Supplement A to the N.C. Spotted Seatrout Fishery Management Plan

Maintaining Short-Term Management Measures to Address Stock Assessment Uncertainty

See Sections 4.3, 10.2.8, and 10.2.2.B in N.C. Spotted Seatrout Fishery Management Plan 2012

March 3, 2014

I. ISSUE

The issue is a proposal to consider maintaining short–term measures in the spotted seatrout fishery (40-percent reduction at 14-inch minimum size) to address several sources of uncertainty in the stock assessment through acquisition and assessment of additional data. This supplement examines sources of uncertainty in the assessment, the rationale for not implementing on schedule the N.C. Spotted Seatrout Fishery Management Plan (FMP) February 2014 management measures, and presents possible interim management measures.

II. ORIGINATION

At the August 2013 Marine Fisheries Commission (MFC) business meeting, the following motion was unanimously passed: Motion to maintain status quo for commercial and recreational management measures for spotted seatrout pending scheduled fishery management plan review. After the meeting it was determined while the MFC has the statutory authority to overrule a management measure from the Division of Marine Fisheries (DMF) regarding measures needed to end overfishing or to rebuild overfished stocks (G.S. 143B-289.52(e1), the Spotted Seatrout FMP was not properly before the MFC for consideration at the August meeting. General Statute 113-182.1 and the MFC FMP Guidelines (NCMFC 2010) provide a supplement mechanism to modify a plan between the five-year scheduled reviews when the Secretary of the Department of Environment and Natural Resources determines it is in the interest of the long-term viability of the fishery and the urgency of the issue makes it impossible to address it the through the FMP amendment process. The draft supplement must contain analysis of the proposed management change including pertinent data with projected outcomes, and proposed rules or proclamation measures necessary to implement that position. Also, the MFC may only consider a single management issue for each draft supplement. The approaching February 2014 measures meet the supplement urgency criteria and possible overly restrictive management has significant negative consequences to the fishery as explained herein.

III. BACKGROUND

Development of the Spotted Seatrout FMP occurred from 2009 to 2012. Management actions were developed to protect spotted seatrout and reduce harvest because the 2009 N.C. Spotted Seatrout Stock Assessment estimated the stock in North Carolina and Virginia was overfished and that overfishing has been occurring throughout the entire 18-year time series (1991-2008). During the development of the FMP, several steps were taken to better manage spotted seatrout for a sustainable harvest (Table 1) starting with a 14 inch size limit as an interim measure recommended by DMF and selected by MFC in December 2009 (FF-53-2009) to enable a greater percent of spotted seatrout stock to spawn at least once. The MFC in May 2010 then selected preferred management strategies for each of the key issues identified in the development of the plan and tentatively approved a draft Spotted Seatrout FMP. However, the draft FMP did not meet criteria in Session Law 2010-13, which passed in June 2010 and required all fishery management plans to end overfishing within two years of final adoption. In order to meet the new requirement, a 57-percent reduction in fishing mortality was required based on the 2009 stock assessment if a 14-inch minimum size limit was the selected as the preferred management size. In November 2011, the MFC adopted and implemented a suite of short–term measures (FF-75-2011) to immediately address overfishing in the spotted seatrout fishery (40-percentreduction), as well as tentatively approving long-term management strategies for the draft FMP that met the overfishing mandates set out in G.S 113-182.1. These more restrictive measures will go into place in February 2014, unless additional data becomes available before that date that indicates additional reductions are not necessary. The MFC adopted the Spotted Seatrout FMP in February 2012 and repealed rule NCAC 03M .0504 in order to use the broader proclamation authority provided in NCAC 03M .0512.

Table 1.N.C. Spotted Seatrout Proclamation History (Oct. 24, 2013) for recreational (A) and commercial (B) fisheries.

