# Atlantic States Marine Fisheries Commission

## Atlantic Striped Bass Management Board

*April 30, 2019*
*10:15 a.m. – 2:30 p.m.*
*Arlington, Virginia*

## Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*M. Armstrong*) 10:15 a.m.

2. Board Consent 10:15 a.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2019

3. Public Comment 10:20 a.m.

4. 2018 Atlantic Striped Bass Benchmark Stock Assessment **Action** 10:30 a.m.
   - Overview of Benchmark Stock Assessment *(M. Celestino)*
   - Presentation of Peer Review Report *(R. Latour)*
   - Consider Acceptance of 2018 Benchmark Stock Assessment and Peer Review Report for Management Use *(M. Armstrong)*

5. Consider Management Response to the 2018 Benchmark Stock Assessment *(M. Armstrong)* **Action** 11:30 a.m.
   - Review Technical Committee Report on Reductions Needed to Achieve Fishing Mortality Reference Points in 2020 *(N. Lengyel)*
   - Review Adaptive Management Timeline *(M. Appelman)*

6. Lunch 12:30 p.m.

7. Consider Management Response, continued *(M. Armstrong*) **Action** 1:30 p.m.

8. Consider Forwarding Comments to NOAA Fisheries Opposing Proposed Measures to Lift Ban on Recreational Striped Bass Fishing in Federal Block Island Sound Transit Zone *(M. Armstrong*) **Action** 2:15 p.m.

9. Other Business/Adjourn 2:30 p.m.

The meeting will be held at the Westin Crystal City; 1800 S. Eads Street, Arlington, Virginia 22202; 703.486.1111

**MEETING OVERVIEW**
**Atlantic Striped Bass Management Board Meeting**

**April 30, 2019**
**10:15 a.m. – 2:30 p.m.**
**Arlington, Virginia**

| | | |
|---|---|---|
| Chair: Mike Armstrong (MA)<br>Assumed Chairmanship: 02/18 | Technical Committee Chair:<br>Nicole Lengyel (RI) | Law Enforcement Committee Rep: Kurt Blanchard (RI) |
| Vice Chair:<br>David Borden (RI) | Advisory Panel Chair:<br>Louis Bassano (NJ) | Previous Board Meeting:<br>February 6, 2019 |
| Voting Members:<br>ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, NMFS, USFWS (16 votes) | | |

**2. Board Consent**

- Approval of Agenda
- Approval of Proceedings from February 2019

**3. Public Comment –** At the beginning of the meeting, public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance, the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

**4. 2018 Atlantic Striped Bass Benchmark Stock Assessment (10:30 a.m. – 11:30 a.m.) Action**

**Background**

- The 2018 Benchmark Stock Assessment for Atlantic striped bass evaluates and informs management about the status of Atlantic striped bass stocks from Maine to North Carolina and was peer reviewed at the Northeast Fisheries Science Center's 66th Stock Assessment Workshop in November 2018.
- At its February 2019 meeting, the Management Board (Board) reviewed preliminary results of the 2018 Benchmark which indicated that the stock was overfished and experiencing overfishing. Unfortunately, due to the partial lapse in federal appropriations, the final assessment and peer review panel reports were not available for this meeting and formal review of those reports was pushed to the ASMFC Spring Meeting.
- The Assessment Summary Report and Peer Review Report are now available for Board review in **Briefing Materials** and on the SAW/SARC website.
- The full Assessment Report is available here on the ASMFC Spring Meeting webpage: http://www.asmfc.org/home/2019-spring-meeting
- The individual peer reviewer reports can be accessed here on the SAW/SARC website: https://www.nefsc.noaa.gov/saw/saw66/saw-66-panelist-reports.html

**Presentations**

- Overview of Benchmark Stock Assessment by M. Celestino
- Presentation of Peer Review Report by R. Latour

**Board Actions for Consideration**

- Consider acceptance of the 2018 Benchmark Stock Assessment and Peer Review Report for management use

**5. Consider Management Response to the 2018 Benchmark Stock Assessment (11:30 a.m. – 12:30 p.m.) Action**

**Background**

- After reviewing preliminary results of the 2018 Benchmark in February, the Board requested additional analysis from the Technical Committee (TC) as a first step in determining a management response to the assessment findings.
- Specifically, the Board tasked the TC to estimate the level of removals needed to reduce fishing mortality (F) to the target and threshold levels by 2020 and to provide one example recreational bag and size limit combination that would achieve those conditions on the coast and in the Chesapeake Bay.
- The TC's report will be included in **Supplemental Materials**.

**Presentations**

- Review Technical Committee Report by N. Lengyel
- Review Adaptive Management Timeline by M. Appelman

**Board Actions for Consideration**

- Consider management response to the 2018 Benchmark Stock Assessment

**6. Lunch (12:30 p.m. – 1:30 p.m.)**

**7. Consider Management Response, continued (1:30 p.m. – 2:15 p.m.) Action**

**8. Consider Forwarding Comments to NOAA Fisheries Opposing Proposed Measures to Lift the Ban on Recreational Striped Bass Fishing in the Federal Block Island Sound Transit Zone (4:15 – 4:30 p.m.) Action**

**Background**

- NOAA Fisheries released an Advanced Notice of Proposed Rulemaking (ANPR) **(Briefing Materials)** to provide background information and make the public aware of a proposal to remove the current prohibition on recreational striped bass fishing in the Block Island Sound Transit Zone.
- After reviewing the ANPR in October 2018, the Board sent comment to NOAA Fisheries requesting a delay on further action on the Transit Zone until the Board has an opportunity to review the benchmark assessment results and formalize a recommendation.
- After reviewing preliminary results of the 2018 Benchmark in February and anticipating consideration of the benchmark and peer review reports for management use at its next meeting, the Board moved to draft comment to NOAA Fisheries opposing the proposed measures (**Briefing Materials**).

**Board Actions for Consideration**

- Consider forwarding comment to NOAA Fisheries regarding proposed Measures to lift the ban on recreational striped bass fishing in the Transit Zone

**9. Other Business/Adjourn**

## Atlantic Striped Bass

## Activity level: High

**Committee Overlap Score:** Medium (TC/SAS/TSC/PDT overlaps with ERP, Atlantic menhaden, American eel, horseshoe crab, shad/river herring)

### Committee Task List

- PDT – prepares and develops Plan addenda or amendment
- SAS/TC – various taskings relating to management response to 2018 benchmark
- TC – June 15th: Annual compliance reports due

**TC Members:** Nicole Lengyel (RI, TC Chair), Kevin Sullivan (NH, Vice Chair), Alex Aspinwall (VA), Alexei Sharov (MD), Carol Hoffman (NY), Charlton Godwin (NC), Ellen Cosby (PRFC), Gail Wippelhauser (ME), Gary Nelson (MA), Heather Corbett (NJ), Jason Boucher (DE), Jeremy McCargo (NC), Kurt Gottschall (CT), Luke Lyon (DC), Peter Schuhmann (UNCW), Gary Shepherd (NMFS), Steve Minkkinen (USFWS), Wilson Laney (USFWS), Katie Drew (ASMFC), Max Appelman (ASMFC)

**SAS Members:** Mike Celestino (NJ, SAS Chair), Nicole Lengyel (RI, TC Chair), Alexei Sharov (MD), Gary Nelson (MA), Gary Shepherd (NMFS), John Sweka (USFWS), Justin Davis (CT), Hank Liao (ODU), Katie Drew (ASMFC), Max Appelman (ASMFC)

**PDT Members:** Angela Giuliano (VA), Heather Corbett (NJ), Jorge Holzer (UMD), Kevin Sullivan (NH), Nicole Lengyel (RI), Gary Shepherd (NMFS), Max Appelman (ASMFC)

# DRAFT PROCEEDINGS OF THE

# ATLANTIC STATES MARINE FISHERIES COMMISSION

# ATLANTIC STRIPED BASS MANAGEMENT BOARD

**The Westin Crystal City**
Arlington, Virginia
**February 6, 2019**

These minutes are draft and subject to approval by the Atlantic Striped Bass Management Board.
The Board will review the minutes during its next meeting.

**TABLE OF CONTENTS**

## INDEX OF MOTIONS

## ATTENDANCE

### Board Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
G. Ritchie White, NH (GA)
Doug Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Raymond Kane, MA (GA)
Mike Armstrong, MA, (Chair) proxy for D. Pierce (AA)
Sara Ferrara, MA, proxy for Rep. Peake (LA)
David Borden, RI (GA)
Jason McNamee, RI (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Sen. Craig Miner, CT (LA)
Bill Hyatt, CT (GA)
Justin Davis, CT (AA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Russ Allen, NJ, proxy for T. Fote (GA)
Adam Nowalsky, NJ, proxy for Sen. Andrzejczak (LA)
Heather Corbett, NJ, proxy for L. Herrighty (AA)
Loren Lustig, PA (GA)
Tim Schaeffer, PA (AA)
Andy Shiels, PA, Administrative proxy
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
Russell Dize, MD (GA)
Mike Luisi, MD, proxy for D. Blazer (AA)
Bryan Plumlee, VA (GA)
Rob O'Reilly, VA, proxy for S. Bowman (AA)
Chris Batsavage, NC, proxy for S. Murphey (AA)
Michael Blanton, NC, proxy for Sen. Steinburg (LA)
Martin Gary, PRFC
Derek Orner, NMFS
Mike Millard, USFWS
Bryan King, DC

**(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)**

### Ex-Officio Members

Nicole Lengyel, Technical Committee Chair

### Staff

Robert Beal
Toni Kerns
Katie Drew
Max Appelman
Jessica Kuesel

### Guests

Karen Abrams, NMFS
Bill Anderson, MD DNR
Steve Atkinson, VA SSA.
Karl Blankenship, Bay Journal
Frank Bonanno, CCA
Josey Cline, ASA
Allison Colden, CBF
Jeff Deem, VMRC
Kelly Denit, NMFS
Chris Diehl, Conowingo, MD
Phil Edwards, RI DEM
Shaun Gehan, DC
Angela Giuliano, MD DNR
Ed Green, MD Charterboat Assn.
Zach Greenberg, PEW Trusts
Brian Hardman, Stevensville, MD
Ken Hastings, Mason Springs Cons.
Peter Himchak, Omega Protein
Shawn Kimbro, CCA
Phil Langley, PRFC
Arnold Leo, E. Hampton, NY
Savannah Lewis, MD DNR
Chip Lynch, NOAA
Chris Moore, CBF
Kelly Place, Williamsburg, VA
Danny Pritchard
Alan Risenhoover, NOAA
Dan Ryan, DC
Alexei Sharov, MD DNR
David Sikorsky, CCA
Marty Simonet, Ches. Beach, MD
Jack Travelstead, CCA
Mike Waine, ASA
Marcus Wilson, MD Charterboat

The Atlantic Striped Bass Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Wednesday, February 6, 2018, and was called to order at 2:25 o'clock p.m. by Chairman Michael Armstrong.

**CALL TO ORDER**

CHAIRMAN MICHAEL ARMSTRONG: Good afternoon folks. I would like to call to order the Striped Bass Board. I'm Mike Armstrong, your Chair.

**APPROVAL OF AGENDA**

CHAIRMAN ARMSTRONG: You all have an agenda; any improvements, additions? Yes, Toni.

MS. TONI KERNS: If it pleases the Chairman; I would like to give an update on the Striped Bass Cooperative Tagging Program.

CHAIRMAN ARMSTRONG: Yes that pleases me. Okay, any disapproval of the agenda with the added item? Seeing none; it is approved.

**APPROVAL OF PROCEEDINGS**

CHAIRMAN ARMSTRONG: You all have the minutes from October, 2018; any revisions, any objection to accepting it as written? Seeing none; the proceedings are approved.

**PUBLIC COMMENT**

CHAIRMAN ARMSTRONG: At this point we will accept brief public comments on items that are not part of the meeting today.

That would include the assessment. We aren't accepting comments on that. Seeing no comments we'll move on.

**REVIEW OF THE PRELIMINARY ASMFC STOCK ASSESSMENT SUMMARY**

CHAIRMAN ARMSTRONG: The first item is the Review of the Preliminary ASMFC Stock Assessment Summary. As you know, the official approval has not been issued by NMFS from the SARC yet, so this is called a preliminary review; so Mike, lead us through.

MR. MICHAEL CELESTINO: I was going to start my presentation off with exactly that remark. These results are considered preliminary. I also want to sort of preface the remarks by noting that we brought a number of models to the Assessment Review in November. The Committee put a ton of work into a migration model; and Gary Nelson in particular.

We anticipate the review not accepting that model for management; so we are bringing forward the model that we had reviewed in 2013. With that I will begin the presentation. I would like to start this presentation the same way we started our presentations in Woods Hole in November; with a huge thank you to all of our committees that worked on striped bass, the Technical Committee, the Stock Assessment Subcommittee, and Tagging Committees.

It really takes a village to move through a benchmark assessment; and everyone did an amazing job. I'll start with some of the bridge building that we did to get us to this new model. I mentioned earlier we started with the 2013 stock assessment review model and data configuration. We updated that with data through 2016; including the old un-calibrated MRIP estimates. We then took that same model completely unaltered, and just plugged in the new calibrated MRIP estimates. Then we created a base model with some of the changes that are described on the slide. In particular, again we are now using calibrated MRIP data, and we have some slides that I'll talk about in a couple of minutes.

We extended the plus group from 13 to 15. We reduced the number of fleets from 3 to 2. The previous implementation of this model had a commercial discard fleet that presented some logistic constraints to management. The Assessment Committee over the last number of years, and I think Gary Nelson in

particular, was able to partition those commercial dead discards into Chesapeake Bay and coastal fleets.

We also made a number of changes to some of our indices. For example, we dropped two indices. We dropped the Virginia Pound Net Index. The Committee had concerns related to the single fixation design of that survey. We dropped the Northeast Fisheries Science Center's Trawl Survey.

The Committee had concerns related to low proportion of positive tows; as well as the elimination of inshore strata that were no longer sampled with the vessel change in about 2008 or so. We added an index. We added a Delaware Bay 30 Foot Trawl Survey that was designed to give us some additional information on Delaware Bay striped bass. We added a ChesMMAP Trawl Survey that was designed to replace some of the information that we were losing from the Virginia Pound Net Index.

We also took two indices that were previously modeled as just fitting to the trend in the data; the MRIP Index and the Connecticut Trawl. But as part of this assessment we were able to develop age composition information for those indices as well; so not the model is able to fit to not just the trend, but age proportions as well.

We also made a change to our Young of the Year Survey; so we have a Young of the Year Survey from Maryland and Virginia, and those surveys are ongoing. One of the things we've heard from review panels over the years are they would like to see a single index that represents the Chesapeake Bay as a whole.

As part of this assessment we were able to develop a Composite Index using some modeling techniques that have been used in other species; and so we now have a single bay wide young of the year Index. We also updated female maturity ogive. That work was done by Angela Giuliano and her colleagues at Maryland DNR. Scale and otolith ages are used and the terminal year for the base model is 2017.

First, I'll start talking about just some of the general catch information. The plot that's on the screen shows number of fish removals by source. The dark blue bars at the bottom are commercial harvest. The white with sort of blue hash marks are commercial dead discards. The gray bars are recreational harvest, and the gold bars are recreational dead releases.

The commercial harvest peaked in 1999 at about 1.2 million fish. You can see from 2004 through approximately 2014, landings averaged about 950,000 fish; and have been generally trending downwards, averaging about 600,000 fish from 2015 to 2017. You may recall that in that timeframe we also had implemented quota reductions as part of Addendum IV. Commercial dead discards, the releases were very low in the eighties, increased through the nineties, peaking in 1998 at about 350,000 fish, and declined through 2010 or so and have been relatively stable since.

Recreational harvest numbers, these are the gray bars. Recreational harvest increased from very low estimates in the 1980s, increased through the '90s, and peaked in 2010 at 5.4 million fish. Harvest has since declined to about 3 million fish in 2017. Then finally, recreational release losses peaked at 2006 at about 5 million fish, declined through 2011, and have been generally increasing since then.

Then the table that's on this plot just shows sorts of mortality; just in the terminal year 2017, and you can see most of our removals are from recreational dead releases in 2017 at just under 50 percent. Recreational harvest is responsible for 42 percent of the removals; commercial dead releases at 2 percent and commercial harvest are responsible for 8 percent of our total removals.

The next plot is just total removals by fleet;

just to illustrate removals by our coastal fleet and Chesapeake Bay fleet, and you can see the blue bars at the bottom are Chesapeake, the orange bars above are the coastal fleet, and the Chesapeake is responsible for about 40 percent of the total removals.

I'll go through and describe a bit about trends in recreational harvest and catch; as part of this assessment. This would bring me, I guess to a discussion on the MRIP calibration process. We were one of the first assessments to go through the peer review process with the new calibrated MRIP estimates. The 2006 NRC Review confirmed what many of you were generally aware of that the Effort Survey was becoming less effective over time.

Subsequent work resulted in adoption and implementation of a mail-based fishing effort survey, and that was implemented in 2018. We were able to use those estimates as part of the current assessment. Also as part of that review that review identified some concerns related to the intercept portion of that survey, and so that was able to be resolved as well.

The final estimates that we're using account for changes to the intercept portion of the survey; as well as the fishing effort survey as well. The plot that's on the screen now shows the percent difference between the original un-calibrated estimates and the final calibrated estimates for harvest; which is the top plot, and live releases on the bottom.

The red line going across the top bar in both instances is the average across the time series. Harvest, the percent difference between the un-calibrated estimates and the final calibrated estimates for harvest is about 140 percent. The percent change varied between roughly 50 percent and 400 percent.

Some of those larger percent differences that we see occurred early in the time series. Catches, harvest was low early in the time series; so small changes on low harvest can result in very large percent differences. But the part of the plot that I'll draw your attention to in particular, is the part between maybe 1995 or so through just before 2010. You'll see the bars are just below the average; and then after about 2010 or so you'll see the percent difference, the calibration accounts for a much greater difference from the early un-calibrated estimates later in the time series. The calibration process honed in on cell phone usage over time; and so with increasing cell phone usage, the calibrated estimates began to grow farther and farther apart from the un-calibrated estimates.

The plot below that is for live releases and shows a general similar trend. The time series average percent difference between the un-calibrated estimates and the calibrated estimates is about 160 percent; but we see that same trend of slightly below average adjustments prior to 2000, 2005 or so, and then slightly above average beyond that. Again, related to primarily cell phone usage.

The next plot shows catch comparison; so that we can see just the impact the calibration process had. In this plot harvest is plotted on the left; and live releases on the right. I'll point out that the scale of the two plots is different. Please keep that in mind. You can see at the Legend the gray lines; which are sort of really overlapping with the orange lines, are the un-calibrated estimates, and the APAIS calibrated estimates.

This is the completely un-calibrated estimates and the intercept portion calibration. You can see the intercept portion has very miner influence. But when calibrating for the effort survey, our understanding of harvest and live releases really change dramatically. In terms of harvest on the left, the scale is in millions of fish.

Again you can see there is not a lot of difference between the un-calibrated estimates and the calibrated estimates early in the time series; but that really grows over time. For example, prior to when the

calibrated estimates were released, our understanding of how many fish were harvested. The peak harvest prior to the calibration we thought that they were about 2.5 to maybe 3 million fish harvested. After calibration that number is closer to 5 million.

The trends are similar with respect to the live releases. But you can see the scale is quite a bit different; so we initially thought prior to the calibration live releases peaked at about 20 million. After the calibration we think they peaked at about 50 million; based on the calibrated MRIP estimates.

In the interest of time I won't go through all the states. But we did see these same patterns held up among the states. Some states changes were more pronounced in some states relative to others. But the series of plots that are on the screen now show recreational harvest by state. They are oriented from north to south; so Maine is in the top left, North Carolina is in the bottom right.

The scales on these plots are all different among the different states and, again, show the general same trend. Not a lot of difference between calibrated and un-calibrated estimates early in the time series; and generally increases over time. The next plot is the same but now for live releases. The arrangement of states is in the same order. We can revisit these if people have questions; but in the interest of time I'll just sort of gloss over these. Then the final plot I have largely related to catch is catch composition. This is the catch at age broken out by fleet. The Chesapeake Bay is on the left; and the ocean fleet is on the right. The Y axis is year, and it is scaled from earliest in the time series at the top through most recent at the bottom, and the X axis is age; so Age 1 through Age 15 plus.

The sort of take-home message from these plots are you can see that early in the time series, in both instances for the Chesapeake and for the coast, but the pattern is more dramatic in the Chesapeake. You can see we don't see a lot of large old fish in the catch in Chesapeake Bay in the 1980s, so if you look at sort of the top right portion of pot there are no blue circles, which are our representation of catch.

As we move through time though, we start to see more and more fish showing up in those older age classes; as the age composition is expanding, but there is a suggestion in these data as well that we are starting to see a contraction of the age proportions later in the time series as well. I'll go quickly through all of our surveys.

I mentioned earlier the different changes we did for this assessment; so I won't go through those details again, unless there are questions. This plot just shows a sort of spatial depiction of where our different surveys are. I won't go through that and again unless there are questions. You can just see we're covering New York through the Chesapeake.

We have a variety of Age 0 and Age 1 surveys. The next plot is showing our Age 1 plus surveys. I'll just take a second to sort of walk through this a little bit. There is kind of a squiggly line that runs along the coast from Maine to Virginia. That is the MRIP survey that we're using and then the stars are the different surveys that take place, again just to kind of give you a sense of spatially where these surveys are taking place.

The next plot is our plot of young of the year survey indices. Partially in the interest of time I won't go through all of these individually. They largely speak for themselves; but I'm happy to revisit these during the question/answer portion. But you can see New York Young of the Year in the top left, moving left to right the Delaware Bay Young of the Year, Maryland Young of the Year, then the next row Virginia Young of the Year; and the composite.

Again, for this assessment we're using the

Composite Index. We're not using the individual Maryland, or Virginia on its own; we're using the composite of those two surveys. The next plot is our Age 1 Indices. Again, I probably won't talk a lot about these unless there are questions. You can see from these plots that we do see evidence of pulses of recruitment, strong recruitment years. We'll see those kind of reflected in the model estimates of recruitment that we will spend some time talking about.

Then finally the next plot we have is the Age Composition Surveys. Again, I won't really spend any time talking about these. Actually, maybe I will take a second. The MRIP Index we have, we made some minor changes to the way that that index is calculated. I mentioned earlier that Connecticut/Long Island Sound Trawl Survey. We're not just fitting to the trend, now we're fitting to the age composition as well; and so you do start to see a suggestion of a decline in the Connecticut Trawl Survey, and also a contraction of age composition data. The New York Ocean Haul Survey that survey has been discontinued. But it provides great information on age composition; so we've retained it for that reason, the New Jersey Trawl Survey kind of bounces around, the Maryland Spawning Stock Survey also kind of bounces around. Again, we can go back and revisit these if there are questions. But I just kind of want to get them just generally on your radars.

I guess on to the statistical catch-at-age modeling. I mentioned earlier that we're using the same model that was reviewed in 2013 that we did make data improvements that I mentioned earlier. This model is estimating recruitment abundance of our youngest age classes. We're getting estimates of fully recruited fishing mortality, estimates of catchability for all of our age composition surveys.

We're fitting to four different selectivity time blocks; to help us sort of get a more accurately modeled selectivity with changes in regulations. Again, I mentioned that the data are split into two fleets; again to give us a better handle on estimating selectivity for differences in fisheries between the Bay and the coast.

Onto the results, the first plot we have is fully recruited fishing mortality by fleet. Just in general you can see the gray line is the Chesapeake Bay fishing mortality, the yellowish gold line is fishing mortality along the Atlantic Coast. In general you see that fishing mortality in the Chesapeake is lower than in the coast.

There is a period of very low F in the late eighties. There is sort of an increase through the mid-1990s in both fleets; and then kind of some oscillation and perhaps stabilization of F for the remainder of the time series. The next plot is fully recruited fishing mortality. This is for the stock as a whole.

If you take the individual Fs at age for the previous two plots and add them together, and take the maximum F at age that is this plot, so our sort of understanding of coastwide fully recruited fishing mortality. It really sort of recapitulates what we saw at the fleet level. There is a period of very low fishing mortality in the late 1980s, increases through about 1995, and then that fishing mortality kind of oscillates roughly between 0.22 and about 0.3 or so.

The next plot we have is of recruitment. Recruitment is estimated in the model; so the year class is actually one year earlier. But you can see from 1982 through the early 1990s, there is a suggestion of a period of very low recruitment from 1994 representing the 1993 year class through 2004, representing the '03 year class.

There is a period of variable, but relatively high recruitment. After 2004, we see variable but relatively lower recruitment; though there are some stronger year classes, the 2011 and 2015 year classes are relatively strong. The dotted horizontal orange line is

the time series average of recruitment.

The next plot we have is our trajectory of female spawning stock biomass. I'll show this plot again with our threshold; which will provide I think some reference, but you can see again this is the result that we largely saw in the previous assessment. There is a period of very low SSB early in the time series. We see a peak in about 1995 or '96, a decrease, a peak again in '03, and then a decline over the last 20 years or so in spawning stock. One of the things we do as part of our assessments is sort of a suite of sensitivity runs; and one very important one for us is the retrospective analysis.

This gives us a sense of just how much parameters might change with the addition of an additional year of data. This plot, on the left hand side we have the actual sort of time series of Age 8 plus abundance, female spawning stock biomass, fully recruited fishing mortality and recruitment. Each line represents a run of the model with one additional year of data removed.

I'll focus more for the plot on the right; which is the percent difference between 2017 and a model run with one year subtracted. I'll focus in particular with that subset on female spawning stock biomass and fully recruited fishing mortality. What we saw; and this was a bit of a difference from the 2013 iteration of this model. We see very little retrospective patterning here.

In the 2013 model our average retrospective, we saw about a 12 to 15 percent difference between the terminal year and some of these peeled, these earlier estimates. In this implementation we see an average over four years of almost 0 percent. But the range is about plus or minus 2 percent. We see that in spawning stock biomass and in fishing mortality; similar to what we've seen in previous iterations of this model.

We generally tend to underestimate biomass; so that with additional years of data SSB increases; and the opposite is true for fishing mortality. One caveat there is with the addition of one or two years of data. We actually expect with one year of additional data a slight decrease in SSB; and that is a bit of a variance from what we've seen in the past. But it's a fraction of a percent decline that we would expect to see.

