

A Tale of Two Rivers: The Extirpation of Striped Bass in the Neuse and Tar/Pamlico Rivers

A Coastal Conservation Association North Carolina (CCA NC) White Paper



Introduction

In North Carolina, estuarine striped bass (*Morone saxatilis*) have for at least a century been an important species both for recreational and commercial harvest. Striped bass are anadromous, meaning that they annually migrate from the ocean into inland rivers and streams to spawn; when the eggs hatch, the resulting larvae and young fish “grow out” in estuarine waters, with mature adults then returning to the estuaries and/or open ocean. The fate of North Carolina estuarine striped bass parallels the history of other anadromous fish stocks in the United States. Overfishing, construction of dams that block spawning migration and natural river/stream flow, and the loss of habitat have predictably extirpated or greatly reduced native fish runs. In our state, the bulk of the estuarine striped bass spawning has occurred in the northern Albemarle Sound/Roanoke River system—the Albemarle Sound/Roanoke Management Area (referred to, respectively, in various Striped Bass plans as either the Albemarle Sound Management Area (ASMA) or the Roanoke River Management Area (RRMA); or collectively as the Albemarle/Roanoke (A/R) management area—with lesser spawning runs in the smaller rivers systems in the central and southern portions of the state—collectively called the Central—Southern Management area (CSMA) (**FMP 2004**).

Under current North Carolina law, fish stocks occurring in coastal waters are managed by the North Carolina Division of Marine Fisheries (DMF) under policies set by the North Carolina Marine Fisheries Commission (MFC), while fish stocks occurring in inland waters are managed by the North Carolina Wildlife Resources Commission (WRC). Those management jurisdictions overlap in state “joint waters”, which are essentially those estuarine areas where state freshwater rivers flow into the coastal water bodies influenced by ocean currents and salinities. Striped bass occur in North Carolina throughout these joint waters.

North Carolina estuarine striped bass stocks nearly collapsed in the late 20th Century due to overharvest and the other aforementioned problems that extirpated historic

anadromous fish spawning runs. As a result of proposed intervention by the Atlantic States Marine Fisheries Commission, or ASMFC (North Carolina is by state law a member of the ASMFC), to find state management in violation of ASMFC management requirements, the MFC and the WRC in 1992 adopted an historic joint Striped Bass Fisheries Management Plan (Joint Plan) that drastically reduced harvest in the A/R management area. Unfortunately, since state striped bass harvest outside the A/R management area had in then recent history been largely insignificant, harvest reduction management measures in the CSMA were largely an afterthought of the Joint Plan. Under Joint Plan management strictures, striped bass in the A/R region were declared recovered by 2001, although increased harvest levels since recovery was declared now threaten stock restoration.

With the passage of the North Carolina Fisheries Reform Act of 1997 (FRA, Fisheries Reform Act of 1997) fisheries management for all “commercially or recreationally significant species” is accomplished via the development and implementation of a specific Fisheries Management Plan (FMP) according to requirements and procedures set out in the FRA. North Carolina striped bass are one such species. The original, FRA-required North Carolina Estuarine Striped Bass FMP (FMP 2004) was adopted by the MFC and WRC in 2004. Because the FRA requires every FMP to be updated at least every five years, the 2004 FMP was updated in Amendment 1 to the 2004 FMP (Amendment 1, 2013), adopted by the MFC and WRC in 2013. Development of Amendment 2 to the 2004 FMP is planned beginning in 2018.

While drastic harvest reduction is the single most important tool available to state fisheries managers for recovering declining anadromous stocks, the inadequate, and often counterproductive, response to the loss of native fish spawning stocks has been to construct fish hatcheries, the products of which can interfere with recovery of native stocks. The abundance of hatchery fish camouflages the loss of native fish and insidiously undermines attempts to control the factors responsible for the loss of the native stocks in the first place. The quintessential example is found in the salmon fisheries of the Pacific Northwest. For more than two hundred years, hatcheries have failed to recover the native salmon fisheries because the causes of the original declines continue to be ignored (Taylor and Cronon, 2015).

While management measures necessary to recover North Carolina striped bass in the RRMA and ASMA have been proven, there has been no corresponding improvement in the plight and condition of North Carolina striped bass stocks outside the A/R region. For that reason, the remainder of this paper deals only with striped bass management in the CSMA.