A. Recreational Management

Proclamation	Date	Measures	What Changed
FF-53-2009	9-29-2009	• 14-inch size limit; • 10-fish bag limit	• 9-24-2009 MFC voted for interim measures while FMP developed; • 15A NCAC 03M .0504(a) suspended
FF-53-2009 R	9-30-2009	• 14-inch size limit; • 10-fish bag limit	Clarification for dealers (see commercial management)
FF-64-2009	12-4-2009	Same as above	Reissued following Nov. 2009 MFC meeting
FF-40-2010	3-26-2010	Same as above	Reissued following Feb. 2010 MFC meeting
FF-53-2010	5-14-2010	Same as above	Reissued following May 2010 MFC meeting
FF-64-2010	8-13-2010	Same as above	Reissued following Aug. 2010 MFC meeting
FF-81-2010	11-23-2010	• 14-inch size limit; • 6-fish bag limit; • Of the 6 fish, only 2 greater than 24-inches	11-4-2010 MFC voted for interim measures until final approval of FMP
FF-7-2011	1-12-2011	No possession	Cold stun events
FF-30-2011	2-14-2011	No possession	• Bycatch allowance for commercial catch (see commercial management); • Intention to open commercial and recreational fishing 6-15-2011 after surviving fish have chance to spawn
FF-57-2011	6-6-2011	• 14-inch size limit; • 6-fish bag limit; • Of the 6 fish, only 2 greater than 24-inches	• Fishery reopened after cold stun events; • 15A NCAC 03M .0504(a) and (b) suspended
FF-65-2011	9-13-2011	Same as above	Reissued following Aug. 2011 MFC meeting
FF-75-2011	11-10-2011	• 14-inch size limit; • 4-fish bag limit	Interim measures intended to be in effect until provisions of final FMP take effect in Feb. 2014
FF-12-2012	2-23-2012	Same as above	Reissued following Feb. 2012 MFC meeting
FF-20-2012	3-26-2012	Same as above	Removed the suspension of authorizing rules that were repealed and replaced the authority with the proper citation

B. Commercial Management

Proclamation	Date	Measures	What Changed
FF-53-2009	9-29-2009	• 14-inch size limit; • 10-fish hook-and-line limit; • 10-12-2009 deadline for dealers to be rid of unfrozen spotted seatrout	• 9-24-2009 MFC voted for interim measures while FMP developed; • 15A NCAC 03M .0504(a) suspended
FF-53-2009 R	9-30-2009	• 14-inch size limit; • 10-fish hook-and-line limit; • 10-12-2009 deadline for dealers to be rid of unfrozen spotted seatrout under 14-inches	Clarification for dealers
FF-64-2009	12-4-2009	Same as above	Reissued following Nov. 2009 MFC meeting
FF-40-2010	3-26-2010	Same as above	Reissued following Feb. 2010 MFC meeting
FF-53-2010	5-14-2010	Same as above	Reissued following May 2010 MFC meeting
FF-64-2010	8-13-2010	Same as above	Reissued following Aug. 2010 MFC meeting
FF-82-2010	11-23-2010	• Year-round weekend restriction for possession or sale; • Dealers exempted	11-22-2010 MFC voted for interim measures until final approval of FMP
FF-7-2011	1-12-2011	• No possession; • 1-20-2011 deadline for dealers to be rid of unfrozen spotted seatrout taken in the fishery, pre-closure	Cold stun events
FF-30-2011	2-14-2011	• Bycatch allowance of 10% up to 50 pounds; • Year-round weekend restriction for possession or sale	Intention to open commercial and recreational fishing 6-15-2011 after surviving fish have chance to spawn
FF-56-2011	6-6-2011	• 14-inch size limit; • Year-round weekend restriction for possession or sale; • Dealers exempted from weekend restriction	Fishery reopened after cold stun events
FF-64-2011	9-13-2011	Same as above	Reissued following Aug. 2011 MFC meeting

FF-74-2011	11-10-2011	• 14-inch size limit; • 75-fish trip limit; • Year-round weekend restriction for possession or sale; • Unlawful to set gill nets in joint waters on weekends • Albemarle and Currituck sounds exempt from both weekend restrictions	Interim measures intended to be in effect until provisions of final FMP take effect in Feb. 2014
FF-74-2011 R	11-16-2011	Same as above	Boundary of eastern Albemarle Sound revised
FF-79-2011	11-23-2011	Same as above	Incorrect reference in FF-74-2011 R III.D. corrected
FF-84-2011	12-15-2011	Same as above plus 4-fish hook-and-line limit	• Possession limit for hook-and-line harvest clarified; • 15A NCAC 03M .0504(a) and (b) suspended
FF-13-2012	2-23-2012	Same as above	Reissued following Feb. 2012 MFC meeting
FF-21-2012	3-26-2012	Same as above	Removed the suspension of authorizing rules that were repealed and replaced the authority with the proper citation
FF-7-2013	2-5-2013	Same as above	Incorrect reference in FF-21-2012 II.E. corrected

IV. AUTHORITY

G.S. 113-134. Rules.
G.S. 113-182. Regulation of fishing and fisheries.
G.S. 113-221.1. Proclamations; emergency review.
G.S. 143B-289.52. Marine Fisheries Commission - powers and duties.
15A NCAC 03M .0512 Compliance with Fishery Management Plans