One more sensitivity run that I'll describe. I mentioned in my first or second slide the series of model runs we did as part of our bridge building and continuity runs. We started with again the model that was peer reviewed in 2013; updated that with data through 2016, and that represents the dotted green line on the slide. It looks like that is showing up pretty reasonably.

The next step we did was take that exact model unaltered; and plug in the new MRIP estimates, the new calibrated MRIP estimates that I described earlier. That is the red dotted line that's on the plot. We did some additional bridge building along the way; but the other line we have on here is that black solid line. That is our final base run from the model.

Of course one of the biggest things that might jump out at you is if you look at the green dotted line again that's our 2013 model we just updated through the present. The rate of SSB decline is fairly shallow. It predicts a relatively shallow decline in SSB over time. What we see in the final base run is a very steep decline in SSB.

If you think back to the MRIP catch estimates that we saw; we think that a lot of that has to do with the new estimates in MRIP. We see that same signal in our surveys as well. We see it in a contraction of age composition data in most recent years. I only have one slide on our tag model work; which is just a compromise in terms of time. It's a disservice to all the work that the Tagging Committee did. But we only have so much time unfortunately; but one of the things that we always like to do with the tagging model is

sort of use it as a check against our Statistical Catch at Age Model Estimate. It's a great way for us to sort of have confidence that the modeling results that we're seeing out of the Catch at Age Model are reasonable.

This plot shows total instantaneous mortality; so natural mortality plus fishing mortality. For the coastal programs the producer areas and for the Statistical Catch at Age. The Statistical Catch at Age is the black solid line. Aside from the earlier part of the time series where we don't have analogous tag model results, you can see that the trajectory and scale of all of our total mortality estimates are all in the same ballpark; they are actually quite similar.

Reference points, the Board and our terms of reference tasked us to address reference points. We wanted to develop a range of reference points that would address the objectives of the FMP. We explored both model-based and empirical estimates. In this model the non-migration model, the model-based estimates of reference points, and we looked at in particular spawning potential ratio reference points, just weren't providing us realistic estimates, particularly with respect to SSB. The F estimates were realistic; but the SSB estimates were not.

We weren't able to fully resolve. We have some hypotheses, but weren't able to fully resolve why that was. We are only brought forward to the review empirical reference points, and we used empirical reference points based on 1993 and 1995 estimates of spawning stock biomass. The current model is not stock specific.

We're modeling one stock but we're doing that through spatial fleets. We're not able to develop stock specific reference points; but we can from this model develop region-specific guidance. In order for us to fully flesh that out we would need some additional guidance from the Board; in terms of how to split the F up between the coast and the Bay. But we do have that available to us through this model.

To develop the reference points we do projections where we have not altered our methods from the 2013 assessment. From the model we get estimates of 1994 SSB for example, and then through our projections we're finding the fishing mortality that gets us to that SSB over the long term. A number of factors can influence that projection model.

This slide just kind of depicts the things that we changed and did not change. Sex ratio did not change; and that would affect the proportion female for our female SSB estimates, natural mortality was unchanged. Maturity I mentioned earlier that was updated, our maturity schedule, and we have the new statistical-catch-at-age model results. We updated the mean weight to age; and maybe one of the larger changes in the way that we've done the projections is we're using what we're terming a Hockey-stick Beverton-Holt stock recruitment model.

The next slide shows that graphically; which I think will help with sort of the explanation. The plot on the left is our stock recruitment relationship with a Beverton-Holt stock recruitment relationship fit to it. This was done external to the model. But one thing that the Committee acknowledged was that it doesn't seem like we're reaching the asymptote of that recruitment curve; and so the consequence of that is as SSB grows beyond that curve, recruitment can kind of wander off into unreasonable places, give us estimates of recruitment that had never been observed. The way around that what we wound up doing was using the plot on the right, we're using the Beverton-Holt model prediction of recruitment through median SSB. Then after SSB we're using average recruitment. This prevents that sort of wandering off of high recruitment values that aren't reasonable.

The next plot is a comparison of a description of our reference points and a comparison of reference points from the previous

assessment and the current assessment. Again as a reminder, our threshold SSB reference point is the 1995 estimate of female spawning stock biomass, and the associated F threshold is the fishing mortality required to get to that SSB level over the long term.

The target is 125 percent of the threshold level; and the associated F reference point again is the fishing mortality required to get us to that SSB over the long term. The bottom portion of the table shows again a comparison of reference points. You can see the spawning stock reference points jump quite a bit; and that's due directly to our change in MRIP estimates. But the fishing mortality reference points didn't change substantively.

In the next plot, the next table shows us our stock status. Again, we've explored reference points related to 1993 and 1995, estimates of female spawning stock biomass. The yellow highlight in this table is highlighting '95 in particular. You can see an SSB in 1995 was just over 91,000 metric tons.

Our estimate of SSB in 2017 is about 68,000 metric tons; so we're under that threshold, and we're very certain that the probabilities are listed in the far right hand part of that table. We're very certain that that is the case. The stock is overfished; and the bottom part of that table shows our stock status with respect to fishing mortality.

The F required to get to the 1995 SSB estimate over the long term is 0.24. F in 2017 was 0.31, so the stock is also experiencing overfishing, and again the probability is very high that that is the case. This is the same plot that I showed earlier; just with that threshold value now depicted. You can see F in 2017 is above the threshold; and F has been above the threshold for 12 or 13 of the last 14 or 15 years.

The next plot shows female spawning stock biomass relative to the SSB threshold; again the 1995 estimate of SSB, and again you can see 2017 is below that and has been for the last three or four years. Again, we think a lot of this is from what we've seen with our change in MRIP estimates. Projections, these are similar to the projections I described earlier; but we're just doing now six year projections. We looked at four different scenarios. We looked at a scenario where we maintained; assuming that catch in 2017 was maintained over the subsequent six years.

We looked at three different fishing mortality scenarios; one in which we held constant fishing mortality in 2017 for the subsequent six years, one at which the F threshold, assuming we're fishing at the F threshold for the next six years, and then an additional scenario of fishing at the F required to get us to the 1993 estimate of SSB over the long term, holding that F value constant over six years. The methods for this projection were similar, nearly identical to the ones I mentioned earlier for our longer term projections. This plot is now showing those four different scenarios; so I'll just take a second to kind of walk us through this. Each panel is the SSB trajectory under each of those four projections. On the far left is the constant catch scenario, so assuming that we were catching 7 million fish over the next six years, the panel next to that is assuming we fish at the status quo F, F in 2017.

The panel next to that is assuming that we fished at the F required to get us to the 1993 level of SSB; and the last panel on the right is the projection assuming that we fish at the threshold. The horizontal blue line near the top of the plot is SSB from 1995. The solid black line is the trajectory of SSB from the projection, and the dotted lines are the confidence interval around that. You can see in each of those four panels the solid line, the trajectory of SSB under all four of those projections.

We do expect female spawning stock biomass to stay below the 1995 estimate of female spawning stock, under the four scenarios that

we considered. This plot just shows the probability of being below that SSB threshold. If you look at the blue line in particular across all of those probabilities plotted on the Y axis, the probability is always above 95 percent that our estimate of SSB in 2023 would be below our estimate and below the F threshold. That is the last slide I have so I'm happy to try and answer any questions.

CHAIRMAN ARMSTRONG: I know there are thousands of questions. The first step I think we need to consider is how far we want to go today with this regarded as preliminary. That is up to the Board. We've seen a lot. I will editorialize that the assessment is likely to be the same, when it comes out.

We don't know that for sure. How far do we move? It's clear we need to do something at some point; and I guess we start the discussion now. But I have lots of questions; I'm sure other people have it too. Keep in mind this isn't officially the assessment yet. Question, Mike.

MR. MICHAEL LUISI: Very nice presentation, Mike. One of your first slides showed a list of all the data changes that took place when this benchmark was conducted. You mentioned it I think periodically throughout your presentation; but I would like to get a sense from you as to if you were to weight the significance of the changes, and how they applied to the changes that occurred as a result to spawning stock biomass and F.

You know is there one or two particular data inputs that were adjusted that kind of drove those, what I would consider significant changes to SSB and F? I might have a follow up, Mr. Chairman, depending on the answer.

MR. CELESTINO: That's a great question. I feel like we did a fairly robust, a very robust bridge-building process. The same signal seems to come through if we remove surveys, add surveys. We looked at I mentioned the composite-young-of-the-year index that changed. We didn't see a change as a result of that.

We are estimating recruitment; that's something that's missing from the slide. We're changing slightly the way we're estimating recruitment as a deviation from mean as opposed to a deviation from a Beverton-Holt. We didn't see any impact, a negligible impact from that; changing the maturity ogive, minor impact from that. I don't know if anything jumped out at me as being singularly responsible. The model seemed to be very robust to the changes we made.

CHAIRMAN ARMSTRONG: Go ahead, Mike.

MR. LUISI: I was trying to get to the point that the MRIP recalibrations likely played a major factor in the shifts that we've seen. While I'm absolutely concerned in the declines that we're seeing in spawning stock biomass, and the stock status as it would stand under this evaluation. I'm less concerned about the spawning stock, only because the overfished status or overfishing status is based on the reference point that we ultimately decide to select.

I think this Board needs to have that discussion about perhaps modifying reference points when we get to that point. But I have very great concern that a new element to the data inputs is having such a dramatic effect to the magnitude of what it is we're looking at; specifically that spawning stock biomass that had been very shallow for years, now seems to be jumping off the diving board. Just some concerns as to one element's impact to this analysis.

CHAIRMAN ARMSTRONG: John McMurray.

MR. JOHN G. McMURRAY: Just in regards to Mike's question. It's my understanding that when you have higher landings and you plug that into the VPA it will return the higher value for SSB, not just F. It kind of evens itself out there. But my question really had to do with the use of 1993 instead of 1995. I'm

unsure of why that has happened in this process. I mean the stock was depleted in 1993; it was rebuilt in 1995. Maybe you could provide some explanation there.

MR. CELESTINO: Yes the Committee was responding to the Board task of trying to come up with a range of, a suite of reference points. Our goal was to bring a suite to the review; 1993 seemed like a good year to the Committee for a number of reasons, one the 1993 year class is a very strong year class, suggesting that SSB in that year was sufficient to produce that year class under perhaps favorable environmental conditions. That's how that year was selected primarily.

CHAIRMAN ARMSTRONG: John Clark.

MR. JOHN CLARK: Thank you Mike, and thanks to the Stock Assessment Committee. There was clearly a massive amount of work that went into this. Just kind of following up on some of the things that we've already heard, when I looked it was pulling out of the draft that went for the peer review.

It just seems that when they look at the continuity run and the bridge run, the final SSB is much closer to where the threshold would be. But with this new model, as Mike said, it looks like it jumped off a diving board. It seems like every time the model is improved the stock looks worse. Just curious as to how the threshold changed so much between like the bridge run and the base model, as you call it here.

MR. CELESTINO: MRIP is we think at play at that as well. Another thing that I think that I remember from our sort of bridge building process, the 1995 estimate does shift a bit, depending on whether we use separate Maryland and Virginia indices versus a composite index. There is a signal that's coming through in the composite index; and that seemed to influence some of the earlier parts of the time series. But over the entire time series we think that it's changes in MRIP that the calibration process is really influencing SSB over the time series.

DR. KATIE DREW: Just to add to that. I think another thing that we had looked at is with the MRIP index we now have age composition information for that. Whereas before, it was just sort of a general, we said it represents this chunk of ages, but now we actually went through and developed an index at age.

You can see a stronger signal in terms of a contraction of the age structure that with those years of poor recruitment you're not seeing that the age structure gets smaller, because you're not having as many fish move into the SSB, and you see that more clearly in the MRIP index now that we have the age structure.

Doing the bridge building run, where you don't include that age structure, things look better than when you do include that age structure. That's kind of part of what's happening is that the model can see that there is worse information on stock status from the age structure of the index.

CHAIRMAN ARMSTRONG: Rob.

MR. ROB O'REILLY: Thank you for your presentation, Mike, and everyone who has been involved in the work. The commercial removals are about 10 percent; and I was just wondering, with them being so low and with the history of difficulty associated with pinpointing commercial discards. What was gained by going from three-fleet to a two-fleet approach? That is the question.

MR. CELESTINO: One of the main goals of doing that was to address one of the Board concerns from some time ago. That third fleet created problems. I think the Board had considered fleet reference points for a period of time; and the one sort of wrinkle to that approach was having this commercial discard fleet.

If either of the two directed fleets could be in reasonable shape, not overfishing or

overfished, but if the commercial discard fleet did require management action it created this sort of perverse scenario where to reduce discards we would have to increase directed catch. It seemed to present an obstacle to management. We were I think largely responding to a request from the Board to help with that management question.

CHAIRMAN ARMSTRONG: Emerson.

MR. EMERSON C. HASBROUCK: Thank you Mike for your presentation. Mike, one of your slides had a graphic showing; I think it was biological reference points and the terminal year SSB and F. I don't recall the full details of that slide; but if you could put that back up again, please? Yes that was the slide. What I'm trying to figure out here is if we're using the new MRIP data, all right the new MRIP data which shows that recreational harvest estimate is whatever it was, 150 percent of what the non-calibrated data shows, right? If the catch was that much greater, than to account for that doesn't the spawning stock biomass have to be bigger by an approximate amount? How is that taken into account in this table, or in the assessment? That's what I'm trying to figure out here.

MR. CELESTINO: That's a great question. Those percentages were for numbers of fish; so I think one explanation is we wouldn't necessarily see a one-to-one increase based on immature fish. It may be the maturity curve that's accounting for that.

CHAIRMAN ARMSTRONG: Go ahead, Emerson.

MR. HASBROUCK: Thank you for the follow up. But even if that is numbers of fish, then the poundage of harvest is greater; and therefore the SSB had to be greater to account for that additional harvest, right?

MR. CELESTINO: Yes and we do see a pretty substantial change in reference points, in direct response. Not necessarily a doubling, but probably close to about the level of increase. For example, 60,000 metric ton threshold to about 90,000 metric tons, not quite as much, but I don't have a great answer for why it's not a one-to-one change.

MR. HASBROUCK: I don't mean to monopolize the discussion here. But my question really wasn't why is there not a one-to-one. I just didn't know where that increase was coming into account. I guess it was this slide here that I had in the back of my mind. What you're saying then is that for spawning stock biomass for instance. The previous reference point was 57,626 for the threshold; and what's being used to determine overfished and overfishing status. Out of the latest assessment now is 91,436, is that correct?

MR. CELESTINO: Correct, yes.

CHAIRMAN ARMSTRONG: Roy Miller.

MR. ROY W. MILLER: Thank you, Mike. What we're seeing is of course consideration of the stock as a whole. Could you quickly review for me what if anything was done with regard to spawning-area-specific stocks, such as Chesapeake versus Delaware River, versus Hudson River? If those had been broken out, would the results have been different for any of those systems?

MR. CELESTINO: That's a trickier question to answer; because we don't have final results from the Northeast Science Center. But the short answer to the question is we did embark on a migration model, a stock-specific model that models explicitly the Chesapeake stock, and explicitly a combined or mixed Hudson River/Delaware Bay stock or Delaware River stock.

I'm not sure how much; well I guess I can say objectively what the results were. It did paint a different picture. The Review Panel, our understanding again from our conversations at the review in November were that the Review Panel did not think that model was

suitable for management at this point, so I'm reluctant to go too much into those results. But I mentioned earlier the work that the Committee did, and again Gary Nelson in particular did this migration model. It was a tremendous amount of work. Our Committee had great confidence in the model. We wouldn't have brought it forward to the review if we didn't think it was suitable.

But we needed to convince a Review Panel, and our understanding is that we're not quite there yet with them. Short answer is it paints a slightly different picture; not terrible different on a combined stock basis, but a slightly different picture. I'm not sure how much I can say about it. I certainly don't want to put words in the mouth of the reviewers until their reports are released. I hope that's helpful.

CHAIRMAN ARMSTRONG: Mike or Katie. What will we see next meeting that's not included in this report now? I assume this information will be the same; if it passes muster. What additional things will we see?

DR. DREW: The complete report from the SARC will have a complete description of the migration model that did not pass; as well as sort of the results and the output of that so that you can evaluate the work that was done for that. But it will also have as well as more details on, we gave you a summary report on the results of this; but obviously the final report will be much more detailed, several hundred pages worth of actual assessment information.

But you will also then receive the Peer Review Panel report; where they will basically explain in more detail why the migration model failed, what needs to be done. They were favorable in the sense of they thought this was a good idea and we should continue to work on it. They gave us additional feedback on how to go forward; in terms of data collection and modeling approaches. That information will be included; as well as sort of an assessment of what they chose as the preferred model. But the numbers that you're seeing are not something that is going to change from that report.

CHAIRMAN ARMSTRONG: Okay and that's very important that what we're seeing now is what we can chew on. Doug.

MR. DOUGLAS E. GROUT: Yes I was curious about; you know seeing that the model is showing that the SSB has been declining for a while. You mentioned that you had gotten the MRIP data split out into age; which is good, and that probably some of the information in that influenced the models output of showing that we're having a decline in recent years, a steep decline in SSB in recent years. Did the other fisheries independent surveys show a similar decline in SSB the fish that are in the SSB age group?

MR. CELESTINO: We did in general see that. The exception that comes to mind is the Maryland Spawning Stock Survey. That probably showed more of a sort of stasis or static. I don't think we saw quite the contraction. But in the other surveys we really did; the Delaware Trawl Survey and New Jersey Trawl, Connecticut/Long Island Sound. We did see that contraction; and again in our MRIP Index as well.

CHAIRMAN ARMSTRONG: Russ.

MR. RUSS ALLEN: Thanks Mike, excellent presentation as always, and thanks everybody else that is working on this. One of the things that jumped out at me was that 48 percent of the removals for 2017, I believe came from recreational discards. That is kind of disturbing to me, for one. Then just looking at Table 1 in the summary, I see that it's the first time that removals from discards were higher than actual harvest for the recreational fishery since 1998.

My question is did the Technical Committee discuss this, Stock Assessment Committee discuss this, and do you have any thoughts on where that's headed? It's a very disturbing

thing for someone who does not like to see dead discards; I mean it bothers me, so if you have any insight on that I would appreciate it.

MR. CELESTINO: Thank you for that question. My memory isn't super clear as to how much the Committee talked about that. My general sense is that we see that increase in recreational dead releases just around the time of implementing Addendum IV. One of the things when we all did our conservation equivalency and we sort of come up with our projections of what we think will be the required reduction.

We are never able to quite account for angling behavior. Some of those things might be at play Addendum IV and some angling behavior that was either unanticipated. Also some strong recruitment classes that are coming through, but I don't know that the Committee talked about it explicitly. My memory is not clear on it.

CHAIRMAN ARMSTRONG: I would think that that is an issue we're going to have to talk about as part of the actions coming up; probably not today, but certainly that is going to be in the package we're going to have to look at, because we can't ignore 50 percent of the mortality on this start. Ritchie White.

MR. G. RITCHIE WHITE: Kind of to follow along on that vein. Recreational release mortality increased since the last stock assessment; is that correct, and if so then I have a follow up?

MR. CELESTINO: Yes, we are seeing an increasing trend, especially in the last couple of years.

MR. WHITE: Follow up would be can that be an indication of the declining spawning stock biomass; in that there are less legal fish available to catch?

MR. CELESTINO: The short answer is I'm not sure. I think it's hard for us to know all the reasons why fish might be discarded; so I'm not going to have a great answer for you. But I think a combination of cohort younger fish moving through. But I don't have a clear answer for you, I apologize.

CHAIRMAN ARMSTRONG: Jay.

DR. JASON McNAMEE: Mike, great job, you know really detailed report for something you weren't able to detail very much; so I really appreciate all the work that you guys did on that. I'm getting back to what new information we might get at the next meeting. One thing I was wondering about is did we get any guidance? I know you guys looked at the suite of different reference points. Did you get any guidance from the peer reviewers as to – I know they wouldn't pick them for you – but did you get anything that we are going to be able to use when we start thinking about the reference points as they are now, or what they should be?

MR. CELESTINO: Our plan was initially to bring, like I mentioned earlier, the suite of reference points to the Review Panel, and exactly as you indicated not have them select. But we wanted to engage in a dialogue with them on range and possibly methods. We reached out to the Northeast Science Center. I won't necessarily say they discouraged us from doing that; but it wasn't an explicit term of reference to have a dialogue on that. My personal expectation would not be to receive guidance in the documents that come forward.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: Thanks for the second opportunity for a question. I think it's important for the Board to get a sense as to what's coming. I don't know can you put up your composite recruitment graph? Mike, you did a nice job of early in the time series recruitment was very poor. We had spikes in recruitment in I guess it was the mid-2000s; late '90s, 2000s, and now we have a time period where we've had some poor years, but also some strong years classes.

The 2011, the 2015 and I guess that's '15/'16. Could you provide the Board with, as far as inclusion of those fish in the SSB estimate, are there a proportions of those classes that are part of the SSB that we're evaluating now? I can imagine the 2011s are getting very close; if not all the way recruited to the SSB. But the other two year classes I think are going to play a significant role in boosting, to some degree, the SSB in future years. If you can give the Board some perspective on that it would be great.

MR. CELESTINO: Sure, thank you for that question. Our maturity schedule does allow for maturity of some of those smaller fish. But we see very few mature fish at younger ages. As an example, up through Age 4 or 5, we're only at about 20 to 25 percent maturity, so a small proportion in those early years. Those larger two year classes I wouldn't expect a lot of SSB to be reflected from those year classes.

CHAIRMAN ARMSTSRONG: Emerson.

MR. HASBROUCK: Thank you Mr. Chairman for coming back to me. But just based on the question that Mike asked, is there any discussion or projection in the assessment about what's going to happen with SSB when the 2011, when that year class becomes fully mature, which is going to happen fairly soon, and similar question for 2015 year class?

MR. CELESTINO: Yes I think the projections, we did a limited number of projections, but I think that those are exactly the year classes that we're seeing sort of coming through; and we see this upswing in SSB. I'm looking to try to get that slide up in just a second. But I think those are those year classes, we're sort of under these status quo fishing mortalities. We still see SSB increasing, and our suspicion is those year classes moving through.

CHAIRMAN ARMSTRONG: Jay.

DR. McNAMEE: I'll stay on this theme as well. It's important to keep in mind that the recruitment plot and you don't have to sweat. The recruitment plot we just looked at is a model generated recruitment plot. There is a retrospective pattern in recruitment that was one of the more good retrospective in general for the model; but that was of all of the things you looked at.

One of the worse ones, I guess the comment I'm making is we should be careful about how many chickens out of those we count. The other thing that we'll need to pay close attention to when we get to this point, are the recruitment assumptions that go into these projections. Mike, I thought you said you guys used the spline Beverton-Holt model here. We'll have to think about that in relation to some of that recruitment information as well. I think it's good to think forward a little bit; but we should do so cautiously.

CHAIRMAN ARMSTRONG: Rob.

MR. O'REILLY: Mike, I guess this is going to be asked out of just a falling out of the technical world a while back. I don't know how the statistical-catch-at-age model behaves; in terms of past information. But it seemed one of those figures you had up, not the catch composition picture, but the earlier one which showed that a lot of the change from MRIP.

Where it was 140 percent overall, and I think you commented it went from 40 to 400 percent, depending on where we were looking. A lot of the elevation was before 1993, it seemed, compared to years after that on the harvest. The B-2s looked a little bit different. They didn't have exactly that same pattern. But I guess what I was wondering is does the model, is the impact from those earlier years with the changes of MRIP as substantial as in the later years? In other words, does it carry through? Then I might have a little follow up.

MR. CELESTINO: I think I understand your question. In the statistical-catch-at-age

model, our earlier years are our most uncertain years in the model. The plot that I'm looking at, I don't know if we can put this one up. I just want to make sure I'm thinking of the same plot that you are. We're going to try to get it up in just a second. Is this the figure you were thinking of?

MR. O'REILLY: That was the second one. There was one where you had prior to that I thought, where at the top it had the harvest, at the bottom it had the B-2s, and it showed the changes from MRIP.

MR. CELESTINO: This plot.

MR. O'REILLY: Yes that is it.

MR. CELESTINO: Maybe the reason I was thinking of the following plot was I mentioned earlier that the percentages are much larger. I'm going to make sure I understand you. I'll try to answer your question. If I'm misunderstanding it please just let me know, I'll try again. When I think of the subsequent plot the largest differences are happening, the lines are getting farther apart after 1995 or 2000 or so. The model is making adjustments for all of those. Our estimates of abundance are going to be most uncertain earlier in the time period. But all the catch estimates are making the way through the model. That sort of smaller difference increase, at least in the part of the time period that I'm thinking about is of course reflected in the model. I don't feel like I'm answering your question.

MR. O'REILLY: Let me try to help, because you're nice to give it a shot here. In the upper graph, the before 1993 you have the average line, but then you have what the changes in MRIP caused I think, right in the brown bars?

MR. CELESTINO: Correct.

MR. O'REILLY: It seems to me that it's above average quite a bit in the early years. I was wondering, does that have equal influence in the model as the later years? It seems that you said it's all considered, it does since it's a forward projection model. But where I was thinking was did the, and is it sort of heresy, but do you always have to look at a starting point of data?

You looked at 1982, so for example what would a run look like if you didn't have those higher years, which are clustered more towards the early time series? Do you look at that in any way? I say that because I remember when we started with striped bass there was a DPA in 1996. This is a different model, I understand that. There were probably 13 years of data. We're talking now about 37 years of data.

Are there ways if we know, and I suspect this is the case, if there is also variability from what I've heard presented by Dave Van Voorhees about certain years; that there is still variability that is there some way to look at this differently that if all of a sudden you get beyond 1993. There is somewhat a better representation. Although I think you could say well in the mid years you're low. Is that something that was even talked about?

MR. CELESTINO: Thank you for clarifying that question. I apologize for getting it wrong the first time. We did talk about as one sensitivity run, rather than doing a retrospective, kind of doing a reverse retrospective. Regrettably we just sort of ran out of time and weren't able to do that. One way that now that I understand your question better, one way that we are accounting for some of this information in the current model is we do have CVs on different years of the catch, so some years of the catch that we're more certain of than others.

