to this day. (T. 3806–07). By any metric, that is not “ordinary prudence,” nor does it demonstrate “care, skill, and caution.” *See* Conclusions of Law, Section I.B.2.

409. Accordingly, based on the preponderance of the evidence, including the evidence described in the Court’s extensive findings above, the Court concludes that the State has breached its obligations under the public-trust doctrine, Article I,

Section 38 of the North Carolina Constitution, and Article XIV, Section 5 of the North Carolina Constitution.

JUDGMENT AS TO LIABILITY AND
ORDER ON FURTHER PROCEEDINGS

Based on the foregoing Findings of Fact and Conclusions of Law, it is hereby ORDERED, ADJUDGED, AND DECREED that:

- (1) As to liability, judgment is entered in favor of Plaintiffs;
- (2) Within 30 days of this order, counsel for the parties shall meet and confer for the purpose of preparing a joint report to the Court within 45 days of this order as to any issues the parties may wish the Court to consider in connection with the scheduling of further proceedings in the remedy phase of this action; and
- (3) This cause is retained for further orders.

Dated: **8/17/2026**

8/17/2026 4:09:20 PM



The Honorable G. Bryan Collins, Jr.
Resident Superior Court Judge