V. DISCUSSION

Estimation of mortality is essential for understanding fish population dynamics as well as determining sustainable harvest rates. Methods for estimating mortality rates of animal populations can be classified into one of two groups; direct approaches such as tagging studies and indirect approaches such as models based on the age distribution of the population (e.g., statistical catch at age, virtual population analysis, and catch curve analysis). Indirect estimates of total mortality (Z) are commonly separated into natural (M) and fishing (F) mortalities by subtracting an assumed value of M from Z. Poor external estimates of M have been recognized as a major source of uncertainty in indirect, age-structured assessment models (including the spotted seatrout assessment), leading to biased estimates of stock status (Hilborn and Walters 1992). The indirect, age-structured approaches are most useful for examining historic fishery trends as they track the reduction of a cohort through successive years (generation). These approaches are less reliable for examining recent fishery trends because the information on the most recent cohorts is incomplete.

Tag-return programs have been recommended to provide rapid direct estimates of *F* that can complement the indirect modeling approaches, without relying on long time series of catch-at-age data and additional assumptions that are difficult to assess (Martell and Walters 2002; Walters and Martell 2002). Unbiased current estimates of *F* are valuable for fisheries managers, who must often make time-sensitive management decisions based on recent trends in the fishery. Importantly, parameters estimated during these studies are only valid for the years in which they were estimated because *F* and *M* fluctuate annually. Tim Ellis (NCSU) is in the final data analysis steps of a three-year statewide tagging study entitled "Movement and mortality of spotted seatrout in North Carolina: a combined conventional tag and telemetry approach" funded by the Marine Resources Fund, Grant 2009-F-001. Expected results include direct estimates of *F* and *M* for October 2008–October 2012. These results were identified in the 2012 Spotted Seatrout FMP as a critical research need to more reliably estimate *F* and *M* (NCMDF 2012). The *M* used in the 2009 stock assessment was set to a single value and based on the maximum observed age (12) of spotted seatrout and the weight of the fish at age (Jensen 2009). It was noted that this estimate of natural mortality was likely an underestimate of *M* because it did not account for known catastrophic sources of environmentally induced mortality: most notably cold stun events. For example, three of the highest years of spawning stock biomass coincided with cold stun years and subsequently produced the lowest levels of recruitment the following year (see open circles in Figure 1). This also indicates other factors (cold stun) may have a major impact on recruitment other than magnitude of spawning stock biomass.

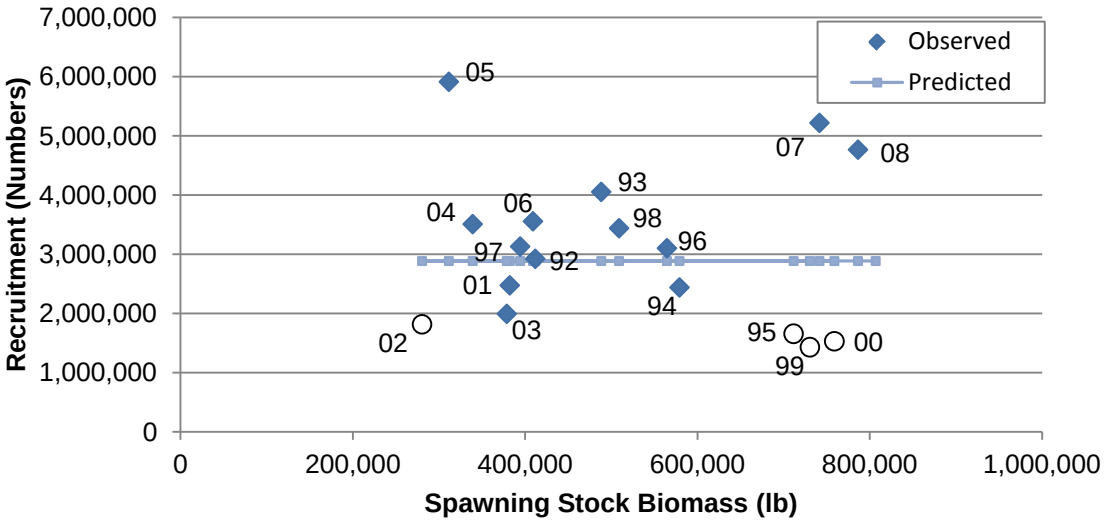

Figure 1.Beverton-Holt stock-recruitment relationship for spotted seatrout in North Carolina and Virginia compared to observed values, 1991-2008. Data labels indicate year of recruitment. Open circles represent years affected by cold stun events.