We can give the model a little more leeway early in the time series when we may not be quite as certain of catch. That is one way that that can be incorporated into the model. But the more explicit sort of shading off early years was discussed explicitly; and it was part of our table of sensitivity runs. We just weren't able to complete that.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: I'm sorry I'm having a hard time following a lot of this. The 2011s, they are fully recruited?

MR. CELESTINO: The 2011s, they would be about seven or eight now, so yes we would expect to see that year class working its way through.

MR. McMURRAY: I could tell you one thing both personally and speaking on behalf of the recreational fishing community. They are not available. I mean certainly there are flashes here and there of those fish. But they are not the panacea everybody thinks that they are. I mean that seems to be pretty clear in the stock assessment; but it's also very clear to those of us that are out there targeting them. They're not around.

MR. CELESTINO: Yes and forgive me, so our selectivity curves in the Atlantic coast, we do assume full selectivity at Age 13, 14, or 15, and so those would not be fully selectable. That should generally jive with your observation, not fully selectable but partially selectable.

CHAIRMAN ARMSTRONG: Mike, to that point. Can you see the 2011 year class moving through the catch-at-age as a strong year class?

DR. DREW: I actually was just looking at this before. Yes you can, if we can go back to that figure actually. I think what we see in the catch at age lines up with what John was saying; which is that you can see, so you see the bigger bubbles are more fish in those age classes than in those years.

You can see on the ocean side you can see the 2011 is a bigger set of bubbles moving through, relative to what is around them. However, I think it is for sure not as abundant as I think that's the 2003 year class above that is much larger. Yes we do see them. They are more abundant than some of the other year classes, but they are not as you were saying the panacea for SSB.

CHAIRMAN ARMSTRONG: Are there any more questions to the assessment? That is a lot of information.

**DISCUSS NEXT STEPS FOR STRIPED BASS MANAGEMENT**

CHAIRMAN ARMSTRONG: We move to the next item, which is discussing the next step. Clearly there are next steps needed; but I'm uncertain which way we go here. Do we charge the TC with some more projections? Under all the projections they provided, under all the scenarios through '23, we don't come close to the reference points that are proposed.

Do we charge them with looking at some other things? What F do we actually need to think about achieving to get the SSB? Are these the right SSBs that we want going forward? Are we looking at an addendum, are we looking at an amendment? But if we don't ask for something now and get it started, we've lost three months already. We really need whatever we do to be in place by the next fishing season. I would suggest we move on something today and open to suggestions. Ritchie.

MR. WHITE: Actually I'll start with a question for Max. What is the wording in the plan that requires us to take action when the stock is overfished and overfishing is occurring? What is the wording?

MR. MAX APPELMAN: I don't have the exact wording in front of me; but if we were in a position to accept the results that would trigger four of the management triggers, two of which are related to fishing mortality, two of which are related to SSB. Those that are related to fishing mortality require reducing F to the target within a year. Those related to SSB charge the Board to increase SSB to a timeline that they need to choose. There are some restrictions on that timeline length.

CHAIRMAN ARMSTRONG: Follow up.

MR. WHITE: A management action can accomplish both those by addendum?

MR. APPELMAN: Yes.

CHAIRMAN ARMSTRONG: John.

MR. CLARK: Also a clarification. On the amendment, if I understand it, if we were to change the reference points at that point we would have to go to a new amendment, right? The actual 1995 SSB is part of the Amendment 6.

MR. APPELMAN: Actually there is a lot of flexibility in the Adaptive Management Section of Amendment 6. I was just reviewing this prior to the Board meeting. Almost everything is covered in the addendum process; except for management objectives and goals. Just about everything else can be done through an addendum; including reference points.

CHAIRMAN ARMSTRONG: In regard to timelines, we are in such a different spot that was never covered in any addendum or amendment. As of last assessment the stock was doing okay. We had some concerns. With brand new data the entire assessment has changed; to no one's fault, but we've pulled back the curtain and the Wizard looks quite different now. The timelines, you know we need to think about that. Mike.

MR. LUISI: The Wizard is old and tired now. I think Ritchie, I think his back and forth with Max was exactly what we should task the TC in evaluating; which is let's take the current amendment framework that we have. Determine whether or not if we were to accept the terms that were just reported to us; did triggers get triggered?

If so what is the consequence of that before the Board? I think that is completely acceptable; as far as a tasking to come back before the Board, so that we can understand what the management implications are for those decisions that we'll have to make the next time we get together. I do want to just provide my opinion as a word of caution; to stepping back in time and kind of redoing Addendum IV, which I wasn't on the Board at the time, but across the board states were required to take reductions through a paper and pencil exercise.

Five years later, it doesn't seem as if what we did a whole lot of good as far as recovering the stock. I feel as if we're in a different place and time right now. Amendment 6 was developed back in the time period when we had a super abundance of stripers in the ocean. We no longer have that based on this assessment.

I would be supportive of a more comprehensive look at all of the elements that are in Amendment 6 for potential change; which would be goals and objectives, trigger mechanisms, reference points, time periods. All those elements, I think we need to reconsider them. You know we did a survey a year or two ago; I don't remember when that was. But there was a clear indication that the Board was kind of split; as far as do we want to have a super abundance of large striped bass in the ocean, or do we want to have harvest as part of that as well?

I do think that we would be foolish to go back; and this is kind of to Russ's point and Ritchie's point earlier. If you look at the last five years, it's the last five years where our dead discards have been greater than the actual harvest in the recreational fishery. That is a really big problem. We can say all day that we want to reduce F.

Let's reduce F. But if we don't succeed by solving a problem, we're going to be right back here again five years from now when the next assessment is done, because we have exacerbated the problem by increasing size limits, creating situations where fishermen have to cull through 20, 30, 40 fish before they can keep one.

We did that and I hope we don't do that

again. I would think that through an amendment or an addendum process, we could be more creative in our approach; to try to solve the problem, which is kind of the focus of that problem would be on dead discards. Ultimately we're taking down removals to accomplish what it is we need to accomplish.

I foresee a little bit of a longer time period. Maybe it can get done before the beginning of next season. I hope that we don't act as a Board swiftly, and find ourselves making the same mistakes we made five years ago. Based on the review of this assessment we really accomplished very little.

CHAIRMAN ARMSTRONG: Doug.

MR. GROUT: Obviously one of the issues we have here is we don't have the final peer reviewed stock assessment here. But we're anticipating getting that shortly, hopefully. What I would like to do is make a motion that will propose to task the TC with some very basic tasks; just to start getting information of what the impacts are from this assessment, what we could potentially need to do just as a minimum with this assessment, based on what's currently in the management plan.

Not start an addendum at this point or an amendment, but let's get some information so that we can see what the impact of this is and maybe a single idea what we might need to do. I agree discards is an issue. I don't see that discards have exceeded harvest in the last five years, but certainly in 2017 it was very evident that we were heading in that direction.

**With that said I have a motion; and I want to caveat it that this tasking of the TC, the work is only to begin after we receive the final benchmark assessment, the report and the peer review of it. But to task the TC with providing the Board with a report that shows the reductions in harvest needed to reduce F to F threshold and F target.**

**When I'm referring to that I'm referring to the ones I saw up there based on the 2015 SSB, was it 0.24 for the threshold and 0.197 for the target. Then I would also, I don't want to over task the SSC with providing a suite of seasons, size limits. But I would like to see an example, just a single example for each, what it would take to reduce the harvest by that amount. My motion goes on to say also provide one example of recreational bag and size limit combination, and in parentheses say if necessary, seasonal restrictions needed to achieve these reductions a; on the coast, and b; in Chesapeake Bay, and to report back to the Board in May.**

CHAIRMAN ARMSTRONG: Is there a second? Justin Davis, second. Discussion, Doug. Ritchie.

MR. WHITE: Question, would it make sense to also add the appropriate percent reduction in the commercial quota? That is a question to Max or the Chair.

MR. APPELMAN: I'm sorry; I was talking with my crew over here. Could you please repeat the question?

MR. WHITE: Sure, does it make sense to add to this the appropriate reduction in commercial quota, corresponding to the motion?

MR. APPELMAN: If you wanted to add that I'm sure you could. What I was just talking about with my group, if you will, was when it comes to providing one example of a bag and size-limit combination. I mean as we know right now there are a plethora of different regulations implemented across the coast; especially Bay versus the rest of the coastal fisheries.

I don't know; I mean they could certainly put an example together, but I fear that that comes in front of the Board and you guys look at it and say that's nothing what we wanted to see or there are a million combinations

that they could put together. I'm looking for a little more direction for them.

MR. GROUT: I'm not saying that this is something we're going to put in a plan. All I'm trying to do is show the Board and show the public about an example of what kind of changes might be needed to accomplish those reductions in F to the threshold and target. You can pick anything, I don't car; you know I prefer bag/size limit.

But if you need to go to a seasonal restriction coastwide and this would be like a coastwide because we have different regulations in the Chesapeake Bay than we do along the coast. Just give us one example. I know this Board can come up with hundreds of different combinations we want them to look at. But that is not the point right now. The point is for us to visualize, and the public to visualize what kind of things it is going to take to accomplish this, just one example.

MS. NICOLE LENGYEL: Doug, a couple other things that would be helpful for the Technical Committee. One is a timeline, so the triggers in Amendment 6 specify F to the target within one year. If we could add a timeline to the motion, perhaps, and also probabilities, if you recall back in Addendum IV that 25 percent reduction in Addendum IV had a 50 percent probability of achieving F to the target. Does the Board have a certain probability they're comfortable with?

MR. GROUT: Two thousand twenty, 50 percent probability, just to get you going.

CHAIRMAN ARMSTRONG: Doug, would you anticipate SSB projections associated with those?

MR. GROUT: It could. I mean we could pile on them. But my goal is what's it going to take to end overfishing in a year?

CHAIRMAN ARMSTRONG: In a year. Okay so that's where we get to 0.197 may not be enough to get us back very quickly. There may be a restoration F we need to move to; as horrendous as that sounds.

MR. GROUT: That may be a further thing that we would have to, a restoration for SSB may be in the future; but let's get the first thing on the table, at least from my perspective.

CHAIRMAN ARMSTRONG: Okay and this is going sort of how I thought it would be. We only planned on three hours, and this is an eight hour meeting we're leading up to, so we do have to watch the time a little bit. But we have a second, so comments on Doug's motion. I have a couple already; Justin, good, Emerson.

MR. HASBROUCK: In Mike's presentation, did I understand it correctly that there were a couple of different sets of reference points that were suggested and we're waiting for feedback from the peer review about those suggested reference points, or did I misunderstand?

MR. CELESTINO: There are two reference points that we brought forward. We brought a 1993 and 1995 SSB and 125 percent of 1995. But we don't anticipate getting any feedback on alternate reference points, only on stock status determination relative to 1995 SSB.

CHAIRMAN ARMSTRONG: Go ahead, Emerson.

MR. HASBROUCK: I could probably answer my own question by looking through the reference documents here; but I'm going to ask it. Might that F threshold and F target change based on the peer review, or are they probably going to remain the same, because if there is a chance of them changing, then we may want to change this motion.

MR. CELESTINO: Our expectation is that the numbers won't change.

CHAIRMAN ARMSTRONG: Jay.

DR. McNAMEE: You've already covered part. I was going to also suggest we needed a risk probability, and so we got that the 50 percent is a good starting point. I also feel a sense of urgency and a sense to kind of get moving here; but I thought Mike's comments were good as well. I think we want to really think this through.

I think what Doug has offered is a good start; to kind of get a sense of this. The one concern I have is about the one regulation example. I'm kind of thinking about what that might look like; and I think it's just going to be alarming. I don't know what value we get out of that. I can see just the discussion to get to that one example. We're saying TC, give us one. They're going to have a battle at the TC to figure out what that one is going to be that comes to us. I'm not pushing this too strongly at this point; but that might be something we might think about peeling out of this motion. Just getting this very basic information of what is it going to take to get us back to the reference points that we have already?

Then I think at our next meeting we'll have a lot more information with which to offer more guidance; because that's what I'm truly struggling with. I feel a need to get moving on this; but I have no idea what guidance to provide the Technical Committee at this point, because we don't have a lot to work with.

CHAIRMAN ARMSTRONG: Doug, would you consider an amendment?

MR. GROUT: I would be more than willing if someone wants to make an amendment. My goal, clearly on the coast we're at one fish, so it's going to be difficult to change the bag limit. Can you raise the size limit high enough to accomplish this or not? I have no idea. That would be a very simple thing for them to do. Okay, how far up on the size limit do we have to go; the coast or in the Bay, just as an example?

Then my concern is saying, okay we've got to take a 25 or a 30 percent reduction in F to get to this point or we need to reduce harvest by this million fish. The public and we are not going to have any concept at all about what it takes to do that. That is my purpose in trying to see if there is a possibility that they could give us a simple example, even if it's just changing the size limit in the Bay and the coast to get to these things.

But if you can't do it, you know I gave them the second option of well maybe we need to put in additional seasonal restrictions. I know we're going to be having lots of discussions about this in the future; but you can tell me we've got to cut it by two million fish, and that means nothing to the public.

CHAIRMAN ARMSTRONG: It sounds like change is not in the works. Would you like to make a motion like that to change it? Okay. John Clark.

MR. CLARK: I'm opposed to this. I think we know what this will turn out. It's going to be drastic, it's going to be alarming, and it's going to really create expectations in the public that things are so terrible we have to take drastic action now. I think this is the time, we know we're going to have to take action. This is the time to start an amendment process; where we rethink our management options, we look at different reference points.

We kind of go back to the drawing board, as Mike said. We've had five years of a 25 percent cutback. It hasn't done the trick so far, so maybe we just need to rethink the whole process. I think without having the TC report, we know it's going to be pretty drastic, especially if we're going to try to get to that target F in one year.

CHAIRMAN ARMSTRONG: Roy.

MR. MILLER: I just wanted to potentially add something to the mix that this motion might cover. We're putting all of the reduction in harvest. We're using the reduction in harvest

to achieve the targets and the threshold. What if, I'm harking back to the comment that Russ Allen made regarding recreational discard mortality being higher than harvest mortality.

What if we were to attempt to reduce recreational discard mortality, and make that part of the mix? How much could we expect to reduce recreational discard mortality? Is it enough to even consider trying to do? I'm thinking of Maryland's proposal over the past couple years to reduce recreational discard mortality using innovations like circle hooks and educational awareness; that kind of thing.

CHAIRMAN ARMSTRONG: Katie or Mike to that point. I know it gets really complicated; because a million Age 2 fish is a lot less fishing mortality than a million Age 8 fish. I'm not saying this now. I think it's something we need to look at. Do we know the age structure of the discard?

DR. DREW: We do have information on that. We rely on some MRIP sampling for that. They do have observers on headboats measuring the size of fish that are thrown back alive. We do have information from angler logbook programs; where people tell us measure the fish they would throw back versus the fish they keep.

We do have information on the size structure of the discards. I would also say we definitely, when we do this analysis we look at we assume when we do the bag and size limit analysis for striped bass that if we raise that size limit from 28 to 30, then those fish that will be thrown back, and a certain amount of them will die.

That goes back into we account for that recreational discard when we count for the total mortality of the removals that those regulation changes will accomplish. But I think the question of how do we reduce. The other thing to keep in mind with striped bass is we release about ten times as many fish as we actually harvest.

Even if you convert 50 percent of those releases to harvest that is more than the recreational dead discards, because only about on the average over the coast 10 percent of them die when they're thrown back alive. But I think the question of how do you balance that out, especially with strong year classes moving through, is something that the TC would consider when looking at these bag and size limit analyses.

CHAIRMAN ARMSTRONG: Ray, did you have a comment? Okay, Mike.

MR. LUISI: I'm going to need to get a privacy screen on my iPad; Roy I think is reading my notes directly that I'm typing to myself. But I wanted to make a similar point to Roy's, and maybe change the wording Roy in such a way. I understand the interest in actually converting the dead discards into harvestable fish. But what if through this TC process we get a sense as to what effect discards would have by increasing size limits. If we're going to have one example on the coast and one example in the Chesapeake Bay of increasing size limits.

Is there a way technically to estimate how many more fish you're now going to have to interact with and have as part of your B-2s, so that stakeholders can understand that by increasing size limits you're ultimately just creating more dead discards and exacerbating the problem. I think if we can add it to that.

I don't know where it fits in there; perhaps after providing one example of recreational bag and size limit combination, if necessary seasonal restrictions, and effect on B-2s or effect on live releases. I think it would be helpful for the public to know what those estimates look like, what those scary estimates look like.

CHAIRMAN ARMSTRONG: This is kind of like a David Pierce motion at this point. Should it be a separate motion? Doug, would you be

amenable to adding that?

MR. GROUT: Someone can gracefully add that into the motion without violating the Pierce Rule, I would be glad to. It sounds like, by what Katie just said that is going to be part of the analysis anyways. As long as in the report you can explicitly bring that out. That's what I thought it was. Yes, I agree we should see that kind of information too.

CHAIRMAN ARMSTRONG: Mike, do you see some language you could add to this that would satisfy you?

MR. LUISI: If it's going to be part of what's reported as it's already stated; that's well beyond technically what I understand what we're going to get back, what the feedback we're going to get. But if we're able to see where the 32 inch, 1-fish bag limit in the ocean under this scenario. If that is the scenario we have.

If we're able to see based on an estimate of how many new live releases that we're going to have as an effect of that that would be ideally what I would like to see, as well as in the Bay. If it's already packaged in there then there is no reason to complicate this anymore than it already is. If it's in there then fine; I'll absolutely support the motion moving forward. But I have to ask Katie or Nicole or somebody.

CHAIRMAN ARMSTRONG: There is a piece, and I'll ask Katie to comment. The piece about how many are you going to have to discard to get to the new size one. That's not what you're talking about.

DR. DREW: That is obviously much harder to do; because it depends on the size and age structure of the population. I think it is something the TC is interested in pursuing; and has been talking about internally when we do these kinds of calculations. I think the fact that we know you're interested in that means that we will try to provide some analysis that can address that question. Obviously we can't guarantee that this is the exact number that you have to go through; but I think we can sort of take that into consideration as we do these calculations.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: A question and then a comment. I want to be clear before I support this that this puts us on track for on the ground potential management action in 2021, I'm sorry, 2020.

MR. APPELMAN: That all depends on what kind of document we're initiating down the road; amendment or addenda. An addendum is obviously more streamlined, an amendment takes a little bit longer, and it also depends on the time of the year that actual final approval of that document would be if that's at the beginning of the year versus more mid-season. Some fisheries could already be operating.

MR. McMURRAY: You could have just said yes. This does put us on track should we go the addenda route, and that is good to hear and I can support it. But I also wanted to respond to some of the comments around the table; particularly the fear that this is going to be drastic. I would just add that this is a really important fishery.

It is to a large extent driven by availability, not necessarily how many you could put in a cooler, but how many fish are around. With that said; in the grand scheme of things, I'm pretty sure that if we have to go up several inches in size and not mess with the bag limit that is not going to be catastrophic.

What is going to be catastrophic is if that availability continues to decline; particularly for the part of the recreational fishing community that targets these fish from the beach, which is both culturally and economically important. If we continue down this road, and if we don't keep the promises that we made in Amendment 6 that is what's going to happen. We're going to be in a really

bad situation. I would encourage the Board to go this route, but to try to take action expediently.

CHAIRMAN ARMSTRONG: Rob.

MR. O'REILLY: I've heard two board members talk about, and if maybe necessary a seasonal closure. Since Amendment 5 there hasn't been a lot about seasonality in this fishery, about truncating seasons when there has been problems with the stock. I just hope that that gets a pretty good look, because we're hearing about discards; raising size limits all the time in my mind is really not that effective.

I hope that the use of seasons gets a pretty good characterization, because if your seasons close you may have catch and release that's about it. You may have recruitment once your season opens; because everyone is in fervor to go out and fish. We understand that as well. But that's nothing such as always having as much season as possible.

I understand that that is what the fishing public wants; they want the longest season possible, no matter what the species is. But at the same time we have some testimony through this last Addendum IV that size limits may not be the way to go all the time. Yes it went to one fish, but in a lot of cases I remember the information from some of the coastal states were one fish would be okay. You know there is certainly a lot of catch and release too. I hope that's not an add-on, I hope that's right up there in the front row with size limit changes and bag limit changes. I hope the Technical Committee can advise us just how much that's been used in the past since 1995. I don't think a whole lot. But I mean if we're truly going to be conservation minded it may be that size limits aren't the way to go.

MS. LENGYEL: Seasons is something that we have not looked at before; and it's not specified in Amendment 6. It is something that we can look at; if the Board wants us to look at it, but that is something that will be more work and more detailed. It will have to be done on a state-by-state basis, because the seasons in all the states do vary quite a bit right now. I'm not sure we will have that ready by the May meeting; but it's definitely something that we can look at if the Board desires us to.

MR. O'REILLY: May I respond?

CHAIRMAN ARMSTRONG: Go ahead, Rob.

MR. O'REILLY: I'm aligned with Doug's idea that we just want to get some glimpse here. We want the public to know that this is something being taken seriously; no expectation for any final results or anything else likes that. I just don't want it to be neglected by the time we really start to work on this.

CHAIRMAN ARMSTRONG: Justin, then Dennis.

MR. JUSTIN DAVIS: This is a question for the Technical folks. I'm wondering if this motion would be more appropriately worded reductions and removals; because what we're really trying to capture here is how many fewer fish we will need to remove to get down to that F threshold, and obviously as we change size limits we might be increasing discards. There is mortality associated with that. There has been concern expressed about that around the table. I'm just wondering if that little change in wording might help sort of capture that dynamic better.

DR. DREW: I think the Technical Committee would have interpreted that at harvest as removals; but if the Board wants to be more specific, it certainly wouldn't hurt us.

CHAIRMAN ARMSTRONG: Dennis.

MR. DENNIS ABBOTT: Not assuming, but with the importance of this issue and assuming that we come back in May and make a

decision to start an addendum. In order to get regulations in place by 2020, that gives us maybe eight months. Is it possible that we can get that done in that time, and would it be necessary or a good idea to consider having additional meetings to expedite this, in order to have a finished product by the end of this calendar year?

MR. APPELMAN: Talking about an addendum here? Assuming the Board initiates an addendum in May. That timeline would have no hiccups along the road. Final approval would be in October of this year.

CHAIRMAN ARMSTRONG: Question Max. If time and area closures were part of it, can that be an addendum, since they don't seem to be in the toolbox yet?

MR. APPELMAN: Yes, but I'm going to check right now just to verify that response.

CHAIRMAN ARMSTRONG: Okay to the motion; anymore discussion? All right hang on just a second.

MR. APPELMAN: Yes.

**CHAIRMAN ARMSTRONG: All right let's vote on it, all in favor raise your right hand; sorry, yes please caucus. All right are we ready? All in favor of the motion raise your hand; keep them up please. Okay, against, nulls, abstention. The motion carries 15 to 1.** All right, well we've got the ball in motion. Does anyone have any other discussion of next step for striped bass management? Jay.

DR. McNAMEE: Just real quick a question for Nicole or Mike or Katie, one of you guys. Does the Technical Committee need any guidance at this point as to what your recruitment assumption should be; or are you just going to roll forward with what you've used to this point? You're going to have to run a projection to do this, right? Do you need guidance on that assumption, or any other?

MR. CELESTINO: I guess the answer depends. We would probably move forward with what we've presented as our preferred recruitment scenario as part of the peer review. Unless there is interest from the Board in an alternate scenario; because I should mention for completeness that we did actually bring two recruitment scenarios, one random draws of recruitment and one with the hockey stick recruitment that we showed.

We did the random draws of recruitment as a sensitivity analysis; not as our preferred run. Unless the Board was interested in something different we would move forward with our Plan A, hockey stick recruitment relationship that we showed earlier.

CHAIRMAN ARMSTRONG: Andy.

MR. ANDREW L. SHIELS: Just before we leave this, perhaps the most disturbing thing that I think a number of people around the table agreed to was the dead discards to the recreational side. I am asking, expecting, hoping that the stock assessment, the final report will include the what, when, where and what sector those dead discards occurred in. Is that expected to be in the report?

MR. CELESTINO: We would expect the plots that we showed will be in the report; the table that are in the briefing materials, unless you're referring to something different.

MR. SHIELS: What I want to be able to know, when we get to this question is I want to know where along the coast in what fishery, whether it's in the ocean or in the bay, the discards occur so that we can have an understanding. Doug was indicating we need to understand what this means to the public. I think that would be very helpful to know which part of which sector and geographically, and whether it's on the coast or in the Bay these discards are occurring, so we can kind of wrap our head around that which is the most disturbing of all the issues I think that we have been presented with today. That's what I'm requesting.

MR. CELESTINO: We believe that most of that is in the report; and if it's not we'll make sure it's included as part of the report from this motion.

CHAIRMAN ARMSTRONG: Anything else before we leave this agenda item?

MR. APPELMAN: Yes, so I just wanted to highlight that it's pretty clear that there is going to be a management document soon being developed. We have a development team; and I would appreciate the Board to look back at those members and just verify that those are the right folks for this management document. There could be any range of issues considered in there. Please look back and let me know if there should be any changes.

CHAIRMAN ARMSTRONG: Do we need to do anything to reenergize them, or charge them to reorganize at this point or they're just sitting dormant waiting for our orders? Excellent, can you send out an e-mail perhaps and remind us to look at our PDT members. Ritchie.

MR. WHITE: This is a suggestion to the formation of the meeting for May. I would leave a big chunk of time for this meeting in May.

**CONSIDER PROVIDING COMMENTS TO NOAA FISHERIES REGARDING THE PROPOSED MEASURE TO LIFT THE BAN ON RECREATIONAL FISHING IN THE FEDERAL BLOCK ISLAND SOUND TRANSIT ZONE**

CHAIRMAN ARMSTRONG: So noted. Our next agenda item is revisiting Providing comments to NOAA Fisheries Regarding the Proposed Measure to Lift the Ban on Recreational Fishing in the Federal Block Island Sound Transit Zone. The question is, it was originally, I think, we would kick the can down until the official review is out. Given what we've seen as a Board, do we know enough to provide comments to NOAA at this point? Mike.