CSMA Background

The geographic area of the CSMA includes the waters from the Tar and Pamlico Rivers, including their estuaries, south to the South Carolina border (see Figure 1, below). In the CSMA there are three relatively large river systems that historically harbored healthy striped bass populations and whose stocks are now in trouble: the Neuse River system,

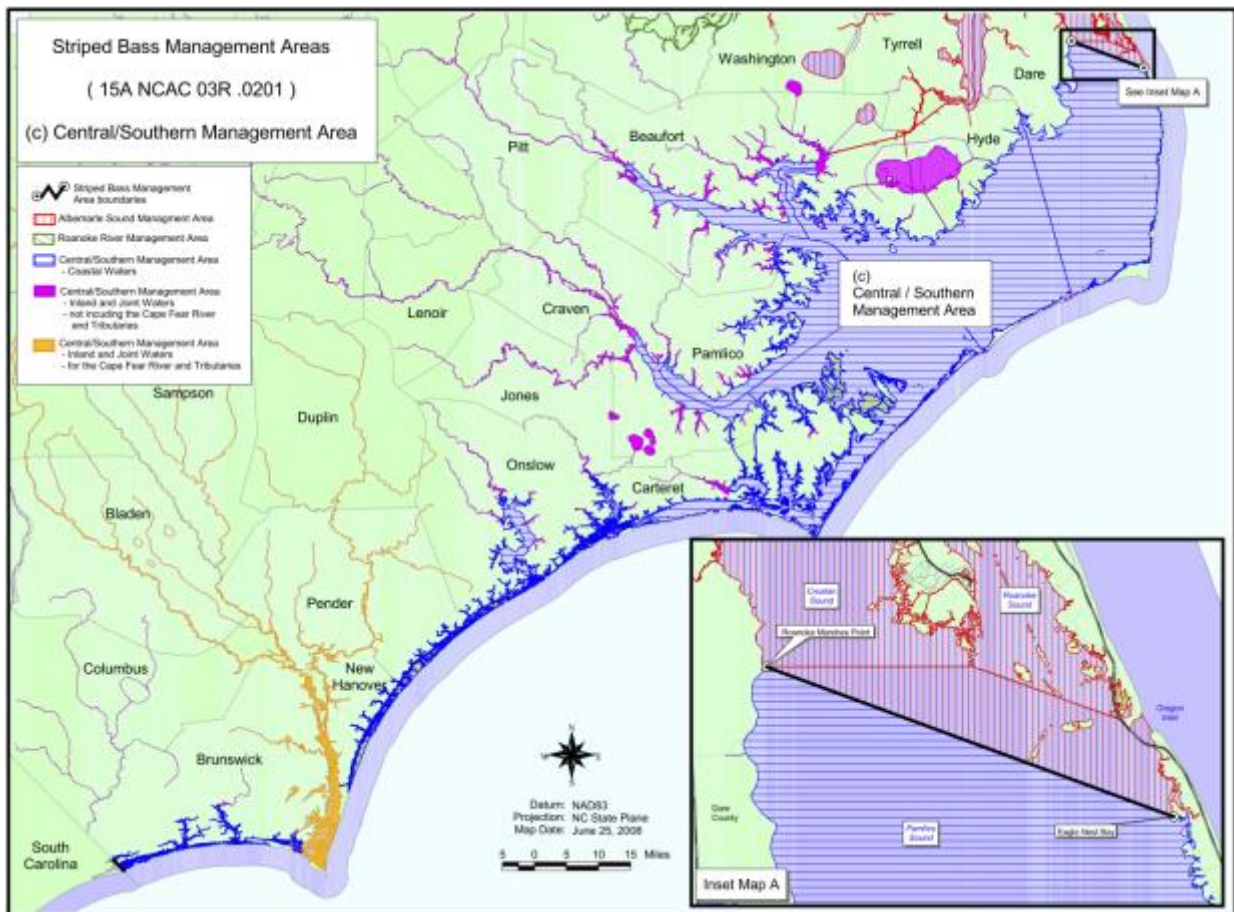


Figure 1. Map of Central Region Management Area for estuarine striped bass (NC DMF)

the Tar/Pamlico River system, and the Cape Fear River system. A total harvest moratorium of striped bass was implemented in 2008 in the Cape Fear River system because of a complete collapse of striped bass spawning stocks in that area, so state southern river systems are not the focus of this discussion. Instead, it will focus exclusively on the plight of striped bass in the Neuse and Tar/Pamlico Rivers systems and their respective adjoining estuaries.

In each of the three CSMA river systems a stocking program of phase II (*i.e.*, “fingerlings” 6-8 inches in length), hatchery-raised striped bass has been underway for decades. About 100,000 fish are stocked every year in the lower reaches of their respective CSMA river systems (see 2010-2014 Neuse/Tar/SBStocking and Amendment 1, 2013). The source of the fish for the Neuse and Tar/Pamlico rivers stocking is the U.S. Fish & Wildlife Service’s (USFWS) Edenton, North Carolina fish hatchery. Operations at the Edenton hatchery are funded by federal dollars (by contrast, the source of fish for the now closed Cape Fear River system is the Watha hatchery that is funded by recreational fishing excise taxes from the so-called “Dingell-

Johnson Act”). The cost of each phase II hatchery fish varies between \$1.50 and \$2.25 (Personal Communication, USFWS). In addition, funding for scientific studies to monitor stocked fisheries is also supplied by Dingell-Johnson funds. Thus, the total, annual, publicly financed cost of the CSMA striped bass stocking program is in excess of \$750,000.00. Restoring native reproduction in the CSMA would not only conserve most of this expense for other uses, but would also potentially be an economic boom for CSMA area tourism, just as the striped bass fishery in the Roanoke River is for the town of Weldon, North Carolina.