North Carolina's stock assessment illustrated the fact that cold stun events seem to have a large influence on spotted seatrout population dynamics; however, at that time it was not possible to vary the *M* value by year in the spotted seatrout assessment model without a customized model using software such as AD Model Builder (Jensen 2009). New statistical models have been developed that merge the capabilities of tag-return and catch-at-age models in order to more accurately and precisely estimate *F* and abundance or biomass, the two critical parameters required to assess stock status (Polacheck et al. 2006; Simmonds et al. 2010). Combining tag-return models with the type of catch-at-age data currently collected by DMF is a powerful, cutting edge approach with the synergistic effect of improving estimates of mortality and population size compared to indirect age-structured models alone.

NCSU's tagging study is being completed and the results of the research will be available to the DMF to incorporate into this advanced stock assessment model in December 2013. Once the data are received, DMF stock assessment scientists can begin modeling the population. Once the assessment model is completed and vetted through DMF, the new assessment will be reviewed by external reviewers to determine its usefulness for management.

Given the previous concerns noted throughout the last stock assessment and FMP, immediate action can be considered for this issue to alleviate potential economic impacts to the fishery and potential data pitfalls in future spotted seatrout stock assessments. However, a relaxation of the management measures selected in the 2012 FMP could result in a lower spawning stock biomass and long-term yield because most of the management measures were chosen to increase the spawning stock biomass and reduce fishing mortality. If the current management measures are not sufficiently restrictive, then the population may not recover to sustainable levels. However if the population is impacted by a cold stun, the recovery may be delayed by factors outside of the control of this management plan.

The potential economic impacts may be felt in both the commercial and recreational fisheries. The reduction in the commercial fishery from 75 fish to 25 fish could result in a maximum of 67-percent reduction in the landings of the spotted seatrout fishery. Discard mortality is another concern for the commercial fishery since regulatory discards will likely increase with more restrictive management measures. The discard mortality for the spotted seatrout from the gill net fishery, which harvested 76-percent of the commercial harvest, was 60-percent (NCDMF 2012). This would result in a substantial number of dead regulatory discards because spotted seatrout are bycatch in gill net fisheries targeting striped mullet and to a lesser extent flounder and spot.

The recreational fishery will be closed to harvest from December 15 to January 31, which could result in reduced charter and private recreational trips. The economic impact could be felt in various sectors including food stores, wholesale trade, oil and gas sales, domestic trade, ice manufacture, hotels, charter fees, realty, home work and repair, business management, food services, and medical services (NCDMF 2012). The reduction from four fish to three fish could also reduce the number of charter and recreational trips if fishers perceive keeping three fish is not worth the effort or money to make a trip. Discard mortality is also a concern in the recreational fishery since regulatory discards will increase due to a closed season and reduced trip limit. Although discard mortality was estimated to be 10%, the estimated number of dead discards from the recreational fishery can be substantial when compared to the number landed. The dead discards averaged 15% from 2002 to 2009. In 2010, when new regulations including the 14 inch size limit were enacted the estimated number of dead discards was greater than 85% of the landed spotted seatrout. In 2012, the estimated number of dead discards (167,064 fish) was 33% of the landed spotted seatrout (Doug Mumford, unpublished data).

The current North Carolina FMP for spotted seatrout outlines the MFC selected management strategy for achieving sustainable harvest (Table 2). It states, if sustainable harvest is not achieved by 2014 then more restrictive management measures will be implemented. Management measures would be 14 inch minimum size limit, 3 fish recreational bag limit with a December 15 – January 31 closure, and a 25 fish commercial trip limit (no closure). In 2012 when the FMP was approved, the NCSU research related to cold stun and estimating M and F for spotted seatrout was anticipated to be completed before November 2013. The report is expected to be completed by the end of November. If the supplement is approved for public comment during the November 2013 business meeting, the division will receive public comment for 60 days from November 18, 2013 through January 18, 2014. The division will summarize received comments and present them to the MFC during their February business meeting. Failure to approve this supplement for public comment will require the Division to proceed with the increased management measures by implementing a proclamation effective in February 2014. If the MFC approves the supplement and selects its preferred management option then the more restrictive measures will not go into effect in February 2014, allowing the fishery to continue while the division updates the stock assessment. Updating the stock assessment does not indicate or guarantee these more restrictive measures may not be needed. After the assessment is completed and reviewed, management options will be evaluated through the FMP process and presented to the MFC.

Table 2. Spotted seatrout management strategy selected by the MFC in the adoption of the FMP.