MR. LUISI: To answer your question directly, I think we know enough. But I think that it's a more strongly worded message once it's been committed to by the Board, and we're on solid ground. It's my understanding and this again. Maybe we should have a two-day meeting in May. It's my understanding that everything is on the table still; and even the model that Gary Nelson had worked on is something that we're going to get a report on and have to debate.

I think the Board needs to select its preferred path, and then based on putting some solid ground under any further actions then I think that message is just more strongly worded from the Board rather than on an updated however it was worded in the agenda, an updated preliminary review of a stock assessment report.

CHAIRMAN ARMSTRONG: Sure. I wonder if we can short circuit it by having a motion or consensus for staff to craft a strongly, if we have consensus of the Board saying, and I don't know we do, saying no you shouldn't open that; some letter to that effect rather than spending here wordsmithing. Can staff do that?

MR. APPELMAN: I'll just remind the Board that when we looked at that ANPR that came out last fall, the Board decided to write a letter to NOAA Fisheries stating just that; that we're going to wait until the final results come out to provide a formal comment or recommendation regarding Block Island Sound. The Board essentially has already done that and I think what Mike was just saying is we're still in that boat, we're waiting for those final results to come out. I think that has already been checked off the list, from my seat at least.

CHAIRMAN ARMSTRONG: Well I'm not sure. We just said hang on don't do anything. We haven't provided a letter saying hell no, or yes sure go ahead with it, right? That's what Derek maybe you could advise us. That's what you're looking for, a letter from this

board?

MR. DEREK ORNER: I guess in the ideal world, yes. I think we were planning back in the annual meeting in October, the assessment would be final for this Board, we would have heard the presentation. We can provide comment from the Board back to NOAA, so we could go forward and make some decisions on directions to go. I guess the hesitation and waiting until May now puts another three months into that process.

I'm not sure if that timeline still fits or how we would move forward; considering the fact that as Katie mentioned the numbers and the trends, everything in the assessment aren't necessarily going to change. We'll get more detail in the assessment reports come May, but the trends and the status are there. As a Board can we have that discussion? Maybe provide and get that off the table now, understanding that come May it's going to be a long meeting.

CHAIRMAN ARMSTRONG: I think I would prefer to get it off the table now. Ritchie.

MR. WHITE: Question, then follow up if I may. This proposal would increase mortality; is that correct?

MR. APPELMAN: I can't answer that. The proposal is to consider opening up recreational fishing in Block Island Sound in that transit zone. How that translates to F, I don't know.

CHAIRMAN ARMSTRONG: Generally if someone wants to get an area more than they are at now, there is going to be more availability and larger harvest, I think we could probably assume.

MR. WHITE: Any increase of mortality at this point, I would be opposed to until after we figure out where we're going, so I would oppose it at this point. If they want to wait, May when we kind of figure where we're headed the answer might be different. But right now if they're looking for an answer I would oppose it.

CHAIRMAN ARMSTRONG: Justin, I'm sorry Jay, one of the J's.

DR. McNAMEE: That's okay, I've been called worse. It is interesting. I thought Mike originally was saying let's wait, maybe. I'm having a little trouble following. But I would be in the camp of waiting to May. It's closed now, so waiting doesn't impact that part of it. The difficulty that we have is we've also been saying in Rhode Island; let's wait to see the outcome of the stock assessment.

We have not had an opportunity to say hey the stock assessment is out; here is what it said. I think we have a general sense of what it's going to say. I don't disagree with that. But I also don't see the harm in waiting until May. I think it's probably going to be a pretty quick agenda item. I don't see us laboring over this too much; based on what we learned today. But what we've not been able to do is kind of go back out and say the stock assessment did not look good, you know in our area. I would like an opportunity to be able to do that.

CHAIRMAN ARMSTRONG: Okay how about a hybrid to save a little time. If we have consensus with this Board, we'll charge the staff to put a letter together that it can bring forward for the next meeting, so it will be a five minute discussion. Then we can put it to bed. Is anyone for opening up that area? Emerson.

MR. HASBROUCK: Yes, and the reason I'm supporting that at least as of now is that the information I have is that it's likely not to increase fishing effort. But what's going to happen is there is going to be the same number of boats. This is primarily charterboat fleet, oh and also private boats. The same number of boats fishing in that area that are fishing there now, it's just that right now they are densely congregated on either the New York side of that transit line or the

Rhode Island side of that transit line.

This will allow that fleet to just disperse and not be fishing right on top of each other. It may not or likely will not increase fishing effort. Relative to that I am wondering if anyone has any information; or if the TC could provide it to us. Was there a reduction in recreational fishing effort when the EEZ was closed, and if so by how much, and that's for the whole EEZ.

DR. DREW: To the question about did closing the EEZ reduce fishing effort. I think that is something the TC could look at for the MRIP data; recognizing it's not perfect, but we do have some information on total number of trips, as well as directed trips and where those trips happen in the ocean. We could look at that if that is something the Board was interested in.

CHAIRMAN ARMSTRONG: Emerson.

MR. HASBROUCK: I think it might be interesting to see that; because we're looking at kind of the reverse of that now. The entire EEZ was closed, so what impact did that have on recreational fishing effort? That might give us some indication; in terms of might there be an increase in fishing effort if we open up this very tiny little sliver of the EEZ, which is probably equal to less than I don't know, 100th of 1 percent of the area that was closed.

CHAIRMAN ARMSTRONG: Okay, we're a little bit at loggerheads then. **I would propose we entertain a motion to write a letter opposing opening it.** If it wins by a majority, staff moves forward with that. We see it in May and the states can also offer up individual opinions by letters, either supporting that or opposing it. Would anyone like to make a motion? Pat Keliher.

**MR. PATRICK C. KELIHER: I move we do what you just said, Mr. Chairman.** Would you like clarity?

CHAIRMAN ARMSTRONG: Would anyone like to second what I said? All right, we have a motion by Pat Keliher, do we have a second, Ray Kane, discussion, Emerson.

MR. HASBROUCK: I'm not going to support this motion for the reasons I just previously stated, as well as for the fact that whatever the outcome is of our future discussions based on a new stock assessment, harvest is going to be constrained by whatever it is that we come up with.

We're going to constrain recreational harvest by size, season, bag, a whole variety of things that might come out of the final discussion here. That effort is going to be constrained, and it's probably going to be lowered anyhow. I don't see how this is going to increase overall fishing effort on the resource.

CHAIRMAN ARMSTRONG: David and then Dennis.

MR. DAVID V. BORDEN: Just a question. I mean the directive is to compose a letter. It does not say submit a letter to NOAA so is the intent to compose a letter and then circulate it to the Board to bring it back at the May meeting? At the May meeting, review at May meeting, okay, all right sorry about that I missed that.

CHAIRMAN ARMSTRONG: I believe our intent is to compose and we'll vote again at the May meeting. Dennis.

MR. ABBOTT: Conversations we had at the last Board meeting and this Board meeting is the whole exercise is simply to legalize an illegal fishery. It's been brought out quite clearly that there is a fishery going on there; and we want to legitimize it. Therefore, I don't think that's a good thing, and therefore I support the motion.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: I support the motion too

for obvious reasons; but it shouldn't be lost on the Board that Congress also issued another directive to open up the entire EEZ. I'm not sure where we are on that; maybe Derek can provide some insight there. But we may want to kill two birds here, and include our opposition in the letter.

CHAIRMAN ARMSTRONG: Derek, would you care to weigh in on that?

MR. ORNER: No. Yes the second item moved forward in that language, well the first one the Block Island Sound was to move forward and consider it at that point. The second one was upon completion of the stock assessment to work with the Commission to consider opening the EEZ, so the entire coastwide EEZ. That will be coming at some point.

I figure that is something that we can pick up after we have review of the assessment itself in May, so we may even push it out a little bit further. Whether that goes through the whole AMPR Rule Process, or if we can all consider it here, and based on the results we don't go forward. That is I think up for the discussion and consideration at that point.

CHAIRMAN ARMSTRONG: Andy then Emerson.

MR. SHIELS: After the October meeting when we heard this news that there was two parts to this, the transit zone and then the wider discussion of opening the EEZ. I felt the need to pen a letter on behalf of the Pennsylvania Fish and Boat Commission, and the Pennsylvania delegation, and I did meet the deadline and it did show up online on the Federal Register, I guess that's what it is.

There is no reason why you can't send two letters. You can send a letter now. You sent one already, you can send another letter. You can send three letters. I sent a letter and I reserved my own opportunity to send an additional letter later if I like. I'm concerned. You know we don't necessarily have a dog in the fight on the transit zone.

But we do have a dog in a fight on the EEZ as a whole; and I'm concerned about the way this is moving along kind of almost discreetly and covertly that well, we'll address this part, and then maybe we'll address the larger part later some time. None of us could predict that the Federal shutdown was going to occur not long after those comments were registered. We've lost the opportunity for the stock assessment to be ready today; which also has put back our opportunity to comment, by having the stock assessment in our hand.

My recommendation is if it's the will of the Board, or the majority of the Board at this time is to send a letter now re-expressing your concerns about the transit zone, and what else might be on deck, and then reinforce that with information on the stock assessment when it comes available, where you can hone in and make it a more finely tuned letter. My concern is that this is kind of by being stretched out; maybe the importance of it might be lost by a little bit.

CHAIRMAN ARMSTRONG: Emerson.

MR. HASBROUCK: With your permission, a question through you to Derek if possible.

CHAIRMAN ARMSTRONG: Please.

MR. HASBROUCK: I'm just wondering where NMFS is with the issue of the transit zone, opening up the transit zone. Is NMFS just waiting for a response from this Commission before they move forward; or is NMFS at some other point in their consideration?

MR. ORNER: Looking back in the audience I'm not quite sure how to answer that one, Emerson, mainly because with the lapse in appropriation we haven't been in the office for a month and a half, basically since this all started. I personally have not had conversations to see exactly where NMFS is or NOAA, you know Secretary level is in making any decisions, which is kind of my push when I was talking to Mike before was

to try and get something moving here, so when that does come we have a response from the Commission.

**CHAIRMAN ARMSTRONG: Any more discussion on the motion? Caucus needed, okay take a minute to caucus. Is everyone ready? Again the motion is to just compose the letter. We will vote on sending it in May. New York, are you good, all right all in favor raise your hand. Okay opposed, abstain, null. All right it passes 15, 0, 0, 1. Mike, I guess you are up.**

**REVIEW OF MARYLAND'S CONSERVATION EQUIVALENCY EFFECTIVENESS REPORT OF 2018 RECREATIONAL MEASURES FOR THE CHESAPEAKE BAY SUMMER AND FALL FISHERY**

MR. LUISI: Is it okay if I say on the side of the table here? Okay, I did prepare a presentation; a few slides, so we can wait until that comes up. What I'm going to present to you are some of the highlights for our Conservation Equivalency Effectiveness Report that the state of Maryland committed to last year; upon approval of a Conservation Equivalency Plan.

If you all remember, we had an issue in Maryland as a result of increasing the size limit from 18 to 20 inches as a result of Addendum IV; exactly what we were talking about before we were experiencing huge numbers of discards. We wanted to address that concern through proposing to the Board a plan which established a 19 inch minimum size; and required that non-offset circle hooks be used with bait fishing.

We also committed to providing this report here at the winter meeting; and trying to gather relevant information on compliance and other things that we were working on as part of our program for this meeting in 2019. It's hard to believe a year has passed since we were here discussing that.

What I'm going to cover, and I'll do it very quickly, and I want to also thank Max for putting this on the agenda for only ten minutes. I'll probably go about nine, and then answer any questions that you have, so thank you, Max. I want to talk to you a little bit about what our current gear regulations are.

I'm pointing that out because they differed just a bit from the discussion that we had at the Board meeting last year. I'm going to go over some outreach and education efforts, enforcement and compliance, and then we did a little bit of an analysis, 2018s MRIP data were preliminary at the point when we were working on this still.

I do want to go over an analysis that we conducted; which I think you'll appreciate the results. Okay so the current gear regulations in Maryland apply to fishermen that are chumming or live-lining. A person engaging in this activity during the periods of May 16 through December 15, and May 16 through December 15 of 2019, shall only use a circle hook.

A circle hook is defined as a non-offset hook at the point turned perpendicularly back to the shank. You'll see the examples of what a circle hook isn't and is as it applies to the regulation. Where things changed slightly, and we discussed this I think back in maybe at the annual meeting.

We talked a little bit about this. But when we went to implement the rule, bait fishermen kind of pushed back a little bit. Folks that were fishing for other species that were not striped bass thought that implementing a circle hook across the board was going to impact them; not only the fishermen but the tackle shops.

Those of you who are in the business of implementing new regulations in your state, sometimes we have to consider the gains versus some things that you might not be able to accomplish. We would have lost the whole program had we tried to push requiring for all bait fishing the use of circle hooks. You'll see the rule there. I don't need to read it to you.

We are allowing for the use of J hooks for bait fishermen. However, we did describe the prohibition on treble hooks through this process; so treble hooks are no longer allowed in Maryland. Moving on to education and outreach, we conducted, you know we phased in a series of education and outreach programs consisting of e-mails to hundreds of thousands of e-mail addresses. We had staff doing industry seminars.

We were all over Facebook and Twitter, radio interviews were conducted throughout the year, and we produced a large amount of just hand-out material that we were giving to folks that were working through the APAIS program, as well as the tackle shops and other places of interest, state parks and places where people were going to be engaging and fishing to kind of get the word out that the rule was going to change for next year.

Moving on to enforcement and compliance, our Natural Resources Police Office in Maryland conducted saturation patrols over the summer. Those saturation patrols were mostly focused on the charterboat fishing activity; and the report from NRP was that it was nearly 100 percent compliance with the use of circle hooks during those patrols.

Field Officers also reported at the end of the season that they had no real issues throughout the year. It wasn't quantified in any way; but reports through their superiors indicated that they did not have a problem with compliance for the use of circle hooks when chumming and live-lining in 2018. Through the ACCSP program and our APAIS program, we also were able to acquire some information throughout the year.

We had 872 anglers, provided answers to extra questions that we asked as a part of that program. We worked with the folks at MRIP and through ACCSP to develop a technique; so that extra questions that you ask were asked, they were not added to the federal form, and we made sure staff weren't slowing down the acquiring angler interviews.

When things were a little slow and people had a little extra time at the end of the interview, we had staff asking additional questions about the use of circle hooks in your fishing activity. Four hundred of those 872 anglers were not chumming or live-lining or using bait; so they were using some form of an artificial lure.

Those individuals for the remaining anglers that were chumming, we had 94 percent compliance rate based on their answers. Live-liners had a 97 compliance rate based on the answers that they gave during this interview. Others that used baited hooks, 30 percent were using circle hooks, but they were not chumming and live-lining.

Because of that J hook requirement we were just assuming that the rest of those anglers were using J hooks. The numbers and more detail about those interviews you can certainly find in your report. Here is the last thing I want to go over with you. What we did was we did an updated.

Our original proposal had an analysis; and that analysis indicated that there were going to be no additional removals as part of the program. We were going to be converting dead discards into harvest; and overall the total removals were going to be around zero, with a range which was all part of the calculation. In order to do that we had to make some assumptions based on the use of artificial lures and bait throughout the waves from Waves 3 through 6. On the left hand side of that table you'll see what our guess was. We guessed that in Wave 3, 42 percent of individuals would be using artificial, and 58 percent of anglers would be using bait. Based on the information we were able to obtain from the APAIS program, the actual values are on the updated side.

In Wave 3 we guessed 42, we determined 41. We guessed 58, and we determined 59. You can see that table as you go down. That was

the one that was right on point; but we were close. However, we wanted to go back to the original analysis, and rerun the analysis with the updated values. We also had to update the proportion of bait anglers using circle hooks. Our original proposal assumed 100 percent; because we had started the program and started the rulemaking process expecting not to allow for J hooks at all with the use of bait.

Because we did not go forward like that we had to change our proportion to reflect that change in our rules. Those are the new values that went into the analysis; and I think the next slide is the last one, which shows the results. What you'll see is that under the original proposal the proportional change in dead discards was expected to be reduced by 28 percent; with a range of minus 31 to minus 24.

The updated analysis with all the new values indicated that we didn't get there. We didn't get as far as we wanted to, as far as the proportional change in dead discards. The new analysis would indicate that we reduced the dead discards by 12 percent, with a range of reduction of 14 to 10. As you read across the table, we get to total removals. This was a large portion of our analysis.

You know we came to the Board and said, you know there is a range of total removals being minus 8 percent, or it could be anywhere from minus 8 to 7 percent increase in total removals as part of our original analysis, with an average of zero. What the update in analysis would indicate is that we now have a new range anywhere from minus 1 to 13 percent increase in total removals, with the average being 6.

Looking at that I think that since that 6 percent increase in our updated analysis falls within the range that was presented in the original analysis, I would say that we got as close as we could with our program. With that said, we felt that the program was successful. We have rules in place to continue with this program for 2019.

It will start on May 15, and carry on through December 15. That regulation has a sunset provision; which would require us to go back and resubmit new rules for the future. Our expectation right now is to continue on in 2019; as I'm discussing here with you. Unless I can think of something else that comes up through maybe a question that is all I have. Maybe one more slide, yes that's it. I'll take any questions, Mr. Chairman.

CHAIRMAN ARMSTRONG: Per the motion this was an informational presentation. It doesn't have an action associated with it; as always if the discussion leads to an actionable thing or whatever, so discussion or questions. Ritchie.

MR. WHITE: Questions for Max. Could you read the language that the Technical Committee reviewed, and what the Board passed for the conservation equivalency, and how that compares to what was implemented?

MR. APPELMAN: Read the language from the motion that the Board passed for the conservation equivalency measures?

MR. WHITE: The proposal that the Technical Committee reviewed and then the motion that was passed.

MR. APPELMAN: You'll have to give me a second to look that up. Thank you, Jess. That is the motion that was approved by the Board at the February, 2018 meeting, if I'm correct. I see you're reading it. Do you want me to read it?

MR. WHITE: Follow up. The Technical Committee did not review including J hooks for bait fishing; would that be correct?

MR. APPELMAN: Correct.

MR. WHITE: We don't know whether the Technical Committee I believe told us they couldn't say whether this met the

conservation equivalency or did not. I believe that was the report; if I'm not wrong. If that is correct then adding J hooks to bait fishing, could that have changed the Technical Committee's response?

MR. APPELMAN: I'll try to remind the Board of the debate that took place in February. Let me back up and say that I believe the recommendation from the Technical Committee is they did not endorse any of the measures that were proposed in that conservation equivalency proposal; primarily because they couldn't figure out that baseline for conservation equivalency, due to the measures that are listed in Addendum IV, specifically that there is no base measure in Addendum IV for the Chesapeake Bay fisheries.

It is simply to achieve a particular reduction from 2013 levels. I would have to look back. The point is that there was no default measure to compare these changes to. It was more of a reduction that had to be implemented through Addendum IV. There is a lot there, but does that clarify?

CHAIRMAN ARMSTRONG: Chris then Loren.

MR. CHRIS BATSAVAGE: Thanks for the report, Mike. Mike, in your presentation it showed that 30 percent of the anglers using natural bait were using circle hooks. Were you able to figure out from those surveys what those anglers were targeting; since it was the APAIS surveyors? I didn't see it in the report right away. I didn't know if that information was available.

MR. LUISI: Because we, no, the answer is no. Some of the reasoning behind that had to do with the actual federal survey itself and the responses that we got from people that were out just fishing. Staff told me that they could only provide this level of detail; and so that 30 percent that is in the report, so of 390 anglers, 119 reported using circle hooks. The others were expected to be using baited hooks. There is really no way to break that down into any other level.

CHAIRMAN ARMSTRONG: Loren.

MR. LOREN W. LUSTIG: Thank you Mike for a very interesting report, I really appreciate it. You had mentioned that the Maryland DNR Police had analyzed only those charterboats, and not private recreational boats for the data, is that correct?

MR. LUISI: That is close to correct. During these patrols where they left both sides of the Bay and kind of hit the fleet all at once so people couldn't leave, most of the boats fishing those days were charterboats. However, there were recreational boats also inspected; but it was much fewer than the charterboat fleet.

MR. LUSTIG: Just a follow up. Certainly when you approach a hundred percent compliance that is very gratifying. I would love to see what the data would show if your officers had a chance perhaps this summer to analyze more thoroughly private boats. That would be very interesting data. I would presume that a law breaker would be disinclined to submit feedback in a questionnaire. Only those who are complying with the law would do that I believe. Additional data would be very helpful, and I do thank you.

MR. LUISI: Yes as I mentioned, the plan is to continue with this in 2019, and expand upon it. One of the things we would like to expand upon is the distribution of circle hooks throughout the interactions that we have during our outreach and education campaign; as well as continuing to work with NRP to get feedback from them from the field. That is all part of what we expect, information we'll expect this year.

CHAIRMAN ARMSTRONG: Pat.

MR. KELIHER: I feel like there was an agreement to do one thing and something else was done here. They did not meet the intent; and did not meet the intent of what

the original proposal was, which is troubling to me. I'm not sure where to go from here, if they are only really affecting about 50 percent of where they were supposed to be going.

They're not in compliance with what we agreed to. I don't want to pick on Maryland; because I thought this was a good thing that they were doing. I still applaud that they're moving in the direction of using circle hooks. But it seems to me if we're going to do it you've got to go all the way.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: I appreciate the concern. We, I, those of us at the Department also talked about this a lot as we went forward. I know that I've mentioned this to the Board before. The chumming and live-lining fleet was the focus of our attention. That was where we wanted the action to happen. We can't specify to the species level; if you're fishing for striped bass. We don't have the authority to do that so we tried to craft it in the best way we could; knowing that we would get an enormous number of anglers who participate through the portion of the year to catch striped bass in Maryland's Chesapeake Bay. You're likely going to be chumming and live-lining. Bait fishing, there are a lot of other things that people are bait fishing for, and they're not overlapped.

We felt like we really accomplished what our attempt was; which was to get on the chumming and the live-lining fleet, and make the requirement for circle hooks. If we were to try to do, and I understand the concern, we said one thing and we modified that as we promulgated regulations.

We were going to lose the entire package. It wasn't going to happen in time. We weren't going to get it in place for the time period when we needed it; and we felt that the conservation effort that we would accomplish by modifying it so that the rule would go into place by May, was the tradeoff that we felt was needed. We still feel that we were successful in that attempt.

CHAIRMAN ARMSTRONG: Adam.

MR. ADAM NOWALSKY: I think we need as a Board to think about what it was we were asking Maryland to achieve; and that was a conservationally-equivalent proposal. I understand the concern that there is a line here that says required when fishing with bait, and Maryland had to deviate slightly.

But, at some point in time we've got to step back and think about the gains of what we achieved. The mass educational outreach of discards and the harm of them, the extreme level of compliance that we were able to achieve in Maryland and fishermen, greater than 90 percent compliance with those, and despite all that at the end of the day using recreational data and analysis, which we know are fraught with all kinds of concerns.

The proposal still landed in the bounds of a 0 percent increase. I think the state should be applauded. I think it is fine to sit here and think about okay, what can we recommend to Maryland to continue to approve it? But I hope we don't lose sight of the bigger pictures with this issue, and in similar issues the states may bring forward.

CHAIRMAN ARMSTRONG: Further discussion, actions, motions. Eric.

MR. ERIC REID: Yes, I guess everybody in Maryland should go buy lottery tickets; because they got lucky on this one. That's the way it worked out. Pat, I appreciate your comments; and I'm right with you. I appreciate Adam's comments, so he accomplished the task more or less. But the reality of it is if the numbers were different, or perhaps maybe the survey was conducted differently, we may be looking at a different set of results, in which case the conversation would be totally different.

I don't know if you improve your tackle shop

sales for circle hooks, and it's more convenient for you to do more surveys with full questions, and you get more private anglers to actually fill out a survey they are required to do. Then you find out a little bit more about it. We might be having a different conversation maybe this time next year. But you got lucky that's it. It's good for the resource, but necessarily good for the long term.

CHAIRMAN ARMSTRONG: Further conversation. Mike, would it be your intent to present again next year with the 2019 data?

MR. LUISI: I don't see anything in that motion that would ask me to do that. I'm making light of it. I don't plan to. We're going to have to review this anyway; and I think that we're onboard with what we talked about for two and a half hours earlier today. I think that we're going to all find ourselves having to do something for the future; especially in the recreational fishery.

Changing our program right now would not be a good thing mid-season. It wouldn't be effective until August, probably. Our intent is to go forward, work with this Board on future management issues that arise through this benchmark assessment and analysis.

**TECHNICAL COMMITTEE REPORT OF CHANGES TO VIRGINIA'S STRIPED BASS MONITORING PROGRAM**

CHAIRMAN ARMSTRONG: All right, enough. Next item is to Review Changes to Virginia's Striped Bass Monitoring Program. Nicole.

MS. LENGYEL: Today I'll be presenting a Technical Committee report on Changes to Virginia's Striped Bass Monitoring and Tagging Programs. I'll start off by giving some background information, review the rationale for the program changes, and then present what those changes were and the comments provided by the Technical Committee.

The Virginia programs began in 1992; and they have been primarily conducted on the Rappahannock River using commercial pound nets. They have been supplemented with fyke net and/or gill net samples from the James and York Rivers during certain periods; but the only long term consistent sampling is from the Rappahannock pound nets.

There were a few things that led to Virginia implementing these changes in 2018; one was that the Virginia pound net data was previously used as an abundance index in the assessment, and it was dropped from the benchmark stock assessment in 2018, due to some concerns about the survey. Recent staffing changes in Virginia, as well as funding reductions in Virginia, were the other reasons for these changes in 2018.

The changes implemented were pound net sampling was completely replaced with multi panel anchored gill net sampling. Tagging was conducted through electrofishing, and sampling and tagging in both the James and Rappahannock Rivers was done, and both programs were deemed successful in 2018, in terms of establishing protocols and the number of specimens sampled and tagged.

As Amendment 6 requires, all spawning stock survey changes to be reviewed and approved by the Technical Committee. The TC reviewed the changes via conference call on January 10. They unanimously approved all of the program changes. The TC did have a few comments on the proposed changes; specifically that reducing the soak time may reduce unnecessarily high sample sizes and gear saturation. That the program only samples the Rappahannock and James Rivers, not the York, so it is missing information on one of the spawning grounds.