CSMA Striped Bass Fisheries Issues

Excessive Striped Bass Harvest

Under the state’s current striped bass fisheries management regime, the Neuse and Tar/Pamlico Rivers support very modest recreational and commercial fisheries. The harvest season for both sectors is limited to a month or two annually, but there is a popular catch-and-release recreational fishery during other times of the year. The directed commercial striped bass gill net fishery in the Neuse and Tar/Pamlico rivers has an annual quota (“Total allowable catch,” or “TAC”) of 25,000 pounds; however, additional significant commercial sector removals may occur as bycatch in non-directed commercial fisheries and unreported commercial landings (as where the fish are kept for personal consumption or given to friends and family).

The entire commercial TAC issue is complicated by the fact that when the original 1992 Joint Plan was adopted, the biological “benchmarks” chosen for recovery of state striped bass stocks were based on A/R management area data, since historical striped bass data for the CSMA were virtually nonexistent. The assumption was made that the plights of the various stocks were similar enough that what would work to recover striped bass in the A/R management area would also work for that purpose in the CSMA. That premise remains untested, because when the Joint Plan was adopted, DMF arbitrarily imposed the current 25,000 pound TAC for the CSMA to allow commercial harvest to continue at then current levels, although the appropriate plan benchmarks would have dictated that the CSMA TAC be some 13,600 pounds, or roughly half the harvest actually implemented. That issue is more fully explained below. However, as a result of that TAC choice, almost 25 years of purposeful overharvest of striped bass has been permitted in the Neuse and Tar/Pamlico Rivers systems.

The 2004 FMP developed in response to the FRA says that for the A/R stock (the ASMA and RRMA stocks discussed previously) the appropriate harvest management target and biomass threshold—*i.e.*, “biological reference points”—are “a fishing mortality rate no higher than 0.22 and a SSB no lower than 400,000 lbs. for the A/R stock.” (FMP 2004, p. 13).

Then as to the appropriate biological reference points for the CSMA stock, the 2004 FMP states that the goal is to: “Manage the CSMA stocks under the same exploitation rate targets and thresholds as selected for the A/R stock (F= 0.22, SSB 400,000 lbs.)”

and to “[i]mprove data collection on these stocks so that biomass thresholds and targets can be developed for these stocks.” (FMP 2004, p. 14).

The 2004 FMP then goes on to recommend the previously noted 25,000 pound TAC for the CSMA striped bass stock without further comment. However, the choice of that TAC is explained in the 2013 Amendment 1 to Striped Bass FMP as follows:

Total Allowable Catch (Quota)

A quota is the maximum amount of fish a fishery may land within a specified period and is often used to prevent expansions in either the commercial or the recreational fisheries. This type of harvest restriction has an administrative cost associated with monitoring the fishery (dealer permits and daily reporting). For the commercial striped bass fishery the CSMA operates on a 25,000 lbs Total Allowable Catch (TAC). The original Albemarle/Roanoke (A/R) TAC was based on an 80% reduction in the historical harvest for the years 1972-1979. ***The CSMA TAC was selected by the director but if it had been based on the same criteria as the A/R it would have been ~13,500 lbs.*** The average annual CSMA landings from 1980-1993 comes closest to the 25,000 lbs TAC level selected. Changes to the TAC could be considered, however the lack of a sustainable harvest measure does not provide a quantitative basis for what the level of the TAC should be. In addition, possible increases in effort in the recreational harvest which is managed by season and trip limits could allow that sector’s harvest to expand. A quota for the recreational fishery is difficult to monitor given the number of anglers involved and the length of the season. (Emphasis supplied) (Amendment 1, 2013, p. 390).

To paraphrase, state fisheries managers said in the 2004 FMP that: (1) because the agencies lacked good biological data to assess more appropriate biological reference points for the CSMA striped bass stock, North Carolina would manage the southern striped bass stock with the same biological reference points as the A/R stock—*i.e.*, target an 80% reduction of historic harvest levels in the CSMA just like they did in the A/R area; and (2) despite that choice of biological reference points for the CSMA stock, DMF ignored its own management directive and instead arbitrarily selected a TAC that was much higher than was warranted biologically, but was apparently much more acceptable to commercial fishermen and their political supporters. At best, CCA NC finds that a startling admission of both a subjective, scientifically unwarranted management decision, and an intentional failure to protect a publicly owned natural resource.

Mortality occurs in all fisheries. Some of that mortality is natural—*e.g.*, becoming prey to other fish, death from old age, death from disease or environmental fluctuations, *etc.*—while some mortality results from human activities, such as pollution or fishing. All indications are that the commercial fishing industry catches up to 80% of the striped

bass harvested in the CSMA, and as previously noted, that the overwhelming majority of fish caught are hatchery raised fish.