ISSUE	MFC SELECTED MANAGEMENT STRATEGY	OBJECTIVES ADDRESSED	REGULATORY ACTION
Achieving Sustainable Harvest	•*½ reduction needed, 6 fish bag, 14-inch minimum size, and weekend closure for commercial gears year-round (no possession on weekends).* •*A maximum of 2 fish over 24 inches for recreational fishermen* • *The small mesh gill net attendance requirement is extended to include weekends, December through February* ***Management Strategy Modified in November 2011*** *Immediately: 14-inch minimum size limit, 4 recreational bag limit, 75 fish commercial trip limit, no gillnets in joint waters on weekends, unlawful for a commercial operation to possess or sell spotted seatrout taken from joint waters on weekends.* *2014: 14-inch minimum size limit, 3 fish recreational bag limit with a December 15- January 31 closure, 25 fish commercial trip limit (no closure)* *If Cold Stun Occurs: close spotted seatrout harvest through June 15 and retain 4 fish recreational bag limit and 75 fish commercial trip limit*	1,2	Repeal Rule 3M.0504 and utilize proclamation authority in 3M.0512
	• *Revisit the Spotted Seatrout FMP in3 years to determine if sustainable harvest measures are working*	1,2	

VI. PROPOSED

RULES(S)

There are no proposed rule changes for this supplement. Management measures for the spotted seatrout fishery are implemented via proclamation, per 15A NCAC 03M .0512.

VII. PROPOSED MANAGEMENT OPTIONS

(+ Potential positive impact of action)
(- Potential negative impact of action)

A. Status Quo
Until February 2014, maintain short-term management measures in the spotted seatrout fishery (Proclamation FF-13-2012: 14-inch minimum size, 75-fish commercial trip limit with weekend closures in joint waters except in Albemarle and Currituck sounds; Proclamation FF-12-2012: 14-inch minimum size, four-fish recreational bag limit). In February 2014, 14- inch minimum size, 25-fish commercial trip limit, three fish recreational bag limit, and a closed recreational season Dec 15- Jan 31.

+ The recreational and commercial fisheries have equitable reductions
+ Reduction ends overfishing based on the 2009 stock assessment.
+ Over 80% of the landed spotted seatrout will have spawned at least once.
+ Has the greatest chance to increase long-term yield in the fishery.
- Increased regulatory discards in the recreational and commercial fisheries.
- Short-term yield decreases.
- Management of spotted seatrout continues to change.

B. Maintain short-term management measures in the spotted seatrout fishery (Proclamation FF-13-2012: 14-inch minimum size, 75-fish commercial trip limit with weekend closures in joint waters except in Albemarle and Currituck sounds; Proclamation FF-12-2012: 14-inch minimum size, four-fish recreational bag limit)

+ The recreational and commercial fisheries have equitable reductions
+ Over 80% of the landed spotted seatrout will have spawned at least once.
+ Management remains consistent with the previous year.
+/- Reduction is greater than 2/3 of the needed reduction to end overfishing based on the 2009 stock assessment.
+/- Moderate long-term yield in the fishery compared to other options.
+/- Short-term yield remains the same.
- Overfishing continues based on the 2009 stock assessment.
- Higher number of regulatory discards in recreational and commercial fisheries compared to Option C.

C. Revert to management measures implemented during the development of the Spotted Seatrout FMP (Proclamation FF-64-2011: 14-inch minimum size, no possession or sale on weekends, except licensed finfish dealers; Proclamation FF-65-2011: 14-inch minimum size, 6-fish recreational bag limit, of those, no more than 2 greater than 24 inches)

+ The recreational and commercial fisheries have equitable reductions.
+ Over 80% of the landed spotted seatrout will have spawned at least once.
+ Increased short-term yield in the fishery.
+ Protects large females through the limitation of two fish greater than 24 inches in the recreational fishery.
- Overfishing continues based on the 2009 stock assessment.
- Likely reduced long-term yield in the fishery compared to current regulations.
- Reduction is less than 50% of the needed reduction to end overfishing based on 2009 stock assessment.
- Management of spotted seatrout continues to change.

VIII. RECOMMENDATION

MFC Preferred Management Strategy

- Maintain short-term management measures in the spotted seatrout fishery (Proclamation FF-13-2012: 14-inch minimum size, 75-fish commercial trip limit with weekend closures in joint waters except in Albemarle and Currituck sounds; Proclamation FF-12-2012: 14-inch minimum size, four-fish recreational bag limit)

NCDMF Preferred Management Strategy

- Maintain short-term management measures in the spotted seatrout fishery (Proclamation FF-13-2012: 14-inch minimum size, 75-fish commercial trip limit with weekend closures in joint waters except in Albemarle and Currituck sounds; Proclamation FF-12-2012: 14-inch minimum size, four-fish recreational bag limit)

X. LITERATURE CITED

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