This was because the FMP only specifies that the Rappahannock and James Rivers are to be sampled. The monitoring program requirements listed in the fishery management plan may not support the future data and assessment needs. The Technical Committee is recommending that the Board consider changes to the FMP to update and

improve those requirements, in consultation with the Technical Committee, and I'll take any questions.

CHAIRMAN ARMSTRONG: Questions for Nicole. I have one, the last item. Will we be getting a report or a letter regarding things you would like to see updated for monitoring?

MS. LENGYEL: I think what the Technical Committee was expecting was just a charge from the Board to revisit those program requirements; and then we're hoping that once the Peer Review Report comes out, some of the elements that are needed for future assessment and future development, specifically of the two-stock model will be in that report, and we can inform the Board as to some changes for the program requirements.

CHAIRMAN ARMSTRONG: Those requirements, would that have to be an amendment or an addendum, an addendum okay. We should keep that in mind as we move forward that this may be an item that we need to include. Rob, while you've got your hand up. The Commonwealth has the resources to continue with the new monitoring?

MR. O'REILLY: Yes, and I would like to make just a couple of comments in that if you go back in time, maybe the 1940s, 1950s, the Rappahannock was sort of the area with the most abundance for striped bass. I think for that reason, when VIMS, which has been doing this work really since 1990, and I followed every year.

Eventually there were spatial problems with the tagging. There were not pound nets in the James River. The York River pound nets disappeared, probably in the early 2000s. But it was the reliance on the pound nets which was the downfall. I think what is offered now is a really good program.

It's taking advantage of different techniques, not new techniques. The electrofishing is used elsewhere, the variable mesh gill net, which Maryland has had a successful spawning stock survey for years is something to look forward to. I think that Nicole putting up the idea of 2018 dropping the pound net index; that really started in 2005.

It's been some trials and errors. I think now looking forward for the future, we can keep supporting it. We have supported it. We do support it through Wallop-Breaux Funding. That was what was indicated by Nicole with the comment about funding issues. But the way that VIMS is situated, they also have ChesMMAP, and so there is the same investigators working on striped bass, and they have more of a compartmentalized approach, rather than having different sectors of VIMS doing different things.

I'm really, really pleased at what has happened, and I think the Board will too as we go in the future, because there have been very few occasions where either the spawning stock information was able to be used, and the tagging information after a certain amount of years. It also suffered from spatial constraints of getting the tagging. Thank you for the time, and I think this will be good.

CHAIRMAN ARMSTRONG: Any questions for Rob or Nicole? Rob, would you like to make a motion?

**MR. O'REILLY: I would. I would move that the Board consider the changes that have been made to Virginia's two monitoring programs be approved, both for the Spawning Stock Survey, and for the Tagging Program**; if you want to shorten that that's okay.

CHAIRMAN ARMSTRONG: Is there a second, John Clark second, discussion. All right we'll wait until it's up on the board. I need to read it first. I haven't read one yet today. **The motion is: move to approve changes to Virginia's Striped Bass Monitoring Program, seconded by John Clark. I'm going to go out**

**on a limb and say is this approved by consensus. Is anyone opposed? So approved.**

**OTHER BUSINESS:**
**UPDATE ON THE STRIPED BASS COOPERATIVE TAGGING PROGRAM**

CHAIRMAN ARMSTRONG: Next up is Update on the Tagging Program, Toni.

MS. KERNS: We have conducted 10 out of the 13 tagging trips through the Cooperative Striped Bass Hook and Line Tagging Trips, and unfortunately this year we have not been as successful as we have been in years past. I believe we have tagged 50 fish in total. In some cases Captain Ryan is doing an excellent job, and they're finding fish. But the fish just don't seem to be biting.

There have been, I think a couple of days where when the weather shifted they weren't able to locate the fish as well. We have three more trips left; so we're hoping that we will have some bang up days on those days, and get a bunch of fish tagged. I just wanted to thank North Carolina.

Greg Reger stepped in and did a lot of the tagging, and led the trips when the Federal Government shut down. He has been a wonderful help, since Josh Newhard hadn't been working, since he is an employee of the Fish and Wildlife Service. Thank you to North Carolina for giving us Greg.

CHAIRMAN ARMSTRONG: Bob.

EXECUTIVE DIRECTOR ROBERT E. BEAL: I've got one other introduction that I should have done at the very outset of the beginning; and I apologize for not doing that. If you notice in the Pennsylvania delegation there is a new face between Loren and Andy; and that's Tim Schaeffer.

Tim was recently appointed as the Executive Director of the Pennsylvania Fish and Boat Commission. He's technically our Administrative Commissioner, and Andy is his proxy at the Commission. But Tim came by just to observe the meeting for a couple days, and feel free to reach out and say hello to Tim in your downtime between meetings. Welcome, Tim. We're glad you're here (applause).

CHAIRMAN ARMSTRONG: Welcome, Tim. Are there any questions for Toni regarding the tagging program? Seeing none; any business before this Board? Yes, Ray.

MR. RAYMOND W. KANE: Yes it's a question to the Technical Committee, the Assessment Committee. We've seen a lot of graphs and charts, and probably I'm going to be told there is no way it can be done. But this Commission went through a painstaking a while back about a tagging program, which was implemented coastwise. Does anybody remember the numbers of fish that were poached that drove this Commission to a tagging program; you know at point of sale?

How would that reflect in these retrospective graphs that you put up, you know in layman's terms? Is there any way of looking at the number of poached fish; and where the biomass would be today if you didn't have, what were the numbers two or three million pounds of fish in that sting operation? This goes back a few years ago, but just a question.

MR. CELESTINO: I'll try. I'm not familiar with those numbers. But your point about the retrospective is a good one. The sort of classical ideas about what's driving retrospective is missing catch, change in natural mortality, or change in catchability over time. If we were missing catch, my understanding from work at the Northeast Science Center is that we would actually see the opposite retrospective pattern. We would see increases in SSB over time, and we see the opposite. It's hard to say. I don't have a great answer for you I'm sorry to say.

MR. KANE: Thank you.

**ADJOURNMENT**

CHAIRMAN ARMSTRONG: Other business. Seeing none; we are adjourned.

(Whereupon the meeting adjourned at 5:16 o'clock p.m. on February 6, 2019)

# 66th Northeast Regional Stock Assessment Workshop (66th SAW)

## *Assessment Summary Report*

**U.S DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
**National Marine Fisheries Service**
**Northeast Fisheries Science Center**
**Woods Hole, Massachusetts**

**February 8, 2019**

# Table of Contents

# SAW-66 ASSESSMENT SUMMARY REPORT

## Introduction

The 66th SAW Assessment Summary Report contains summary and detailed technical information on stock assessments reviewed during November 27-30, 2018 at the Stock Assessment Workshop (SAW) by the 66th Stock Assessment Review Committee (SARC-66): Summer flounder and Striped bass. The SARC-66 consisted of three external, independent reviewers appointed by the Center for Independent Experts [CIE], and an external SARC chairman from the MAFMC SSC. The SARC evaluated whether each Term of Reference (listed in the Appendix) was completed successfully based on whether the work provided a scientifically credible basis for developing fishery management advice. The reviewers' reports for SAW/SARC-66 are available on the Northeast Fisheries Science Center SAW website under the heading "SARC 66 Panelist Reports."

An important aspect of any assessment is the determination of current stock status. The status of the stock relates to both the rate of removal of fish from the population – the exploitation rate – and the current stock size. The exploitation rate is the proportion of the stock alive at the beginning of the year that is caught during the year. When that proportion exceeds the amount specified in an overfishing definition, overfishing is occurring. Fishery removal rates are usually expressed in terms of the instantaneous fishing mortality rate, F, and the maximum removal rate is denoted as $F_{THRESHOLD}$.

Another important factor for classifying the status of a resource is the current stock level, for example, spawning stock biomass (SSB) or total stock biomass (TSB). Overfishing definitions, therefore, characteristically include specification of a minimum biomass threshold as well as a maximum fishing threshold. If the biomass of a stock falls below the biomass threshold ($B_{THRESHOLD}$) the stock is in an overfished condition. The Sustainable Fisheries Act mandates that a stock rebuilding plan be developed should this situation arise.

As there are two dimensions to stock status – the rate of removal and the biomass level – it is possible that a stock not currently subject to overfishing in terms of exploitation rates is in an overfished condition; that is, has a biomass level less than the threshold level. This may be due to heavy exploitation in the past, or a result of other factors such as unfavorable environmental conditions. In this case, future recruitment to the stock is very important and the probability of improvement may increase greatly by increasing the stock size. Conversely, fishing down a stock that is at a high biomass level should generally increase the long-term sustainable yield. Stocks under federal jurisdiction are managed on the basis of maximum sustainable yield (MSY). The biomass that produces this yield is called $B_{MSY}$ and the fishing mortality rate that produces MSY is called $F_{MSY}$.

Given this, federally managed stocks under review are classified with respect to current overfishing definitions. A stock is overfished if its current biomass is below $B_{THRESHOLD}$ and overfishing is occurring if current F is greater than $F_{THRESHOLD}$. The table below depicts status criteria.

| | | BIOMASS | | |
|---|---|---|---|---|
| | | $B < B_{THRESHOLD}$ | $B_{THRESHOLD} < B < B_{MSY}$ | $B > B_{MSY}$ |
| **EXPLOITATION RATE** | $F > F_{THRESHOLD}$ | Overfished, overfishing is occurring; reduce F, adopt and follow rebuilding plan | Not overfished, overfishing is occurring; reduce F, rebuild stock | $F = F_{TARGET} <= F_{MSY}$ |
| | $F < F_{THRESHOLD}$ | Overfished, overfishing is not occurring; adopt and follow rebuilding plan | Not overfished, overfishing is not occurring; rebuild stock | $F = F_{TARGET} <= F_{MSY}$ |

Fisheries management may take into account scientific and management uncertainty, and overfishing guidelines often include a control rule in the overfishing definition. Generically, the control rules suggest actions at various levels of stock biomass and incorporate an assessment of risk, in that F targets are set so as to avoid exceeding F thresholds.

**Outcome of Stock Assessment Review Meeting**

Text in this section is based on SARC-66 Review Panel reports (available on the Northeast Fisheries Science Center SAW website under the heading "SARC-66 Panelist Reports").

SARC-66 concluded that the summer flounder stock is neither overfished nor did it experience overfishing in 2017. The Panel concluded that the SAW WG had reasonably and satisfactorily completed its tasks. Estimates of recreational catch came from newly calibrated MRIP time-series that reflected a revision of both the intercept and effort surveys. The Bigelow indices take account of trawl efficiency estimates at length from 'sweep-study' experiments. No factor was identified as strongly influencing the spatial shift in spawner biomass or the level of recruitment. The assessment shows that current mortality from all sources is greater than recent recruitment inputs to the stock, which has resulted in a declining stock trend.

SARC-66 concluded that the striped bass stock is overfished and experienced overfishing in 2017. The SARC Panel accepted the single stock, non-migration SCA model for management, and concluded that all ToRs were met for that model In addition, the Panel reviewed a new two stock model developed by the SAW WG. This model represents an innovative advance and the SARC panel recommends continued development and refinement for possible use in the future.

## Glossary

**ADAPT**. A commonly used form of computer program used to optimally fit a Virtual Population Assessment (VPA) to abundance data.

**ASAP**. The Age Structured Assessment Program is an age-structured model that uses forward computations assuming separability of fishing mortality into year and age components to estimate population sizes given observed catches, catch-at-age, and indices of abundance. Discards can be treated explicitly. The separability assumption is relaxed by allowing for fleet-specific computations and by allowing the selectivity at age to change smoothly over time or in blocks of years. The software can also allow the catchability associated with each abundance index to vary smoothly with time. The problem's dimensions (number of ages, years, fleets and abundance indices) are defined at input and limited by hardware only. The input is arranged assuming data is available for most years, but missing years are allowed. The model currently does not allow use of length data nor indices of survival rates. Diagnostics include index fits, residuals in catch and catch-at-age, and effective sample size calculations. Weights are input for different components of the objective function and allow for relatively simple age-structured production model type models up to fully parameterized models.

**ASPM**. Age-structured production models, also known as statistical catch-at-age (SCAA) models, are a technique of stock assessment that integrate fishery catch and fishery-independent sampling information. The procedures are flexible, allowing for uncertainty in the absolute magnitudes of catches as part of the estimation. Unlike virtual population analysis (VPA) that tracks the cumulative catches of various year classes as they age, ASPM is a forward projection simulation of the exploited population. ASPM is similar to the NOAA Fishery Toolbox applications ASAP (Age Structured Assessment Program) and SS2 (Stock Synthesis 2).

**Availability**. Refers to the distribution of fish of different ages or sizes relative to that taken in the fishery.

**Biological reference points**. Specific values for the variables that describe the state of a fishery system which are used to evaluate its status. Reference points are most often specified in terms of fishing mortality rate and/or spawning stock biomass. The reference points may indicate 1) a desired state of the fishery, such as a fishing mortality rate that will achieve a high level of sustainable yield, or 2) a state of the fishery that should be avoided, such as a high fishing mortality rate which risks a stock collapse and long-term loss of potential yield. The former type of reference points are referred to as "target reference points" and the latter are referred to as "limit reference points" or "thresholds." Some common examples of reference points are $F_{0.1}$, $F_{MAX}$, and $F_{MSY}$, which are defined later in this glossary.

**$B_0$**. Virgin stock biomass, i.e., the long-term average biomass value expected in the absence of fishing mortality.

**$B_{MSY}$**. Long-term average biomass that would be achieved if fishing at a constant fishing mortality rate equal to $F_{MSY}$.

**Biomass Dynamics Model**. A simple stock assessment model that tracks changes in stock using assumptions about growth and can be tuned to abundance data such as commercial catch rates, research survey trends or biomass estimates.

**Catchability**. Proportion of the stock removed by one unit of effective fishing effort (typically age-specific due to

differences in selectivity and availability by age).

**Control Rule**. Describes a plan for pre-agreed management actions as a function of variables related to the status of the stock. For example, a control rule can specify how F or yield should vary with biomass. In the National Standard Guidelines (NSG), the "MSY control rule" is used to determine the limit fishing mortality, or Maximum Fishing Mortality Threshold (MFMT). Control rules are also known as "decision rules" or "harvest control laws."

**Catch per Unit of Effort (CPUE)**. Measures the relative success of fishing operations, but also can be used as a proxy for relative abundance based on the assumption that CPUE is linearly related to stock size. The use of CPUE that has not been properly standardized for temporal-spatial changes in catchability should be avoided.

**Exploitation pattern**. The fishing mortality on each age (or group of adjacent ages) of a stock relative to the highest mortality on any age. The exploitation pattern is expressed as a series of values ranging from 0.0 to 1.0. The pattern is referred to as "flat-topped" when the values for all the oldest ages are about 1.0, and "dome-shaped" when the values for some intermediate ages are about 1.0 and those for the oldest ages are significantly lower. This pattern often varies by type of fishing gear, area, and seasonal distribution of fishing, and the growth and migration of the fish. The pattern can be changed by modifications to fishing gear, for example, increasing mesh or hook size, or by changing the proportion of harvest by gear type.

**Mortality rates**. Populations of animals decline exponentially. This means that the number of animals that die in an "instant" is at all times proportional to the number present. The decline is defined by survival curves such as: $N_{t+1} = N_t e^{-z}$ where $N_t$ is the number of animals in the population at time t and $N_{t+1}$ is the number present in the next time period; Z is the total instantaneous mortality rate which can be separated into deaths due to fishing (fishing mortality or F) and deaths due to all other causes (natural mortality or M) and e is the base of the natural logarithm (2.71828). To better understand the concept of an instantaneous mortality rate, consider the following example. Suppose the instantaneous total mortality rate is 2 (i.e., Z = 2) and we want to know how many animals out of an initial population of 1 million fish will be alive at the end of one year. If the year is apportioned into 365 days (that is, the 'instant' of time is one day), then 2/365 or 0.548% of the population will die each day. On the first day of the year, 5,480 fish will die (1,000,000 x 0.00548), leaving 994,520 alive. On day 2, another 5,450 fish die (994,520 x 0.00548) leaving 989,070 alive. At the end of the year, 134,593 fish $[1,000,000 \times (1 - 0.00548)^{365}]$ remain alive. If we had instead selected a smaller 'instant' of time, say an hour, 0.0228% of the population would have died by the end of the first time interval (an hour), leaving 135,304 fish alive at the end of the year $[1,000,000 \times (1 - 0.00228)^{8760}]$. As the instant of time becomes shorter and shorter, the exact answer to the number of animals surviving is given by the survival curve mentioned above, or, in this example:

$N_{t+1} = 1,000,000e^{-2} = 135,335$ fish

**Exploitation rate**. The proportion of a population alive at the beginning of the year that is caught during the year. That is, if 1 million fish were alive on January 1 and 200,000 were caught during the year, the exploitation rate is 0.20 (200,000 / 1,000,000) or 20%.

**$F_{MAX}$.** The rate of fishing mortality that produces the maximum level of yield per

recruit. This is the point beyond which growth overfishing begins.

**$F_{0.1}$**. The fishing mortality rate where the increase in yield per recruit for an increase in a unit of effort is only 10% of the yield per recruit produced by the first unit of effort on the unexploited stock (i.e., the slope of the yield-per-recruit curve for the $F_{0.1}$ rate is only one-tenth the slope of the curve at its origin).

**$F_{10\%}$**. The fishing mortality rate which reduces the spawning stock biomass per recruit (SSB/R) to 10% of the amount present in the absence of fishing. More generally, Fx%, is the fishing mortality rate that reduces the SSB/R to x% of the level that would exist in the absence of fishing.

**$F_{MSY}$**. The fishing mortality rate that produces the maximum sustainable yield.

**Fishery Management Plan (FMP)**. Plan containing conservation and management measures for fishery resources, and other provisions required by the MSFCMA, developed by Fishery Management Councils or the Secretary of Commerce.

**Generation Time**. In the context of the National Standard Guidelines, generation time is a measure of the time required for a female to produce a reproductively-active female offspring for use in setting maximum allowable rebuilding time periods.

**Growth overfishing**. The situation existing when the rate of fishing mortality is above $F_{MAX}$ and when fish are harvested before they reach their growth potential.

**Limit Reference Points**. Benchmarks used to indicate when harvests should be constrained substantially so that the stock remains within safe biological limits. The probability of exceeding limits should be low. In the National Standard Guidelines, limits are referred to as thresholds. In much of the international literature (e.g., FAO documents), "thresholds" are used as buffer points that signal when a limit is being approached.

**Landings per Unit of Effort (LPUE)**. Analogous to CPUE and measures the relative success of fishing operations, but is also sometimes used a proxy for relative abundance based on the assumption that CPUE is linearly related to stock size.

**MSFCMA**. Magnuson-Stevens Fishery Conservation and Management Act. U.S. Public Law 94-265, as amended through October 11, 1996. Available as NOAA Technical Memorandum NMFS-F/SPO-23, 1996.

**Maximum Fishing Mortality Threshold (MFMT, $F_{THRESHOLD}$)**. One of the Status Determination Criteria (SDC) for determining if overfishing is occurring. It will usually be equivalent to the F corresponding to the MSY Control Rule. If current fishing mortality rates are above $F_{THRESHOLD}$, overfishing is occurring.

**Minimum Stock Size Threshold (MSST, $B_{THRESHOLD}$)**. Another of the Status Determination Criteria. The greater of (a) $\frac{1}{2}B_{MSY}$, or (b) the minimum stock size at which rebuilding to $B_{MSY}$ will occur within 10 years of fishing at the MFMT. MSST should be measured in terms of spawning biomass or other appropriate measures of productive capacity. If current stock size is below $B_{THRESHOLD}$, the stock is overfished.

**Maximum Spawning Potential (MSP)**. This type of reference point is used in some fishery management plans to define overfishing. The MSP is the spawning stock biomass per recruit (SSB/R) when fishing mortality is zero. The degree to which fishing reduces the SSB/R is expressed as a percentage of the MSP (i.e., %MSP). A stock is considered overfished when the fishery reduces the %MSP below the level specified in the overfishing definition. The values of %MSP used to define overfishing can be

derived from stock-recruitment data or chosen by analogy using available information on the level required to sustain the stock.

**Maximum Sustainable Yield (MSY)**. The largest average catch that can be taken from a stock under existing environmental conditions.

**Overfishing**. According to the National Standard Guidelines, "overfishing occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis." Overfishing is occurring if the MFMT is exceeded for 1 year or more.

**Optimum Yield (OY)**. The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems. MSY constitutes a "ceiling" for OY. OY may be lower than MSY, depending on relevant economic, social, or ecological factors. In the case of an overfished fishery, OY should provide for rebuilding to $B_{MSY}$.

**Partial Recruitment**. Patterns of relative vulnerability of fish of different sizes or ages due to the combined effects of selectivity and availability.

**Rebuilding Plan**. A plan that must be designed to recover stocks to the $B_{MSY}$ level within 10 years when they are overfished (i.e. when B < MSST). Normally, the 10 years would refer to an expected time to rebuild in a probabilistic sense.

**Recruitment**. This is the number of young fish that survive (from birth) to a specific age or grow to a specific size. The specific age or size at which recruitment is measured may correspond to when the young fish become vulnerable to capture in a fishery or when the number of fish in a cohort can be reliably estimated by a stock assessment.

**Recruitment overfishing**. The situation existing when the fishing mortality rate is so high as to cause a reduction in spawning stock which causes recruitment to become impaired.

**Recruitment per spawning stock biomass (R/SSB)**. The number of fishery recruits (usually age 1 or 2) produced from a given weight of spawners, usually expressed as numbers of recruits per kilogram of mature fish in the stock. This ratio can be computed for each year class and is often used as an index of pre-recruit survival, since a high R/SSB ratio in one year indicates above-average numbers resulting from a given spawning biomass for a particular year class, and vice versa.

**Reference Points**. Values of parameters (e.g. $B_{MSY}$, $F_{MSY}$, $F_{0.1}$) that are useful benchmarks for guiding management decisions. Biological reference points are typically limits that should not be exceeded with significant probability (e.g., MSST) or targets for management (e.g., OY).

**Risk**. The probability of an event times the cost associated with the event (loss function). Sometimes "risk" is simply used to denote the probability of an undesirable result (e.g. the risk of biomass falling below MSST).

**Status Determination Criteria (SDC)**. Objective and measurable criteria used to determine if a stock is being overfished or is in an overfished state according to the National Standard Guidelines.

**Selectivity**. Measures the relative vulnerability of different age (size) classes to the fishing gears(s).

**Spawning Stock Biomass (SSB)**. The total weight of all sexually mature fish in a stock.

**Spawning stock biomass per recruit (SSB/R or SBR)**. The expected lifetime

contribution to the spawning stock biomass for each recruit. SSB/R is calculated assuming that F is constant over the life span of a year class. The calculated value is also dependent on the exploitation pattern and rates of growth and natural mortality, all of which are also assumed to be constant.

**Stock Synthesis (SS).** This application provides a statistical framework for calibration of a population dynamics model using a diversity of fishery and survey data. SS is designed to accommodate both age and size structure and with multiple stock sub-areas. Selectivity can be cast as age specific only, size-specific in the observations only, or size-specific with the ability to capture the major effect of size-specific survivorship. The overall model contains subcomponents which simulate the population dynamics of the stock and fisheries, derive the expected values for the various observed data, and quantify the magnitude of difference between observed and expected data. Parameters are sought which will maximize the goodness-of-fit. A management layer is also included in the model allowing uncertainty in estimated parameters to be propagated to the management quantities, thus facilitating a description of the risk of various possible management scenarios. The structure of SS allows for building of simple to complex models depending upon the data available.

**Survival Ratios**. Ratios of recruits to spawners (or spawning biomass) in a stock-recruitment analysis. The same as the recruitment per spawning stock biomass (R/SSB).

**TAC**. Total allowable catch is the total regulated catch from a stock in a given time period, usually a year.

**Target Reference Points**. Benchmarks used to guide management objectives for achieving a desirable outcome (e.g., OY). Target reference points should not be exceeded on average.

**Uncertainty**. Uncertainty results from a lack of perfect knowledge of many factors that affect stock assessments, estimation of reference points, and management. Rosenberg and Restrepo (1994) identify five types: measurement error (in observed quantities), process error (or natural population variability), model error (mis-specification of assumed values or model structure), estimation error (in population parameters or reference points, due to any of the preceding types of errors), and implementation error (or the inability to achieve targets exactly for whatever reason)

**Virtual Population Analysis (VPA) (or cohort analysis)**. A retrospective analysis of the catches from a given year class which provides estimates of fishing mortality and stock size at each age over its life in the fishery. This technique is used extensively in fishery assessments.

**Year class (or cohort)**. Fish born in a given year. For example, the 1987 year class of cod includes all cod born in 1987. This year class would be age 1 in 1988, age 2 in 1989, and so on.

**Yield per recruit (Y/R or YPR)**. The average expected yield in weight from a single recruit. Y/R is calculated assuming that F is constant over the life span of a year class. The calculated value is also dependent on the exploitation pattern, rate of growth, and natural mortality rate, all of which are assumed to be constant.