A recent analysis of striped bass in the CSMA by WRC biologists (Rachels and Ricks, Rundle) indicated that “cryptic mortality” (essentially, unexplained mortality) was much greater than the totals of mortality from all known sources, including reported recreational and commercial harvests. Using even the highest known natural mortality rate for striped bass in this analysis could not explain the excessively high striped bass mortality rates in the CSMA. Accordingly, WRC biologists determined that the most likely explanation for the excessive CSMA striped bass cryptic mortality is that it results from illegal and underreported commercial harvest, dead discards from gillnet harvest, and harvest by ghost (abandoned) fishing gears.

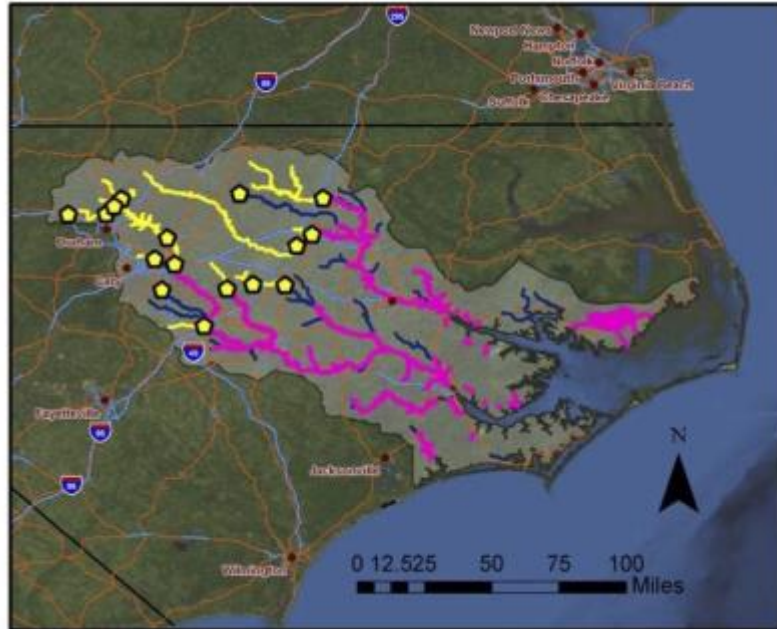


Figure 2. Rivers of the Tar Pamlico River Basin showing waters that could support anadromous fish based on spring flows—according to the National Marine Fisheries Service. The color pink represents designated Anadromous Fish Spawning habitat, the yellow/black pentagons show the current locations of dams, and the color yellow represents potential spawning habitats that are currently blocked by dams. The upper river is the Tar/Pamlico Rivers system, and the lower river is the Neuse River system. The southernmost river system of the CSMA—the Cape Fear River system—is not highlighted here since it has since 2008 been effectively closed to striped bass harvest. Also not shown are the adjoining estuaries that are part of the CSMA. (Reference Guide to NC Anadromous Fishes).

As a result of this analysis, the WRC biologists concluded that in the CSMA long-term recruitment overfishing is occurring in a striped bass stock with a severely truncated age structure, but that the stock condition would likely improve if harvest mortality was substantially reduced.

Reproductive Issues with CSMA Striped Bass & Resultant Loss of Genetic Diversity in North Carolina Striped Bass

Additionally, genetic studies by WRC scientists have revealed a steady decline in striped bass that are actually native to the Neuse and Tar/Pamlico rivers, so that today at most, only 7% or less of the fish caught there are of native origin (Rachels and Ricks, Rundle). Almost all native stripers were shown to be greater than 19.5 inches in size.

However, in the Neuse River system, spawning by wild native striped bass is below detectable values, and elsewhere there is little recent evidence of native stock reproduction. Moreover, there is no evidence that hatchery fish are reproducing at all.

It is presumed that the lack of detectable spawning in genetically native CSMA stocks results from the extraordinarily low numbers of remaining native fish. The reason(s) for the lack of reproduction by *hatchery raised fish* is currently not known, but several hypotheses have been offered. One hypothesis is that hatchery raised fish lack “imprinting” (*i.e.*, instinctive programming to release eggs at a certain place or time) due to their age when released or geographic area where released. As stated, the fish are raised in Edenton until they are 6-8 inches in size and then the placement of the phase II fish is not in historical spawning grounds, but much further downstream. Moreover, until 2012 the brood stock used in hatcheries used for CSMA stocking came not from CSMA rivers, but from the Roanoke river, within the A/R/ management area (Amendment 1, 2013). The genetics of fish can be a critical factor, as fish have “evolved” in response to specific environmental factors in each of their respective natal streams. Thus, taken together, the lack of “imprinting” at the proper age from the proper river system coupled with the lack of genetically adapted brood stock are possible reasons for the lack of reproduction in hatchery reared fish.