**Figures**

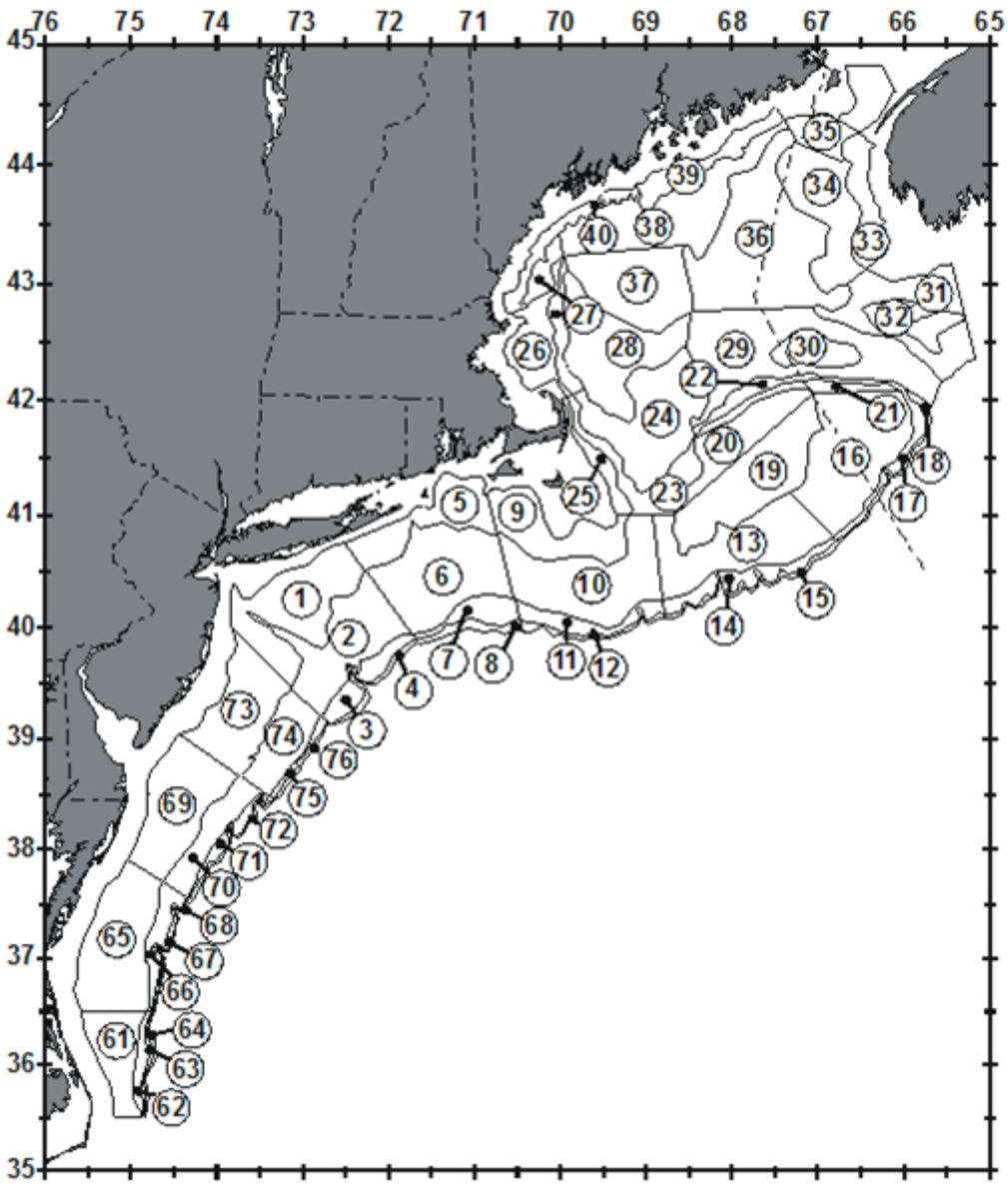



Figure 1. Offshore depth strata sampled during Northeast Fisheries Science Center bottom trawl research surveys. Some of these may not be sampled presently.

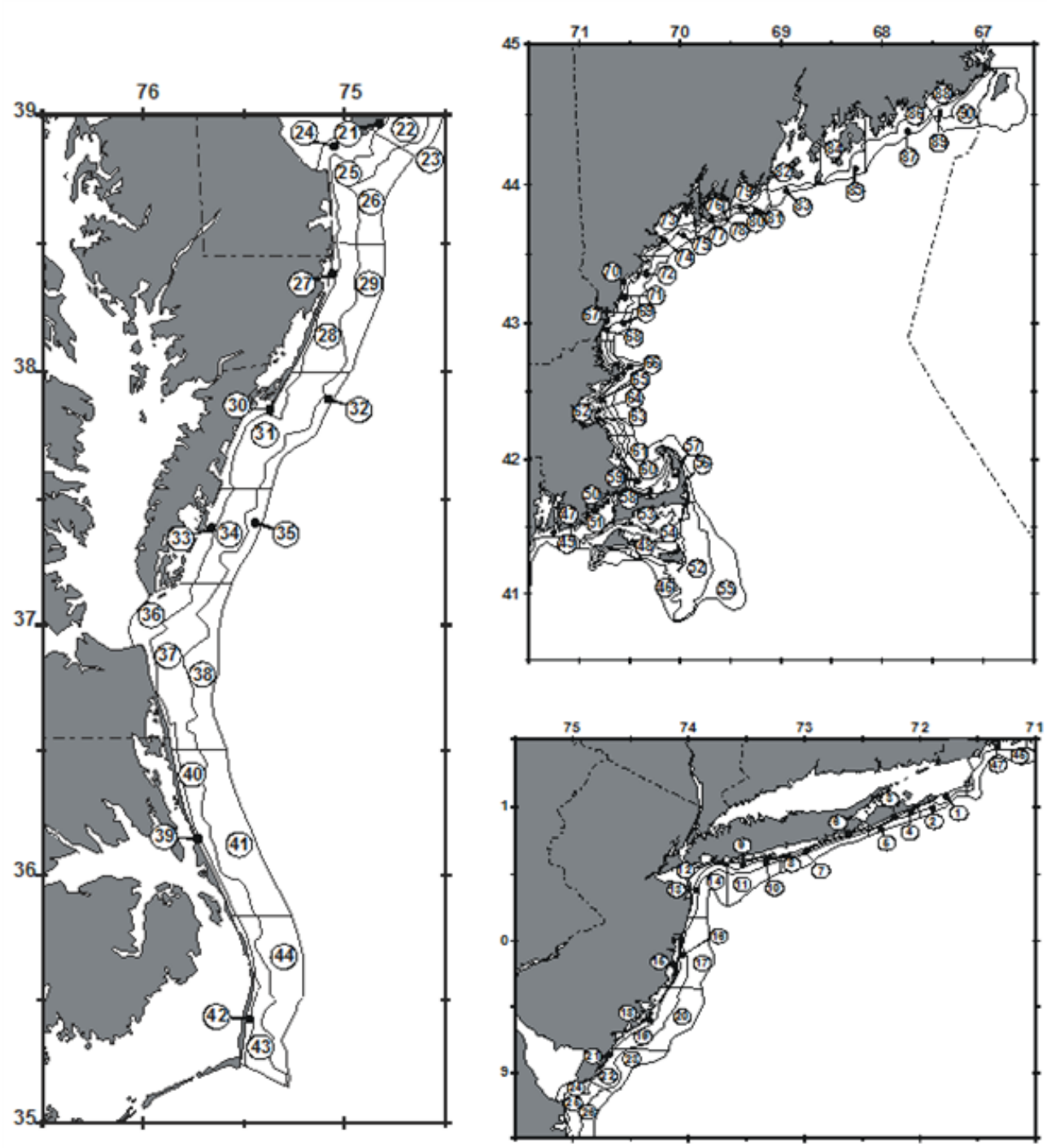
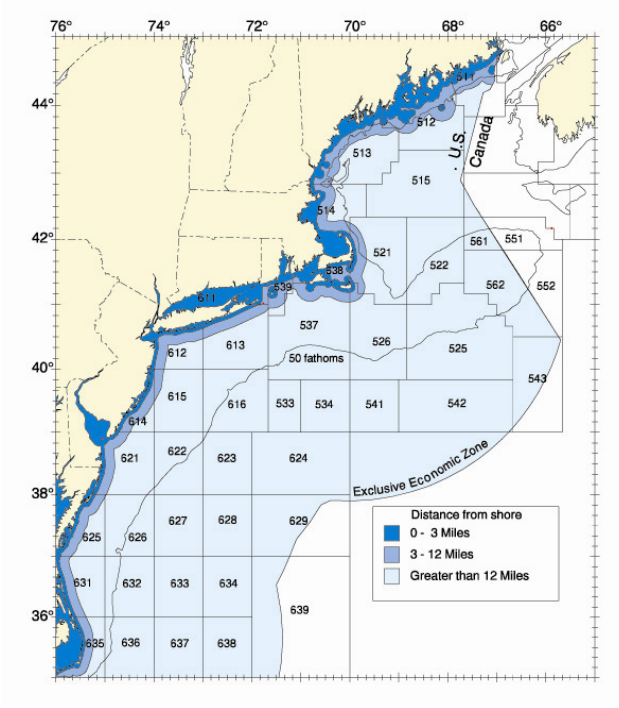



Figure 2. Inshore depth strata sampled during Northeast Fisheries Science Center bottom trawl research surveys. Some of these may not be sampled presently.



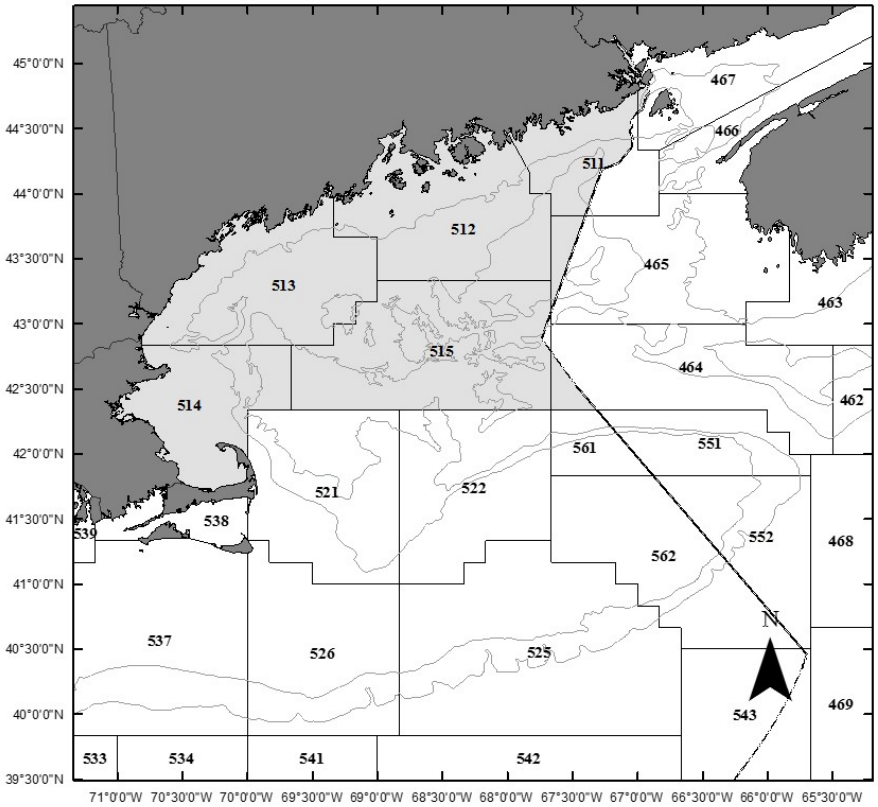




Figure 3. Statistical areas used for reporting commercial catches.

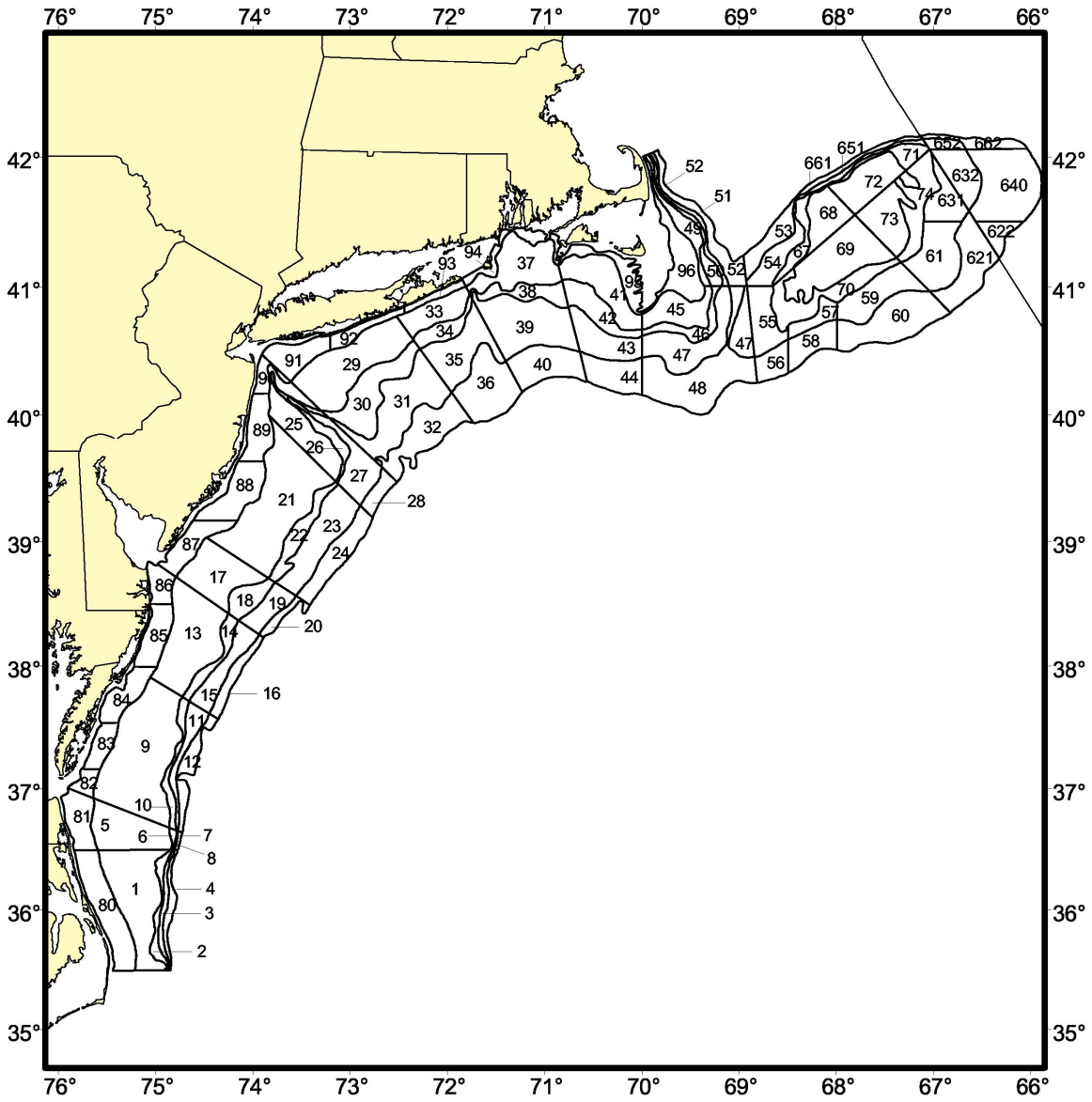



Figure 4. Northeast Fisheries Science Center shellfish resource survey strata, along the east coast of the US.

## B. ATLANTIC STRIPED BASS ASSESSMENT SUMMARY FOR 2018

### State of Stock

The biomass threshold for Atlantic striped bass is the estimate of female spawning stock biomass (SSB) for year 1995. The F threshold is the F value that allows the stock to achieve the SSB threshold under long-term equilibrium conditions.

Female SSB for Atlantic striped bass in 2017 was 68,476 mt, which is less than the $SSB_{threshold}$ of 91,436 mt, indicating the stock is overfished (Figure B1). $F_{2017}$ was 0.307, which is greater than the associated $F_{threshold}$ of 0.240, indicating the stock is experiencing overfishing (Figure B1).

### Projections

Stock projections of female SSB were made by using the same population dynamics equations used in the assessment model. Four scenarios of constant catch or F are provided here.

The model projection began in year 2018 and ran for a total of 6 years. A composite selectivity pattern was calculated as the geometric mean of 2013-2017 of total F-at-age, scaled to the highest F. Residuals from the stock-recruitment fit from 1982-2017 were randomly re-sampled and added to the deterministic predictions of recruitment from the hockey-stick recruitment function to produce stochastic estimates of age-1 recruitment for each year of the projection. Projections were done using: constant 2017 catch; constant 2017 F; F equal to $F_{threshold}$; and F equal the F required to achieve the 1993 estimate of female SSB in the long term. Female SSB in 1993 was lower than the SSB threshold, but was still capable of producing a very strong year class, and so fishing mortality required to achieve the 1993 estimate of female SSB was explored as a sensitivity run to understand projected population dynamics under an F in between F in 2017 and the F threshold.

Under the projection with status quo F ($F=F_{2017}$), the population trajectory remained relatively flat from 2018-2023; reducing F to $F_{threshold}$ resulted in an increasing trend in SSB (Figure B2). However, under all four scenarios, the probability of female SSB being above $SSB_{threshold}$ in 2023 was very low (Figure B3). In addition, although the probability of F being above $F_{threshold}$ declined in the constant catch scenario, there was still a 60% chance of F being above $F_{threshold}$ in 2023 (Figure B4).

## Catch and Status Table: Atlantic striped bass

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|
| Commercial landings (mt) | 3,974 | 3,584 | 3,655 | 3,557 | 3,403 | 3,069 | 2,898 | 2,504 | 2,531 | 2,450 |
| Commercial discards (mt) | 432 | 488 | 418 | 367 | 640 | 409 | 530 | 468 | 492 | 504 |
| Recreational catch† (mt) | 32,949 | 31,692 | 32,944 | 29,190 | 28,127 | 34,403 | 23,982 | 22,063 | 24,962 | 21,797 |
| Catch used in assessment (mt) | 37,355 | 35,764 | 37,016 | 33,114 | 32,170 | 37,881 | 27,409 | 25,035 | 27,985 | 24,751 |
| | | | | | | | | | | |
| Female spawning stock biomass (mt) | 106,656 | 106,094 | 106,261 | 99,768 | 98,798 | 88,864 | 78,999 | 70,858 | 73,924 | 68,476 |
| Recruitment (Millions of age 1 fish) | 129.2 | 77.5 | 104.9 | 147.9 | 214.4 | 65.4 | 92.6 | 186.9 | 239.6 | 108.8 |
| Full F | 0.241 | 0.233 | 0.273 | 0.276 | 0.272 | 0.368 | 0.283 | 0.243 | 0.278 | 0.307 |

†: MRIP 2018 calibrated landings plus 9% release mortality on fish released alive.

| | Min | Max | Mean |
|---|---|---|---|
| Commercial landings (mt) | 29 | 3,974 | 2,296 |
| Commercial discards (mt) | 24 | 1,458 | 470 |
| Recreational catch† (mt) | 1,031 | 34,403 | 18,256 |
| Catch used in assessment (mt) | 1,144 | 37,881 | 21,022 |
| | | | |
| Female spawning stock biomass (mt) | 15,369 | 113,602 | 74,920 |
| Recruitment (Millions of age 1 fish) | 37.9 | 312.2 | 140.9 |
| Full F | 0.030 | 0.368 | 0.195 |

Min, max, and mean values calculated for the assessment time series, 1982 - 2017

†: MRIP 2018 calibrated landings plus 9% release mortality on fish released alive.

| | ASMFC 2014 | | Updated (SARC 66, 2018) | |
|---|---|---|---|---|
| **Reference Point** | Definition | Value | Definition | Value |
| SSB threshold | Estimate of 1995 female SSB | 57,626 mt | Estimate of 1995 female SSB | 91,436 mt |
| SSB target | 125% SSB threshold | 72,032 mt | 125% SSB threshold | 114,295 mt |
| F threshold | F projected to achieve SSB threshold | 0.22 | F projected to achieve SSB threshold | 0.240 |
| F target | F projected to achieve SSB target | 0.18 | F projected to achieve SSB target | 0.197 |

## Stock Distribution and Identification

The Atlantic coastal striped bass management unit includes the coastal and estuarine areas of all states and jurisdictions from Maine through North Carolina. The Albemarle-Roanoke stock is currently managed as a non- migratory stock by the state of North Carolina under the auspices of ASFMC. Coastal migratory striped bass are assessed and managed as a single stock, although the population is known to be comprised of multiple biologically distinct stocks, predominantly the Chesapeake Bay stock, the Delaware Bay stock, and the Hudson River stock.

Atlantic coastal migratory striped bass live along the eastern coast of North America from the St. Lawrence River in Canada to the Roanoke River and other tributaries of Albemarle Sound in North Carolina (ASMFC 1990). Atlantic striped bass are anadromous, meaning they return to their natal rivers to spawn.

Stocks which occupy coastal rivers from the Tar-Pamlico River in North Carolina south to the St. Johns River in Florida are believed to be primarily endemic and riverine, as historical tagging data suggest they do not presently undertake extensive Atlantic Ocean migrations, as the more northern stocks do. These areas are not considered part of the coastal striped bass management unit.

## Catches

Annual commercial harvest of striped bass peaked at approximately 5,888 mt (13 million pounds) in 1973, but due to stock declines and subsequent management actions, landings decreased by 99 percent to 68 mt (151,000 pounds) in 1986 (Figure B5). Commercial landings gradually increased through the early 1990s as the stock recovered and management measures were liberalized. The quota system has kept the commercial landings relatively stable from 2004 – 2014, with average landings of 2,935 mt (6.5 million pounds). In response to the 2013 benchmark assessment, the commercial quota was reduced beginning in 2015 through Addendum IV. Landings averaged 2,133 mt (4.7 million pounds) from 2015 – 2017.

Commercial discards increased from the early 1980s to a peak of nearly 350,000 fish in 1998, and have been declining since then (Figure B5). Commercial discards averaged 105,000 fish from 2015 – 2017. Commercial landings have generally exceeded discards since the early 1990s; discards made up approximately 15% of total commercial removals coastwide from 2015 – 2017.

This assessment incorporated the newly calibrated MRIP estimates of recreational catch and length frequencies. The calibrated MRIP estimates of harvest were approximately 150% higher than uncalibrated estimates in recent years; calibrated estimates of live releases were approximately 200% higher than uncalibrated estimates (Figure B6). The calibration did not change the overall trend of the recreational catch.

Recreational harvest of striped bass increased from a low of 264,000 fish in 1984 to a high of 5.4 million fish in 2010. Harvest averaged 3.2 million fish for 2015 – 2017 (Figure B5).

The annual Atlantic coast harvest (in numbers) has been a small fraction of the total catch (harvest and releases, combined) since the 1980s because the live releases have accounted for 85 to 90% of the annual catch in most years; in 2015 – 2017, only 9% of the total catch was landed.

Recreational harvest and live releases showed different patterns after 2006, with releases declining faster initially and then increasing, and harvest staying relatively steady through 2013 before beginning to decline.

A recreational release mortality of 9% was applied to the total number of live releases to calculate the numbers of fish that died after being released alive. Recreational release mortalities increased from 79,660 fish in 1984 to a peak of 4.8 million fish in 2006 before declining through 2011 to 1.5 million fish (Figure B5). Live releases increased after that, with the number release mortalities averaging 2.9 million fish from 2015 – 2017.

Over the entire time series, about one third of the total removals (commercial landings, commercial discards, recreational landings, and recreational release mortalities combined) were taken in the Chesapeake Bay, with the rest coming from the ocean and other areas such as Delaware Bay and Long Island Sound (Figure B5). In 2017, the Chesapeake Bay accounted for 35% of total removals; from 2014-2016, it was closer to 50%.

**Data and Assessment**

The assessment used total catch (commercial landings, commercial discards, recreational landings, and recreational release mortalities) and catch-at-age from 1982-2017, split into two regions (Chesapeake Bay and the ocean/other areas). The assessment used seven fishery-independent indices of abundance for age-1+ striped bass, and one fishery-dependent index: the CT Long Island Sound trawl survey, the NJ ocean bottom trawl survey, the NY ocean haul seine survey, the MD spawning stock survey, ChesMMAP, the DE 30' trawl, the DE spawning stock electrofishing surveys, and an MRIP CPUE. Five recruitment indices for young-of-year (YOY) and age-1 fish were also used: a composite YOY index based on YOY surveys from MD and VA, a MD age-1 survey, a NY YOY survey, a NY Age-1 survey, and a NJ YOY survey. Two surveys used in the 2013 assessment were dropped due to either concerns about the design and long-term future of the survey (VA poundnet survey) or low catch rates of striped bass (NEFSC bottom trawl survey). The ChesMMAP survey was added to provide additional information on striped bass abundance in the Chesapeake Bay, and the DE 30' trawl survey was added to provide a longer time series of data on striped bass abundance in the Delaware Bay.

The SARC-66 accepted model for striped bass is a forward projecting statistical catch-at-age (SCA) model, specifically a single stock, non-migration SCA model. This SCA model estimates annual recruitment, annual full F by fleet, and selectivity parameters for indices and fleets in order to calculate abundance and female spawning stock biomass. Recruitment was estimated as deviations from mean recruitment. This model was approved for management use at SARC-57 in 2013, and several improvements to the input data were made for the 2018 assessment. In 2013, three fleets were used: a Chesapeake Bay fleet, an ocean fleet, and a commercial discard fleet. For the SARC-66 assessment in 2018, commercial discards were estimated by region, so the model used only two fleets: a Chesapeake Bay fleet and an ocean fleet. This allowed the model to better represent the regional dynamics of the fisheries and differences in selectivity patterns. In addition, proportions at age for the CT trawl survey and the MRIP CPUE were developed for the 2018 assessment based on length frequency information, so that neither of those indices had to be treated as age-aggregated indices as was done in the 2013 assessment; all age-1+ indices in the 2018 assessment had age-structure information for the model fitting.

As a complement to the SCA, Jiang et al.'s (2007) instantaneous rates tagging model (IRCR) was run on data from the USFWS coast-wide striped bass tagging program through the 2017 tagging year to estimate abundance, survival, fishing mortality, and natural mortality.

**Fishing Mortality**

Fishing mortality (F) in both Chesapeake Bay and the ocean has been increasing since 1990. The combined full F was 0.307 in 2017, above the current $F_{threshold}$ of 0.240. The combined full F has been at or above the threshold for 13 of the last 15 years (Figure B1).

**Biomass**

Total biomass was low at the beginning of the time series. Total biomass increased through the 1980s and 1990, peaking in 1999 before declining again. The total biomass of Atlantic coastal migratory stock striped bass was 173,663 mt (383 million pounds) in 2017. Total biomass peaked at 334,661 mt (738 million pounds) in 1999.

Female SSB showed a pattern similar to that of total biomass. Female SSB started out low and increased through the late-1980s and 1990s, peaking at 113,602 mt (250 million pounds) in 2003 before beginning to gradually decline; the decline became sharper in 2012 (Figure B1). Female SSB was estimated at 68,476 mt (151 million pounds) in 2017, which is below the SSB threshold of 91,436 mt (202 million pounds); female SSB has been below $SSB_{threshold}$ since 2013 (Figure B1).

**Recruitment**

The stock appears to have experienced low recruitment at the beginning of the time series. Mean recruitment through the early 1990s to the present has been higher.

The 2015 year class was strong, as was the 2011 year class. But the 2016 year class was below average (Figure B7). Recruitment in 2017 was estimated at 108.8 million age-1 fish, below the time series mean of 140.9 million fish.

**Biological Reference Points**

Biological reference points for Atlantic striped bass are based on the condition of the stock in 1995, the year the stock was declared recovered. The SSB threshold is the estimate of female SSB in 1995, and the SSB target is 125% of the estimate of 1995 female SSB. The F threshold and F target are the F rates that will maintain the stock at the SSB threshold and SSB target, respectively, under long term equilibrium recruitment conditions. The previous benchmark assessment (2013) estimated $SSB_{threshold}$ at 57,626 mt (127 million pounds) and the associated $F_{threshold}$ at 0.22. $SSB_{target}$ was estimated at 72,032 mt (159 million pounds) and the associated $F_{target}$ was 0.18. These reference points were for the total coastal migratory stock complex of Atlantic striped bass.

For the SARC-66 benchmark assessment in 2018, the definition of the targets and thresholds were kept the same as the previous assessment, but the values were re-estimated. $SSB_{threshold}$ was estimated at 91,436 mt (202 million pounds), with $SSB_{target}$ equal to 114,295 mt (252 million pounds). $F_{threshold}$ was estimated at 0.240, and the associated $F_{target}$ was 0.197.

Model-based estimates of MSY were not calculated for this assessment. An empirically-based proxy for MSY derived from the SSB target or threshold could be an area for future development, depending on management goals.

The new F reference points are similar to the values currently used in management, but the SSB reference points are significantly higher, primarily due to the inclusion of the new, calibrated MRIP values.

**Special Comments**

The new estimates of recreational catch resulted in higher estimates of recruitment and biomass compared to the 2016 assessment update that used uncalibrated estimates. However, it did not significantly change the overall population trend, which has been declining since about 2003.

An impressive amount of work went into developing the two stock model presented by the working group. This model represents an innovative advancement, and the SARC panel recommends continued development and refinement of that model.

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ASMFC. 1990. Source document for the supplement to the Striped Bass FMP - Amendment #4. Washington (DC): ASMFC. Fisheries Management Report No. 16. 244 p.

ASMFC. 2014. Addendum IV to Amendment 6 to the Atlantic Striped Bass Interstate Fishery Management Plan. Arlington (VA): ASMFC. 20 p.

Jiang H, Pollock KH, Brownie C, Hoenig JM, Latour RJ, Wells BK, Hightower JE. 2007. Tag return models allowing for harvest and catch and release: evidence of environmental and management impacts on striped bass fishing and natural mortality rates. North American Journal of Fisheries Management 27:387-396.

**Figures**

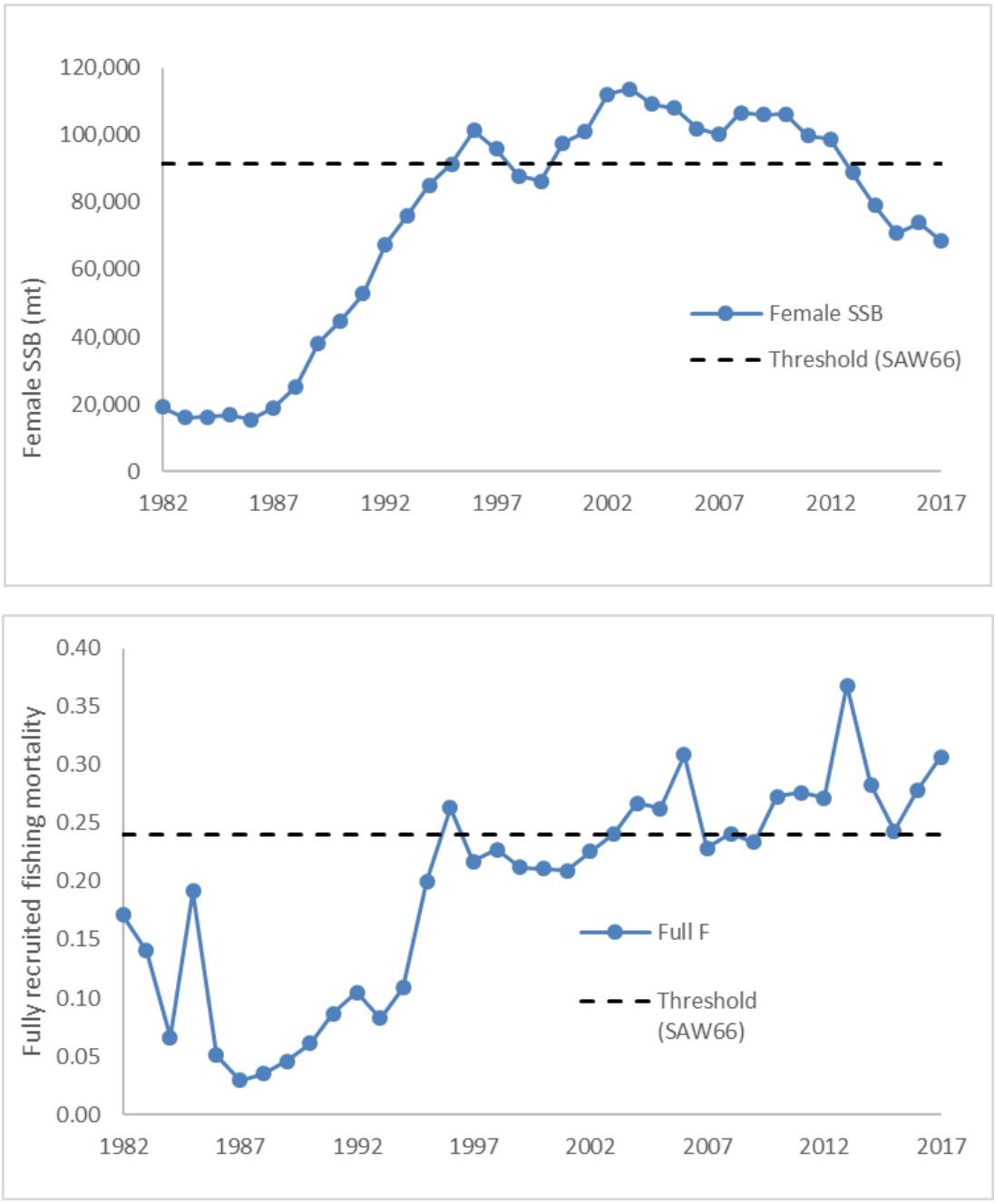


**Figure B1.** Female spawning stock biomass (SSB; top) and fishing mortality (F; bottom) for Atlantic striped bass through 2017, plotted with the respective SSB and F thresholds.

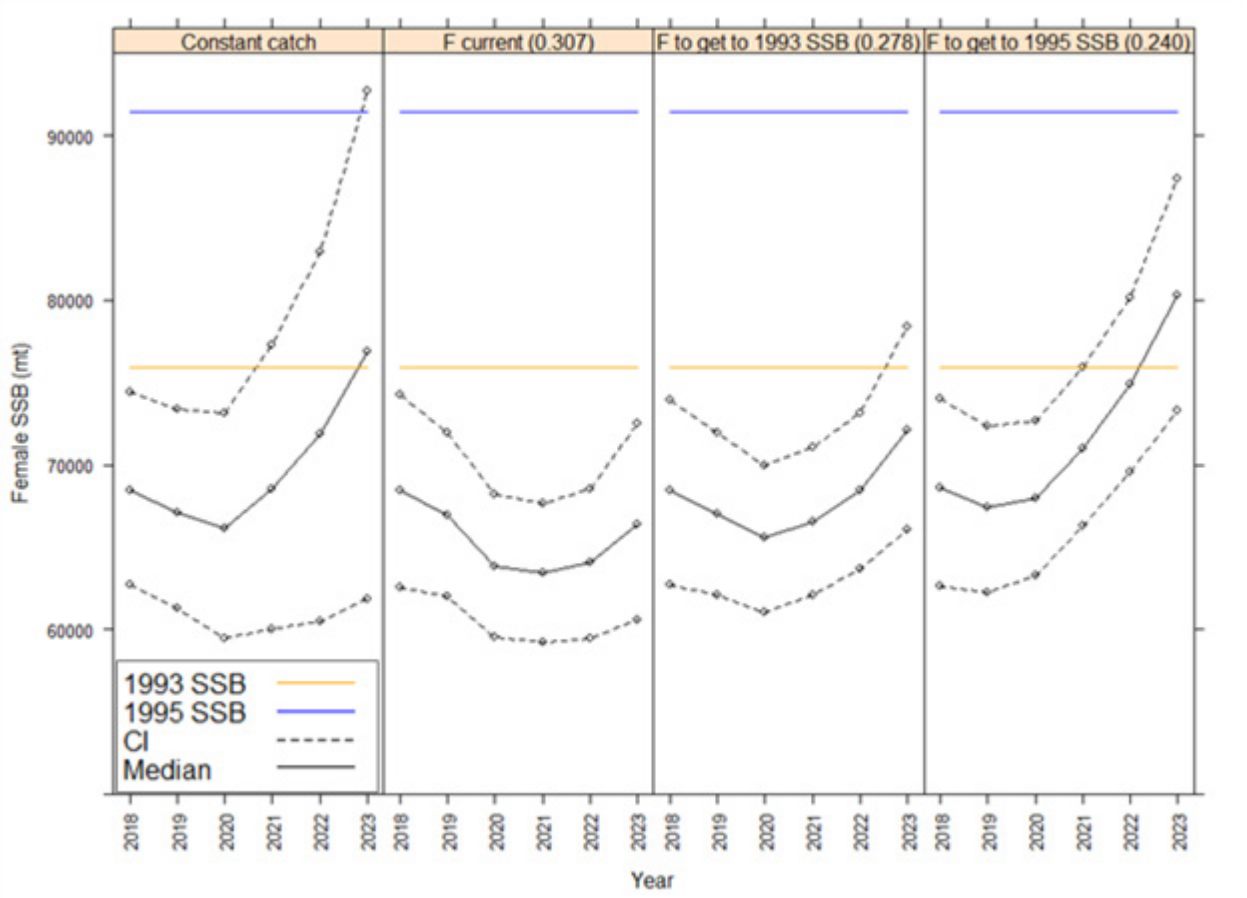


**Figure B2.** Trajectories of female Atlantic striped bass spawning stock biomass (SSB), with 95% confidence intervals, under different harvest scenarios. Projections were done using: constant 2017 catch; constant 2017 F; F equal the F required to achieve the 1993 estimate of female SSB in the long term; and F equal to $F_{threshold}$.

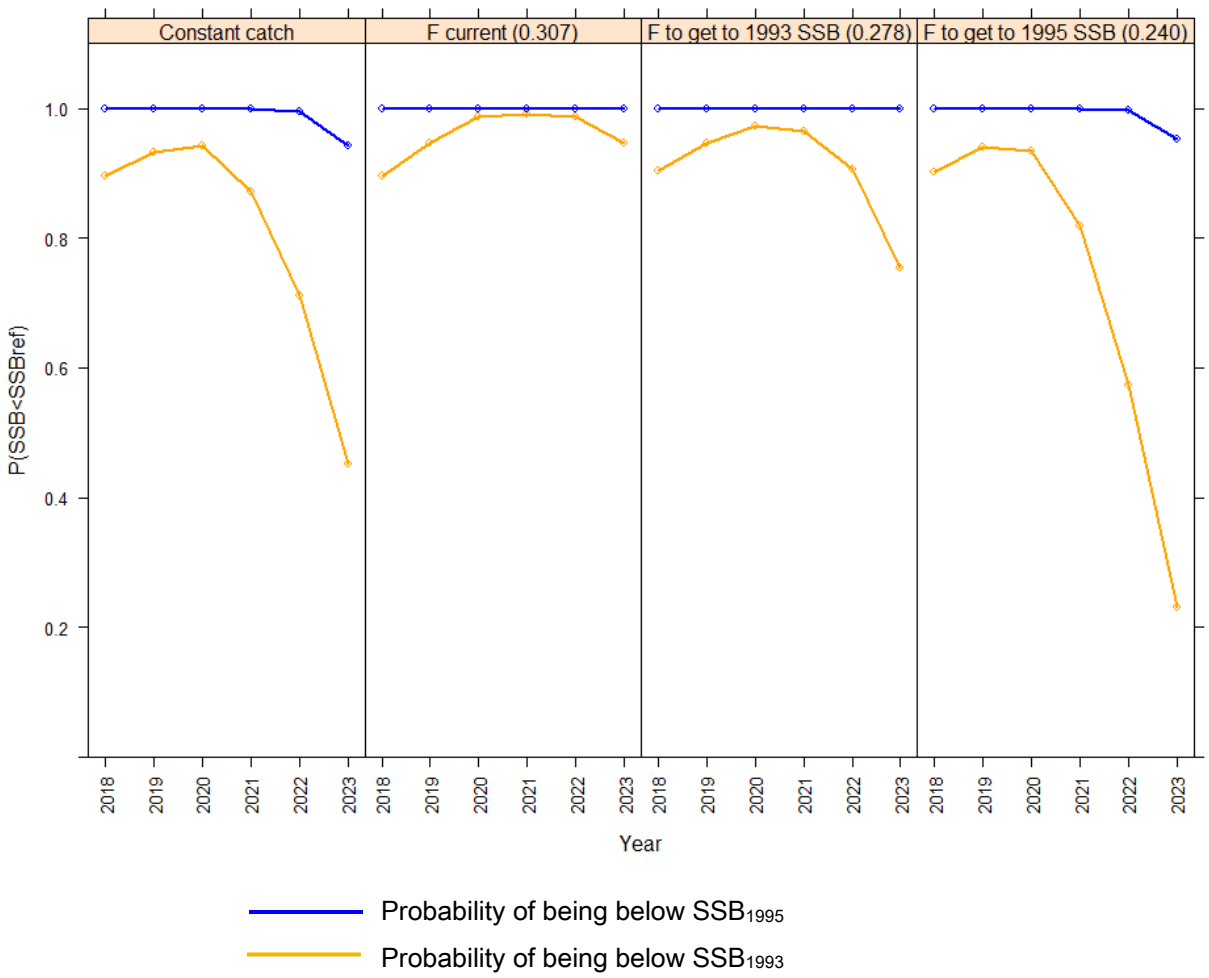


**Figure B3.** Probability of female Atlantic striped bass spawning stock biomass (SSB) being below the SSB threshold under different harvest scenarios. Projections were done using: constant 2017 catch; constant 2017 F; F equal the F required to achieve the 1993 estimate of female SSB in the long term; and F equal to $F_{threshold}$.

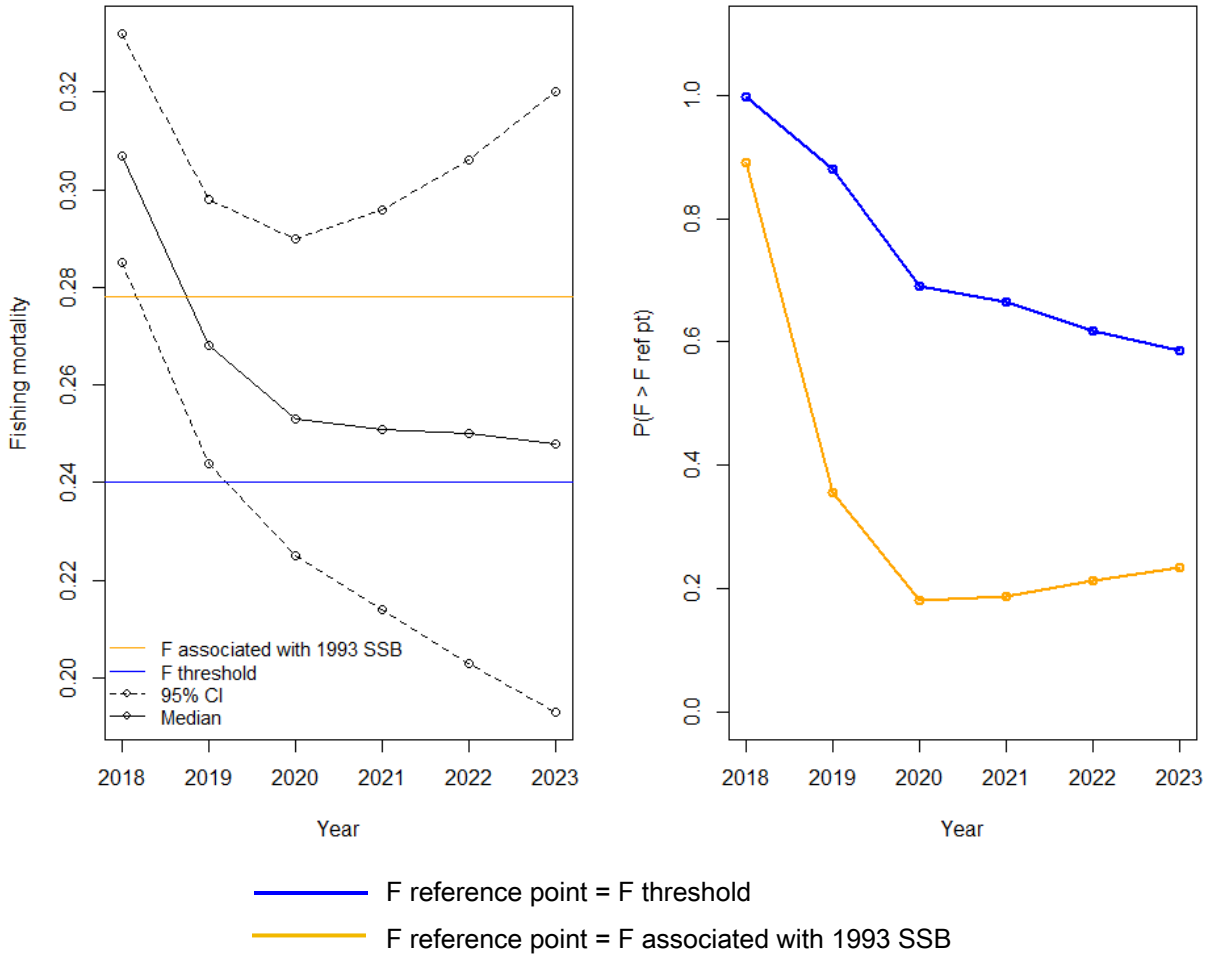


**Figure B4.** Atlantic striped bass. Trajectory of combined full fishing mortality (F) for the population (left) and the probability of F being above F threshold (right) under the constant 2017 catch scenario.

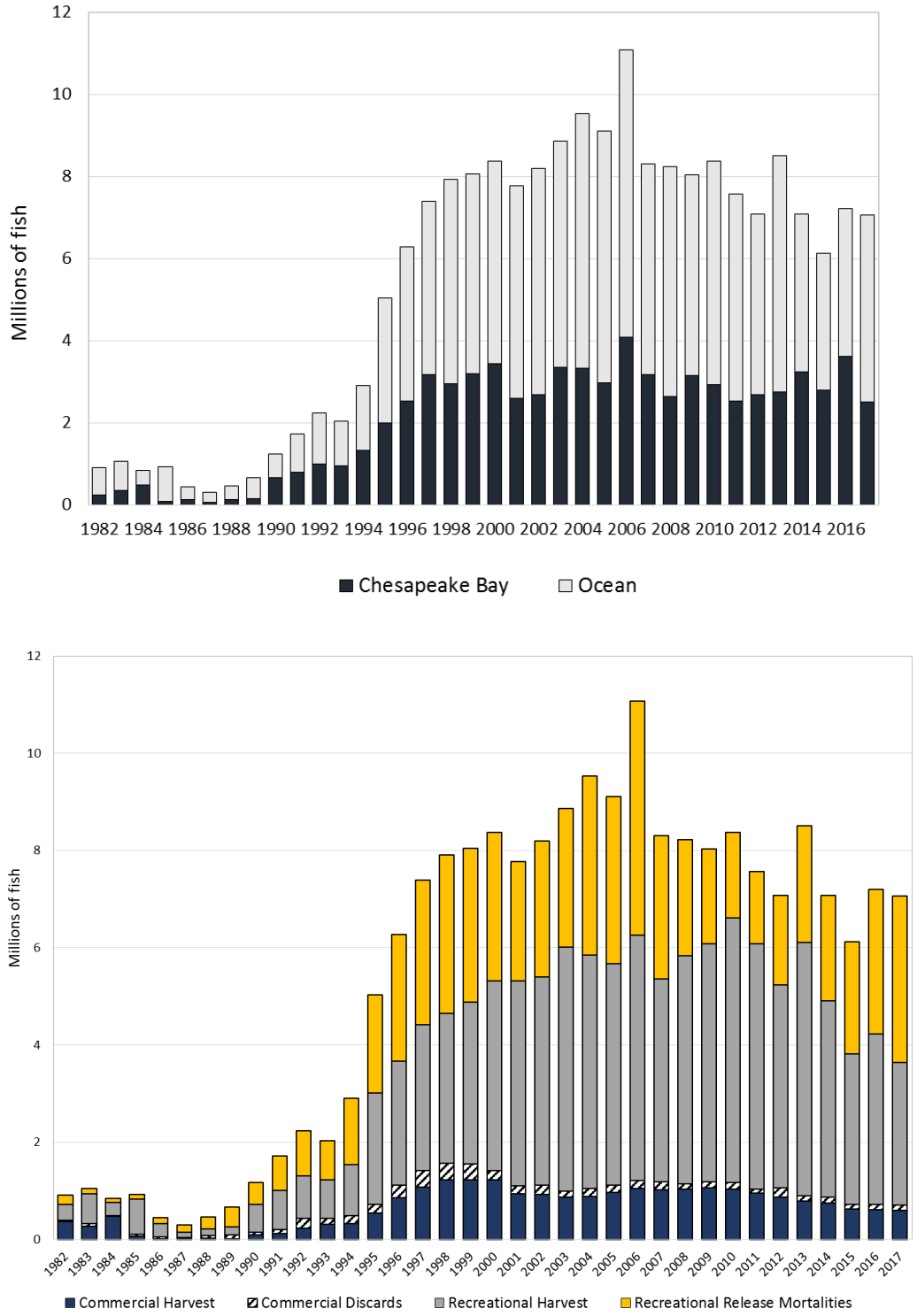


**Figure B5.** Total removals of Atlantic striped bass by region (top) and sector (bottom) through 2017.

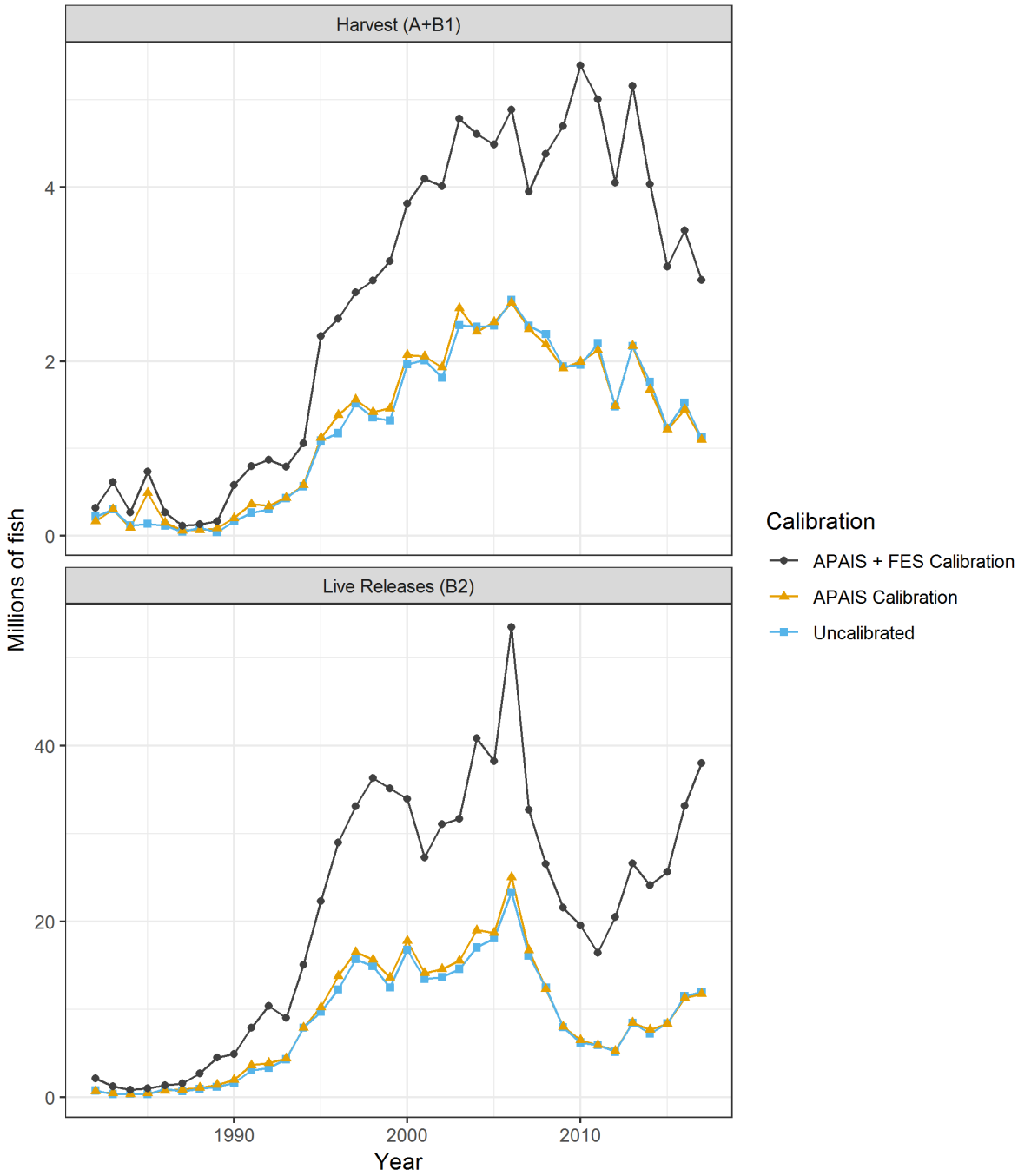


**Figure B6.** Comparison of calibrated and uncalibrated MRIP estimates of recreational harvest (top) and live releases (bottom) for Atlantic striped bass through 2017. Uncalibrated = original MRIP estimates; APAIS calibration = MRIP estimates after calibration to account for changes in the Access Point Angler Intercept Survey (APAIS). APAIS + FES calibration = MRIP estimates after calibration to account for APAIS changes and the change in effort estimation from the coastal household telephone survey to a mail-based fishing effort survey (FES).