Additional impediments for reproduction of *both native and hatchery raised* striped bass include dams that block upstream movement (Figure 2) and access to spawning grounds, loss of spawning habitat, and inappropriate river/stream flows during the spawning season caused by human stream flow manipulations to prevent flooding. The small Milburnie Dam in Raleigh is the first remaining upstream dam in the Neuse River, and is scheduled for removal in the next year or two (<http://milburniedam.com/>, <http://www.americanrivers.org/blog/removing-the-milburnie-dam-neuse-river-north-carolina/>). Thirteen miles above Milburnie Dam is the Falls Lake Dam. This additional 13 miles of river—currently inaccessible to spawning striped bass—consists of a different geophysical bottom than downstream areas and represents important historical spawning habitat (Amendment 1, 2013).

There was historically an important recreational fishery just below Milburnie Dam as striped bass made their spawning run, but that fishery has become virtually non-existent with the decline of native fish in the Neuse River system. To put that reduction in perspective, currently only about 2 % of striped bass are caught in inland waters, demonstrating the staggering, historic decline of striped bass spawning in the CSMA (Kyles and Ricks).

General Failure of the Estuarine Striped Bass FMP

The current legal document for the management of striped bass in North Carolina coastal waters is Amendment 1 to the North Carolina Estuarine Striped Bass FMP. That document states:

The goals of Amendment 1 to the North Carolina Estuarine Striped Bass FMP are to achieve sustainable harvest through science based decision-making processes that conserve adequate spawning stock, provide and maintain a broad age structure, and protect the integrity of critical habitats. To achieve these goals, the following objectives must be met:

- 1. Identify and describe population attributes, including age structure, necessary to achieve sustainable harvest.*
- 2. Restore, improve, and protect striped bass habitat and environmental quality consistent with the Coastal Habitat Protection Plan to increase growth, survival and reproduction.*
- 3. Manage the fishery in a manner that considers biological, social, and economic factors.*
- 4. Initiate, enhance, and/or continue programs to collect and analyze biological, social, economic, fishery, habitat, and environmental data needed to effectively monitor and manage the fishery.*
- 5. Initiate, enhance, and/or continue information and education programs to elevate public awareness of the causes and nature of issues in the striped bass stocks, habitat, and fisheries, and explain management programs.*
- 6. Develop management measures, including regulations that consider the needs of all user groups and provide sustainable harvest.*
- 7. Promote practices that minimize bycatch and discard mortality in recreational and commercial fisheries. Amendment 1, p. 11.*

Sadly, but predictably, Amendment 1 has been an abysmal failure in the CSMA in terms both of meeting the overall plan goals, or even achieving a single plan objective. Consequently, it is CCA NC's adamant contention that Amendment 1 must be revised to remedy those failures. The native stocks in the Neuse and Tar/Pamlico Rivers systems and their unique genetic material are in peril due to drastic declines in the abundance of those stocks. It is critical that immediate steps be taken to reverse this decline, although given the massive failure of state fisheries management agencies to properly protect this resource, it is possible that these stocks are already irretrievably lost.

Failure of Stocking as the Primary Recovery Strategy for CSMA Striped Bass

According to Amendment 1, the purpose of stocking hatchery raised striped bass within the CSMA is as follows: "Specific objectives for stocking striped bass into coastal river systems include attempts to increase spawning stock abundance while promoting self-sustaining population levels appropriate for various habitats and ecosystems."

As previously discussed, stocked hatchery fish are not spawning in the Neuse and Tar/Pamlico Rivers, and thus have done nothing to achieve either of these objectives. There have been no other management efforts aimed at restoring striped bass stocks in the Neuse and Tar/Pamlico Rivers systems; indeed, the DMF adamantly refuses even to acknowledge that there is currently a resource problem with the central region striped

bass stock, although both WRC biologists and independent fisheries scientists recognize the grave nature of the problem.

Potential Management Solutions to the CSMA Striped Bass Dilemma

As previously noted, stocks of estuarine striped bass are co-managed by the WRC and the MFC, and the next Estuarine Striped Bass FMP Amendment is presently scheduled, under North Carolina law, to start in 2018 and would be implemented at 2020 at the earliest. That is simply not acceptable in terms of responsible management of a publicly owned natural resource.

Time is of the essence here. According to Dr. Roger Rulifson, a prominent fisheries biologist with decades of research experience pertaining to state striped bass stocks, given the current rate of decline the Neuse and Tar/Pamlico Rivers, any remaining native striped bass stocks will be extirpated before FMP management revisions are in place under a new Amendment (Rulifson-Rock Email Exchange). In response to that dire warning, there are a number of proposals being discussed to restore Neuse and Tar/Pamlico Rivers striped bass stocks. In CCA NC's opinion, while it is likely a multipronged approach will be required to recover Neuse and Tar/Pamlico Rivers striped bass, any remedial strategy considered should first, if not primarily, focus on restoring genetically native striped bass stocks in those systems.

A. Options Within the Existing State Law Regulatory Framework

Option 1: Maintain the status quo.

While this is neither a viable, responsible management option for CSMA striped bass nor a true solution to the current CSMA striped bass management dilemma, it is mentioned here for completeness for two reasons. First, it is the current default position under state law pertaining to the FMP process. And secondly, it is the current option of choice of DMF biological staff without stated rationale. In the opinion of CCA NC, this "choice" is blatantly irresponsible, since it is not rationally supportable from a biologic, resource management or socioeconomic perspective.

Option 2: Implement an emergency Supplement to current Amendment 1 as soon as is legally possible.

Under North Carolina law, only the Secretary of the North Carolina Division of Environmental Quality (Secretary), DMF's parent agency, is able to authorize the MFC and the WRC to adopt temporary, emergency management measures to supplement an existing state FMP covering coastal waters. To do so the Secretary must find that adopting supplemental measures is "in the interest of the long-term viability of the fishery." N.C.G. S. 113-182.1(e1). ~~So~~In the case of CSMA striped bass, that necessarily means that the first order of business is to

convince the Secretary of the critical nature of Supplement authorization. If and when Supplement authorization occurs, the MFC and WRC could immediately begin action to adopt and implement such emergency rules.

In that Supplement, at a minimum, the following issues ~~should~~ must be discussed and addressed:

1. Stop the bleeding in terms of excessive mortality. By far, the major factor that impacts the short-term recovery of Neuse and Tar/Pamlico Rivers striped bass populations is commercial harvest, and for that reason directed commercial harvest of striped bass should be stopped in the entire CSMA immediately for several reasons. First, as previously discussed, commercial harvest represents the major source of CSMA striped bass mortality. By contrast, recreational harvest in the CSMA is minimal.

Secondly, commercial fishing is a hugely inefficient and expensive way to supply striped bass to the public. In preface, it is necessary to note that fisheries management decisions necessary to implement state law requirements to conserve and protect North Carolina public trust resources are always unnecessarily controversial where they affect individual livelihoods—both in the case of recreational and commercial fishermen—no matter how small the actual economic impact. In the case of Neuse and Tar Rivers systems striped bass harvest, the actual economic impact of a closure of directed commercial harvest in the CSMA would be minimal. As was pointed out in an April 8, 2016 letter submitted by Eb Pesci, Ph.D., to the WRC on the issue:

... some will say that stopping this harvest will cause great hardship. However, that is not the case. At most, stopping the commercial striped bass harvest in all CMSA waters will eliminate the legal sale of 25,000 pounds of striped bass each year. From 2005 to 2014, the average annual commercial harvest of striped bass from the CMSA was 23,623 pounds [only 168 commercial fishermen reported a striped bass sale in 2013, which is the latest available data]. The CMSA striped bass harvest is on average, only 15% of the yearly harvest taken from internal waters in North Carolina, with the other 85% coming from the Albemarle Sound Management Area (ASMA) and Roanoke River Management Area (RRMA). In 2014, the reported commercial harvest from the CMSA was 25,085 pounds and this had a value of \$68,607. This works out to an average of about \$400 per commercial fishermen if about 168 fishermen reported sales in 2014 as was the case in 2013.

This ~\$68.6 thousand annual commercial harvest value must be evaluated against the annual ~\$750 thousand cost of stocking and monitoring these fish—an approximate “return” of 9 cents on the dollar expended. As previously discussed, all of the stocking/monitoring costs are either paid for with general tax revenues or borne directly by recreational fishermen; nevertheless, *all* of the return is pocketed by less than 170 private citizens. These numbers indicate that in addition to making no biological sense, the current CSMA situation makes absolutely no economic sense.

Moreover, the CSMA TAC of 25,000 lbs. is only available to commercial fishermen for about a month during the year, and sometimes only for a matter of a few weeks. As noted, even when fully taken, the allowable TAC harvest results in an economic value of less than \$69,000.00/yr., measured against an annual stocking investment in excess of \$750,000.00, or more than ten times that amount. Farm-raised striped bass are both substantially cheaper to produce and represents a year round supply that dwarfs the wild fishery in volume and economic value. The current practice of stocking striped bass with the expenditure of USFWS funds in what amounts to a “put-and-take” commercial fishery unfairly subsidizes a tiny segment of state citizens, and puts the government in economic competition with fish farmers, far outside the mandated role of the USFWS.

Thirdly, in addition to the spawning run directed commercial harvest of CSMA striped bass, there will remain a year-round bycatch striped bass fishery so long as gill nets are in the water directed at any other species. Possession and sale of striped bass taken as bycatch in the CSMA should continue to be prohibited (meaning that striped bass may neither be sold nor kept for personal consumption), and supplemental measures should require attendance of all CSMA gillnets to ensure that striped bass taken may be released while still alive.

Luckily, in addition to being the single most significant factor preventing the recovery of CSMA striped bass, commercial harvest is one factor over which state fisheries managers have complete control. For all of those reasons, commercial harvest of striped bass within the CSMA should be eliminated as entirely as is practicable until native striped bass stocks can measurably declared to be recovered.

2. Solve the mystery of poor reproduction. The Supplement should authorize studies aimed-at understanding the current lack of striped bass reproduction in the CSMA, especially the as it pertains to the imprinting issue. A proposal to address imprinting has been made that would replace phase II stocking downstream with larval stocking upstream. Monitoring of larval survival, migration, genetics and reproduction are

critical to unraveling this problem and determining possible solutions. Additional studies based on the results will likely also be necessary.

3. Remove physical barriers to striped bass spawning success. The Supplement should support the removal of the Milburnie dam that will open up historic, potentially critical spawning habitat for striped bass (and shad). If other dams are identified that are not serving their original purposes, the Supplement should support dam removal; if other existing dams need to remain, then the Supplement should seek and discuss methods for spawning bypass of the dams.
4. Redirect stream flow regimens toward spawning success. The Supplement should also explore methods of working with the U.S. Army Corps of Engineers at Falls lake to maximize optimum water release patterns during the striped bass spawning season. Through thoughtful planning, enhanced water flows that more closely mimic natural, historic river flow patterns should aid in striped bass recovery, although CCA NC realizes that under human control, just as under natural regimens, in some years inadequate flows are unavoidable. Stream flow regulation from upstream dams in the Roanoke River was an important factor in the recovery of the A/R striped bass stock. There are many examples in fisheries biology showing that during certain years with favorable environmental conditions, exceptional year classes have “carried” fish stocks through poor recruitment in succeeding years.
5. Change harvest size limits. Because the current data indicate that very few large fish are present in the population that and that large mature females are crucial to spawning success, CCA NC supports a minimum size limit of 26 inches for CSMA striped bass. Implementation of such a size limit would ensure that at least some fish are protected until they spawn and should result in improvement of the current, severely truncated age structure situation plaguing CSMA striped bass.
6. Educate CSMA recreational fishermen appropriately to minimize striped bass mortality. Current data show that recreational catch and release of CSMA striped bass in warmer months (*i.e.*, when water temperatures are higher) results in unacceptably high release mortality. The Supplement should implement an education program that encourages recreational fishermen not to target striped bass when water temperatures rise, and that stresses proper catch and release techniques that would maximize survival for striped bass caught in the warmer months. Those programs could potentially be funded through the existing Coastal Recreational Fishing License (CRFL) funds disbursement program.

In a March 11, 2016 meeting with the Secretary, CCA NC specifically requested that the Secretary authorize a Supplement to Amendment 1 to address the

CSMA striped bass management dilemma. The Secretary had not informed CCA NC as to his decision in the matter at the time of release of this White Paper.

Option 3: Use Existing State Fisheries Management Agencies Proclamation Authority to Address the Outlined Issues.

Amendment 1 expressly states, at page 9, under the heading "Proclamation Authority for the ASMA, RRMA, and CSMA striped bass stocks" that

It should also be noted that under the provisions of this FMP the NCDMF Director and the NCWRC Chief of Inland Fisheries will maintain the ability to establish seasons, authorize or restrict fishing methods and gear, limit quantities taken or possessed, and restrict fishing areas as deemed necessary to maintain a sustainable harvest.

In reference to that provision of the plan, since commercial harvest mortality is the major, readily controllable factor preventing the recovery of CSMA striped bass stocks, and because regulation of commercial harvest is solely under the authority of the MFC, only proclamation authority of the DMF Director is discussed below.

North Carolina G.S. § 113-221.1(b) authorizes the MFC to delegate to the Fisheries Director "the authority to issue proclamations suspending or implementing, in whole or in part, particular rules of the Commission that may be affected by variable conditions." The MFC has delegated such authority to the Director in rule 15A NCAC 03H.0103, which sets out the variable conditions under which proclamation authority may be exercised. Those conditions expressly include "any of the following":

(1) compliance with changes mandated by the Fisheries Reform Act and its amendments; (2) biological impacts; (3) environmental conditions; (4) compliance with Fishery Management Plans; (5) user conflicts; (6) bycatch issues; and (7) variable spatial distributions.

In the case of the current management crisis facing CSMA striped bass stocks, variable conditions (2), (5) & (6) are directly applicable, thus authorizing the DMF Director to exercise his proclamation authority by suspending the rule allowing commercial and/or recreational harvest of striped bass that has been authorized by Commission rule in the coastal waters of the Neuse and Tar Rivers systems. From the standpoint of "biological impacts" as a variable condition, the rule also gives the DMF Director the authority to suspend any Commission rules allowing the harvest of other species of fish in the Neuse and Tar Rivers systems where the take of striped bass as bycatch is reasonably foreseeable.

It is clear to CCA NC that as explicitly authorized by Amendment 1, the DMF Director may lawfully, immediately use his proclamation authority to resolve

much of the CSMA striped bass management dilemma by (1) suspending future proclamations that allow the directed commercial harvest of striped bass in Neuse and Tar Rivers systems coastal waters; (2) modifying all proclamations that allow the recreational harvest of striped bass in Neuse and Tar Rivers systems coastal waters; (3) changing the current size limit regulations for Neuse and Tar Rivers striped bass; and (4) modifying all proclamations that allow the use of gill nets within Neuse and Tar Rivers systems coastal waters to take species other than striped bass to prevent sale and possession of striped bass bycatch and to require net attendance in order to ensure that most striped bass are released alive.

Given the fact that this solution may be implemented immediately without action by the Secretary or the MFC, it would appear to be the most expedient potential solution to the CSMA striped bass dilemma. Unlike the Supplement route discussed above, there is no legal requirement for public hearings or input before this solution may be implemented. If the DMF Director is unwilling to voluntarily exercise his lawful authority to adequately conserve and protect CSMA striped bass stocks, then the MFC can, by motion and vote, require the Director to exercise such proclamation authority. The downside of this Option as a total solution to the current CSMA striped bass management crisis is that it is limited in potential scope, since existing MFC rules do not embrace the full range of issues that must be resolved in order to fully restore CSMA striped bass stocks.

Option 4: Implement a Combination of Options 2 & 3 Above:

As noted, the use of existing state fisheries management agencies' proclamation authority is the most expedient manner of resolving a large portion of the management dilemma facing CSMA striped bass. However, given the potentially sensitive political nature of a decision to use proclamation authority to resolve the current CSMA striped bass crisis, it would appear prudent that the MFC follow up a decision by the DMF Director to exercise his proclamation authority in the case of CSMA striped bass—whether that decision is voluntary or directed by the Commission—with a formal request to the Secretary to authorize a Supplement to Amendment 1 in order to accomplish several necessary ends: (1) ensure additional public input on the CSMA striped bass issue; (2) formally codify in rule CSMA striped bass management decisions, just as was done in 2008 for Cape Fear Rivers system striped bass; and (3) implement other management changes necessary to the recovery of CSMA striped bass that cannot be accomplished through the use of proclamation authority, *e.g.*, implementing revised stream flow regimens for the Neuse and Tar Rivers and removing physical impediments to upstream spawning migrations.

For the reasons set out above, this is CCA NC's preferred option to resolve the current CSMA management crisis.

B. Options Outside the Existing State Law Regulatory Framework

Option 1: File a Lawsuit Seeking to Enjoin Current CSMA Fisheries Management Strategies

One potential legal route to resolve the current CSMA striped bass management crisis would be for some third (non-state agency) party to file a lawsuit in the appropriate North Carolina court challenging the current management regime as being arbitrary and capricious, or otherwise in violation of state law.

Takeover of fisheries management decisions by state courts to impose fairness and objectivity into such decisions is in some ways an attractive option to resolve this crisis, given DMF's long history of anti-conservation bias in fisheries resources management. Sadly, CCA NC has little doubt that at some point in the near future conservation organizations will have to resort to such an option in order to force DMF to perform its existing obligations under North Carolina law. At the same time, lawsuits challenging state agency decisions are expensive propositions for both parties to the litigation, difficult for a plaintiff to win because of judicial deference to state agency decision-makers, and seldom foster a relationship of amicability and cooperation between state agency personnel and interested stakeholders in considering future management issues. Moreover, a lawsuit would have little or no effect on problems preventing the full recovery of CSMA striped bass that are outside the regulatory purview of state agency decision-makers, such as dam removal and improvement of stream flow regimens.

Option 2: Introduce a Bill in the General Assembly to Address CSMA Issues

A second potential solution to the current CSMA striped bass management crisis outside the current regulatory process would be to pursue a so-called "legislative fix" to the issue, wherein a bill imposing appropriate management changes for the CSMA would be introduced for consideration and adoption by the North Carolina General Assembly. Presumably, such a bill would have to await the 2017 "long session" of the legislature to be validly introduced.

While CCA NC is ready and willing to assist in authoring such a bill if necessary, this organization has traditionally not supported legislative micromanagement of North Carolina fisheries management issues. This is particularly true where, as in this instance, the management crisis is a result of state fisheries management agencies' failure to carry out their existing, statutory duties to conserve and protect publicly owned coastal fisheries resources. This option has the additional problem of not being responsive where time is of the essence, as is true in the case of CSMA striped bass stocks.

Conclusion

CCA NC hopes that this first fisheries management “White Paper” will prove useful in promoting responsible public trust resources management in our state. CCA NC remains committed to the principle that state public trust resources must first be protected and conserved in the overall public interest, and exploited for any purpose only secondarily. To accomplish this objective, CCA NC stands ready to work with state and federal resource management agencies to resolve the issues set out in this document in a timely fashion, and to otherwise assist in any way possible in restoring North Carolina striped bass stocks to biologic and ecologic sustainability.

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