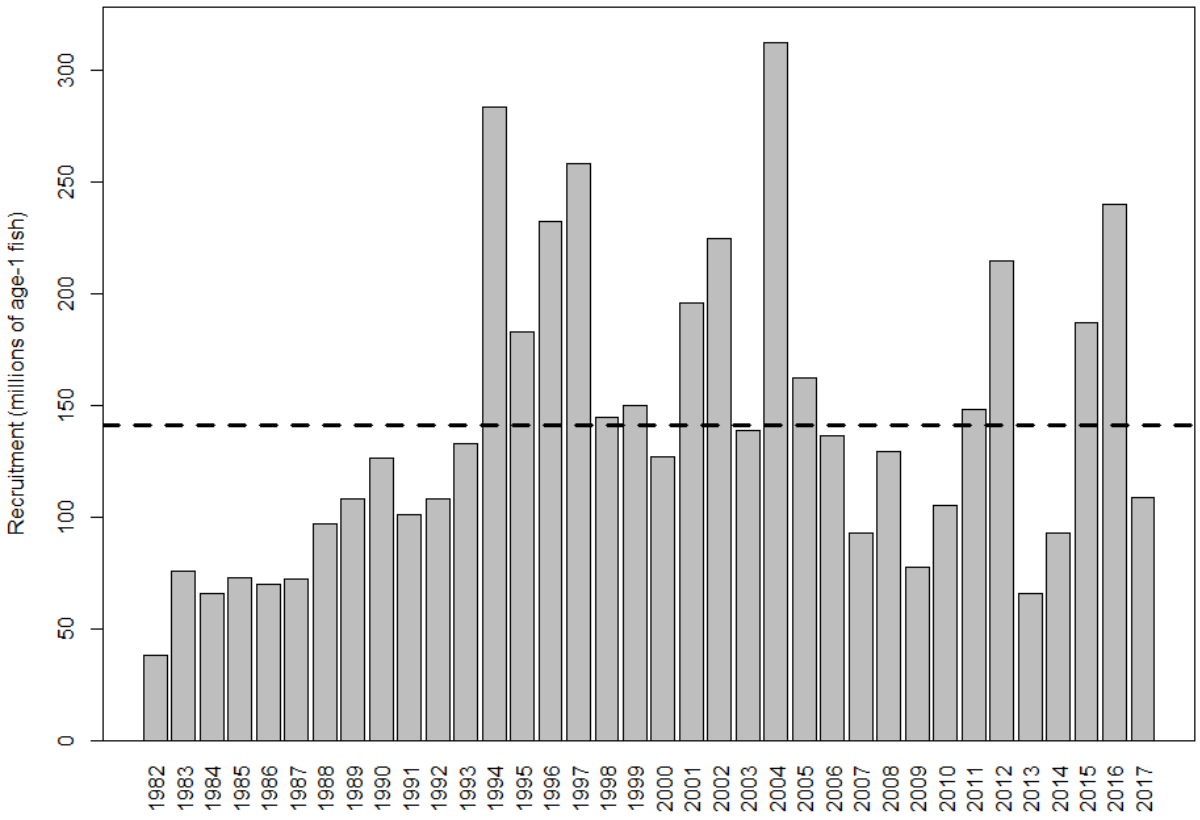


**Figure B7.** Annual estimates of recruitment for Atlantic striped bass through 2017. Dashed black line indicates time-series average for the stock.

**B. Striped bass**

1. Investigate all fisheries independent and dependent data sets, including life history, indices of abundance, and tagging data. Discuss strengths and weaknesses of the data sources.

2. Estimate commercial and recreational landings and discards. Characterize the uncertainty in the data and spatial distribution of the fisheries. Review new MRIP estimates of catch, effort and the calibration method, if available.

3. Use an age-based model to estimate annual fishing mortality, recruitment, total abundance and stock biomass (total and spawning stock) for the time series and estimate their uncertainty. Provide retrospective analysis of the model results and historical retrospective. Provide estimates of exploitation by stock component and sex, where possible, and for total stock complex.

4. Use tagging data to estimate mortality and abundance, and provide suggestions for further development.

5. Update or redefine biological reference points (BRPs; point estimates or proxies for BMSY, SSBMSY, FMSY, MSY) for each stock component where possible and for the total stock complex. Make a stock status determination based on BRPs by stock component, where possible, and for the total stock complex.

6. Provide annual projections of catch and biomass under alternative harvest scenarios. Projections should estimate and report annual probabilities of exceeding threshold BRPs for F and probabilities of falling below threshold BRPs for biomass.

7. Review and evaluate the status of the Technical Committee research recommendations listed in the most recent SARC report. Identify new research recommendations. Recommend timing and frequency of future assessment updates and benchmark assessments.

## *Appendix to the SAW Assessment TORs:*

**Clarification of Terms used in the SAW/SARC Terms of Reference**

**On "Acceptable Biological Catch" (DOC Nat. Stand. Guidel. Fed. Reg., v. 74, no. 11, 1-16-2009):**

> *Acceptable biological catch (ABC)* is a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of Overfishing Limit (OFL) and any other scientific uncertainty…" *(p. 3208) [In other words, OFL ≥ ABC.]*
>
> *ABC for overfished stocks.* For overfished stocks and stock complexes, a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates in the rebuilding plan. *(p. 3209)*
>
> NMFS expects that in most cases ABC will be reduced from OFL to reduce the probability that overfishing might occur in a year. (p. 3180)
>
> ABC refers to a level of ''catch'' that is ''acceptable'' given the ''biological'' characteristics of the stock or stock complex. As such, Optimal Yield (OY) does not equate with ABC. The specification of OY is required to consider a variety of factors, including social and economic factors, and the protection of marine ecosystems, which are not part of the ABC concept. (p. 3189)

**On "Vulnerability" (DOC Natl. Stand. Guidelines. Fed. Reg., v. 74, no. 11, 1-16-2009):**

> *"Vulnerability.* A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce Maximum Sustainable Yield (MSY) and to recover if the population is depleted, and susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery (e.g., loss of habitat quality)." (p. 3205)

**Participation among members of a Stock Assessment Working Group:**

> Anyone participating in SAW meetings that will be running or presenting results from an assessment model is expected to supply the source code, a compiled executable, an input file with the proposed configuration, and a detailed model description in advance of the model meeting. Source code for NOAA Toolbox programs is available on request. These measures allow transparency and a fair evaluation of differences that emerge between models.

**Guidance to SAW WG about "Number of Models to include in the Assessment Report":**

> In general, for any TOR in which one or more models are explored by the WG, give a detailed presentation of the "best" model, including inputs, outputs, diagnostics of model adequacy, and sensitivity analyses that evaluate robustness of model results to the assumptions. In less detail, describe other models that were evaluated by the WG and explain their strengths, weaknesses and results in relation to the "best" model. If selection of a "best" model is not possible, present alternative models in detail, and summarize the relative utility each model, including a comparison of results. It should be highlighted whether any models represent a minority opinion.

The 2018 Atlantic Striped Bass Benchmark Stock Assessment, conducted through the Northeast Regional SAW/SARC, can be obtained at **https://tinyurl.com/y452cxk6**

**Final Report**

# Summary Report of the 66th Northeast Regional Stock Assessment Review Committee (SARC 66)

**Members of SARC 66**
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National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Woods Hole, Massachusetts

Meeting dates: 27 November – 30 November, 2018
Report date: 21 December, 2018

## Contents

# 1. Introduction

## 1.1 Background

The 66th Stock Assessment Review Committee (SARC) met in Woods Hole, MA from 27 November – 30 November, 2018 to review the most recent stock assessments for summer flounder, *Paralichthys dentatus*, and striped bass, *Morone saxatilis* (Attachment 1). The review committee was composed of Robert J. Latour (MAFMC SSC and Virginia Institute of Marine Science, SARC Chair) and three scientists affiliated with the Center for Independent Experts: John Casey (Consultant), Robin Cook (University of Strathclyde), and Yan Jiao (Virginia Polytechnic Institute and State University).

The SARC was assisted by the Stock Assessment Workshop (SAW) Chairman, James Weinberg (NEFSC). Supporting documentation for the summer flounder assessment was prepared by the NEFSC Summer Flounder Working Group (SFWG) and presentation of the assessment was made by Mark Terceiro (lead analyst) with support from Jessica Coakley (MAFMC, Chair SFWG). Technical documents for the striped bass assessment were prepared by the Striped Bass Working Group (SBWG) and presentations were made by Katie Drew (ASMFC), Gary Nelson (MADMF), and Michael Celestino (NJDFW, Chair SBWG). Tony Wood, Toni Chute, Alicia Miller, Brian Linton, and Chris Legault (all NEFSC) served as rapporteurs. A total of 39 individuals attended the SARC 66 meeting, representing NEFSC, MAFMC, ASMFC, MADMF, NJDFW, DEFW, RIDMF, various academic institutions, non-governmental organizations, and fisheries stakeholder organizations (Attachment 2). The contributions of all associated with the SARC 66 process are gratefully acknowledged.

## 1.2 Review of Activities

Approximately two weeks before the meeting, assessment documents and supporting materials were made available to the SARC Panel electronically. On the morning of 27 November, the Panel met with James Weinberg and Russell Brown to discuss the meeting agenda, reporting requirements, and meeting logistics. The meeting opened on the morning of 27 November with welcoming remarks by James Weinberg and Robert Latour. Following introductions, the remainder of day was devoted to presentations of the summer flounder assessment. Most all of 28 November was spent on presentations of the striped bass assessment, with the latter part of the day dedicated to follow-up discussion of the summer flounder assessment and editing of the summer flounder Assessment Summary Report. Virtually all of 29 November focused on discussion associated with the striped bass assessment and editing of the striped bass Assessment Summary Report. The final day of the meeting was restricted to only the SARC Panelists for report writing.

The presentations given during the meeting for each assessment followed the Terms of Reference (ToRs) which allowed the Panel to gain a deeper understanding of each assessment. The Panel asked each working group for additional model runs to explore sensitivities and alternative model configurations, and the efforts by working group members

to quickly generate those model runs were greatly appreciated. The tone of the meeting was collegial, and considerable time was devoted to facilitate dialog among Panelists, working group members, and MAFMC and ASMFC staff. The SARC Panel was able to conduct a thorough review of both assessments.

The assessments were effective in providing current stock status information and the SARC Panel was able to reach consensus on both assessments, although the accepted model configuration for striped bass differed considerably from the base model put forth by the SBWG. Since the last peer-reviewed assessments of each species (2013 SAW/SARC 57 for both species), considerable research advancements have been made for each assessment. The assessments conducted by the SFWG and SBWG were very thorough, and it was apparent that each working group devoted significant time and effort to data analysis, model fitting, evaluation of uncertainty, and report preparation.

Special Comment, summer flounder: The SARC Panel acknowledged the public comment submitted by Save the Summer Flounder Fishery Fund regarding past efforts and future plans to develop a sex-structured assessment model for summer flounder. This comment was read into the record by Patrick Sullivan.

# 3. Review of Striped Bass

## 3.1 General Comments

The stock assessment model for striped bass was last peer-reviewed in 2013 (SAW/SARC 57) and the model put forth by the SBWG at that time was a fairly traditional single-stock statistical catch-age-age model (referred herein as the 'SCA model'). However, it has been well documented in the primary literature that the coastal striped bass population is of mixed stock origin, and that striped bass exhibit differential habitat utilization among estuarine and coastal areas based on season of the year and ontogeny. Therefore, in an effort to build a stock assessment model that more closely represented the biology and ecology of striped bass, the SBWG introduced new assessment model formulation in 2018 that was stock-specific (two-stocks: Chesapeake Bay and Delaware/Hudson), seasonally-explicit (three periods: Jan-Feb, Mar-Jun, Jul-Dec), and spatially-explicit (two regions: Chesapeake Bay, coastal ocean). The SARC Panel was supportive of this very innovative modeling effort (referred herein as the '2SCA model'), but ultimately did not accept this model as a tool for the basis of striped bass management. Several technical issues regarding configuration of the 2SCA model were raised by the SARC Panel (see ToR 3 for more details) along with a conceptual concern pertaining to BRPs. Historically, the BRPs for striped bass were based on the estimated female SSB for 1995 ($SSB_{Threshold} = SSB_{1995}$), which was regarded as the biomass achieved when the stock had recovered from a period of being overfished. Associated fishing mortality reference points were estimated from long-term stochastic projections by finding F values that corresponded to the median $SSB_{Threshold}$ and $SSB_{Target}$ values (see ToR 5 for more details). In developing the 2SCA model, the SBWG attempted to redefine the BRPs to be both stock- and area-specific, which resulted in two SSB reference points (one for the Chesapeake Bay stock and one for the Delaware/Hudson stock) and three F reference points (two for the Chesapeake Bay stock and one for the Delaware/Hudson stock). Specific to the Chesapeake Bay stock, this structure yielded a bay F reference point and a coastal F reference point. If accepted, this would imply that the Chesapeake Bay stock could be, for example, experiencing overfishing in the ocean but not experiencing overfishing in the bay. The SARC Panel regarded this as not biologically meaningful since the cumulative F on a stock should determine status as opposed to a single spatially-specific component. Imposing the constraint of a single, stock-wide F reference point is necessary to ensure a unique solution because there is an infinite number of ways of partitioning F between fleets or areas. Despite these concerns, the SARC Panel strongly recommended continued development of the 2SCA model and was optimistic that the model could become the basis for management in the future following more extensive testing and refinement.

In light of the SARC Panel's decision to not accept the 2SCA model, the SBWG brought forward an updated configuration of the SCA model (2013 assessment model – SAW/SARC 57). Available time for the SARC Panel to evaluation this model was abbreviated due to discussions associated with the 2SCA model, but the SBWG was able to present the key elements of the model structure, data inputs, model diagnostics with some sensitivity runs,

results, and recommended stock status information. The SARC Panel accepted the SCA model for management, concluded that all ToRs were met for that model, and noted that the aforementioned discussion of area-specific reference points (e.g., bay vs. coastal ocean, Section 3.1) also pertains to the SCA model.

## 3.2 Evaluation of the Terms of Reference for Striped Bass

### ToR 1. Investigate all fisheries independent and dependent data sets, including life history, indices of abundance, and tagging data. Discuss strengths and weaknesses of the data sources.

This ToR was met. The SBWG provided detailed summaries of the available fisheries-independent and fisheries-dependent data. Rich datasets supported estimation of life history parameters such as growth and maturity. Published literature provided insight into potential population effects of mycobacteriosis, particularly disease-associated mortality. In total, over a dozen research survey datasets were analyzed to generate estimates of relative abundance. Indices were estimated for YOY and aggregated age-1+ fish. Age-specific indices were available from a few sampling programs. A wealth of tag-return data were available from producer areas (stock-specific tagged fish on/near spawning grounds) and coastal areas (mixed stock fish tagged in coastal zone). These data were used to aid fit and scaling of the SCA model, support estimation of natural mortality (M), and provide information on stock composition of the coastal population (needed only for the 2SCA model). The SARC Panel concluded that the SBWG satisfactorily assembled the necessary life history and relative abundance information needed for the SCA model.

### ToR 2. Estimate commercial and recreational landings and discards. Characterize the uncertainty in the data and spatial distribution of the fisheries. Review new MRIP estimates of catch, effort and the calibration method, if available.

This ToR was met. Strict quota monitoring is conducted by individual states through various state and federal reporting systems, and annual landings are compiled by state biologists. Directed commercial landings were assumed to be a census. The 2013 SCA model was structured to include three fleets: Chesapeake Bay, coastal ocean, and commercial discards. However, for the 2018 SCA model, commercial discards were separated regionally (Chesapeake Bay, coastal ocean) such that only two regional fleets were needed. Although some empirical estimates of commercial discards were available (e.g., Delaware Bay), discard estimation was largely based on tagging data. Specifically, a ratio approach was used that involved the ratio of tags report from discarded (or released) fish in the commercial fishery to tags reported from discarded fish in the recreational fishery, scaled by total recreational releases/discards. Corrections were made for differences among tag-reporting rates between sectors and gear-specific release mortality rates were applied to total discards to estimate

dead discards. Directed commercial landings have generally exceeded discards since the 1990s with discards comprising roughly 15% of the total commercial removals from 2015-2017. Commercial catch-at-age summaries were based on regional age-length keys.

Estimates of annual recreational harvest and total catch (harvested+released) came from the newly calibrated MRIP, and were 140% and 160% higher than previous estimates, respectively. A 9% release mortality rate was applied to live releases (catch type B2). Temporal trends of catch and harvest statistics were similar among uncalibrated and calibrated MRIP data despite significant differences in magnitude. Recreational catch-at-age was based on state-specific age-length keys developed from fisheries-dependent (MRIP, state logbook programs, volunteer angler surveys, creel sampling, and the American Littoral Society volunteer angler tagging program) and fisheries-independent sources. The SARC Panel concluded that the assembled landings and discard data were suitable for the assessment.

ToR 3. Use an age-based model to estimate annual fishing mortality, recruitment, total abundance and stock biomass (total and spawning stock) for the time series and estimate their uncertainty. Provide retrospective analysis of the model results and historical retrospective. Provide estimates of exploitation by stock component and sex, where possible, and for total stock complex.

This ToR was met. As noted above (section 3.1), the SARC Panel did not accept the 2SCA model for use as the basis of striped bass management. Specific research needs raised by the SARC Panel for the 2SCA model are as follows:

- More extensive simulation testing
    - Exploration of parameter estimability
    - Testing of the effects of various emigration rate assumptions
    - Alternative methods (e.g., multi-state tagging models) to estimate emigration rates from existing tagging data
    - Development of a method to estimate numbers-at-age for the first year
- Further examination of tagging data after 1995 (including developing ways of assigning ages to NY data) to examine potential time-varying emigration rates
- Further exploration of appropriate BRPs for a two-stock population with mixing
    - Can the model detect changes in stock status with different emigration rates/exploitation patterns/etc?
- Evaluation of why model output for the two stocks show such similar patterns over time
- Further exploration of the assumption of constant selectivity across periods within a region & year
- Identify weaknesses in the existing data that can be improved to support the further development of this model

- Develop more robust estimates of stock composition

However, as noted above (section 3.1) the updated and slightly modified SCA model was accepted by the SARC Panel for striped bass management. The SCA model included two fleets (Chesapeake Bay, coastal ocean), four selectivity blocks in each area that corresponded to notable changes in management, and the aforementioned YOY and aggregated age 1+ indices of relative abundance. Likelihood weights favored the age-composition data which led to poor model fits to some survey indices.

Estimates of fully-recruited instantaneous fishing mortality (F) in Chesapeake Bay were low (≈ 0.05-0.10) across the time-series with comparably higher values estimated for the coastal ocean (≈ 0.03-0.26). CVs associated with estimates of fishing mortality in both areas were low and indicative of good precision (≈ 0.10-0.37). Estimates of female SSB were low in the 1980s (as expected given the depressed condition of the stock at the time) but increased through the 1990s to a peak in 2003. Since 2010, estimated female SSB has declined steadily such that the 2017 SSB estimate is commensurate to that of 1991-1992.

A retrospective analysis of the SCA model (seven year peels) showed very little trend (+/- 2%) in the more recent estimates of fully-recruited total fishing mortality, female SSB, and age-8+ abundance. Notable patterns did not emerge until five years of data were peeled (> 10% change). The SBWG indicated that fishing mortality is likely slightly overestimated with female SSB being slightly underestimated. The retrospective analysis of age-1 recruits indicated that the terminal year estimate of age-1 abundance was most uncertain.

### ToR 4. Use tagging data to estimate mortality and abundance, and provide suggestions for further development.

This ToR was met. Tagging data are available for striped bass from both coastal areas (MA, NY, NJ, and NC) and producer/spawning areas (Hudson, DE/PA, MD upper Chesapeake Bay, and VA Rappahannock River). These tagging data represent a rich source of information since most all programs have been operating continuously since the late 1980s. Age-invariant instantaneous rates catch and release models that allow for the release of tagged fish were applied to provide estimates of survival (S), instantaneous total mortality (Z), F and M for two size-classes of fish (≥ 457 mm and ≥ 711 mm). For each tagging dataset, a suite of candidate model parameterizations was fitted and information theoretic approaches were used to obtain final weighted parameter estimates across the hypothesized models (multi-model inference). Stock sizes were estimated using the annual exploitation rates averaged across all tagging program in concert with total catch (recreational and commercial harvest and dead discards; average stock size = catch/exploitation).

The SARC Panel accepted the analyses of the tagging data for comparative purposes to the mortality rates and stock sizes derived from the SCA model. As noted above (ToR 3), the

SBWG did make use of the tagging data to make inferences about stock composition of the coastal population and emigration rates, both of which were needed for the 2SCA model. The SARC Panel recommended continued work in this area for future assessments.

ToR 5. Update or redefine biological reference points (BRPs; point estimates or proxies for $B_{MSY}$, $SSB_{MSY}$, $F_{MSY}$, MSY) for each stock component where possible and for the total stock complex. Make a stock status determination based on BRPs by stock component, where possible, and for the total stock complex.

SPR-based reference points were explored with the SCA model but ultimately not used for recommendations of stock status because estimates of SSB associated with various SPR fishing mortality rates were unrealistic. For example, long term (100 yr) projections at $F_{40\%}$ resulted in an equilibrium female SSB value that was approximately twice the highest estimated female SSB value in the time-series. Although the SBWG was unable to fully explain the stock dynamics associated with SPR-based reference points, it is possible that the SCA model did not adequately capture sex-specific dynamics associated with regional fisheries, particularly those operating in Chesapeake Bay. Sex ratio data from the bay showed high proportions of males, which is consistent with the notion that young females migrate to coastal areas earlier than males. Lower fisheries selectivity of young fish in coastal areas compared to that in the bay implies that female SSB could be elevated due differential habitat utilization among sexes.

For stock status determination from the SCA model, the SBWG put forth the empirical reference points used in previous assessments. Specifically, the $SSB_{Threshold}$ was defined as the estimated female SSB for 1995 ($SSB_{1995}$) and the $SSB_{Target}$ was defined as 125% of the female $SSB_{1995}$ value. Fishing mortality reference points associated with the $SSB_{Threshold}$ and $SSB_{Target}$ were generated using projections based on randomly selected 2017 estimates of January 1 abundance-at-age from a normal distribution, and geometric means of recent (2013-2017) selectivity, spawning stock weights-at-age, and age-1 recruitment stochastically obtained from the 'hockey-stick' approach (Beverton-Holt stock-recruitment up to median female SSB followed by the median recruitment thereafter). As a sensitivity run, projections were also generated where recruitment was 'empirical' and simply obtained as random selections from estimates spanning 1990-2017. In both cases, the input F was manually adjusted to obtain the median female SSB values closest to the female $SSB_{Threshold}$ and $SSB_{Target}$ in year 100.

The SCA model yielded the following stock status output: $SSB_{Threshold}$ = 91,436 mt, $SSB_{2017}$ = 68,476 mt; $F_{Threshold\text{-}HockeyStick}$ = 0.240, $F_{Threshold\text{-}Empirical}$ = 0.248, $F_{2017}$ = 0.307. Thus, the recommended stock status is overfished with overfishing occurring. Fleet-specific F reference points indicated the Chesapeake Bay fleet was equal to its $F_{Threshold}$ while the ocean fleet was above its $F_{Threshold}$. The BRPs and recommended stock status determination were accepted by the SARC Panel.

ToR 6. Provide annual projections of catch and biomass under alternative harvest scenarios. Projections should estimate and report annual probabilities of exceeding threshold BRPs for F and probabilities of falling below threshold BRPs for biomass.

This ToR was met. Short-term, six-year projections of the SCA model (2018-2023) were configured similarly to the projections used to estimate fishing mortality reference points (see ToR 5 for more details). Four scenarios were examined: (i) constant catch equal to 2017 catch, (ii) constant F equal to 2017 F, (iii) constant F equal to $F_{Threshold}$ ($F_{1995}$), (iv) and constant F equal to $F_{1993}$. Recruitment was modeled using both the 'hockey-stick' and 'empirical' approaches. Projection results showed very high probabilities (≈0.95-1.0) of remaining overfished and for overfishing to continue (≈0.6-1.0) assuming 'hockey-stick' recruitment. For 'empirical' recruitment, the probabilities of staying overfished in the short term were similar to the 'hockey-stick' projection results, but the probabilities of maintaining overfishing were lower (≈0.4-1.0). The SARC Panel accepted the projection analysis conducted by the SBWG for the SCA model.

ToR 7. Review and evaluate the status of the Technical Committee research recommendations listed in the most recent SARC report. Identify new research recommendations. Recommend timing and frequency of future assessment updates and benchmark assessments.

This ToR was met. Progress has been made on several of the research recommendations stemming from the 2013 assessment (SAW/SARC 57). The SARC Panel recommended continued efforts on high priority research topics from this list along with advancements associated with testing and refining the 2SCA model (see ToR 3 for details).

## 4. Description of SAW Supporting Materials

### References

| Working paper | Title | Author(s)/Publisher |
|---|---|---|
| **Summer Flounder** | | |
| A1 | The effect of ocean environmental conditions on the relative abundance of summer flounder (*Paralichthys dentatus*): spatio-temporal analysis and model comparison using R-INLA | S. Deen et al. |
| A2 | Summer flounder CPUE derived from cooperative research study fleet self-reported data | B.J. Gervelis |
| A3 | Evaluating summer flounder (*Paralichthys dentatus)* spatial sex-segregation in a southern New England estuary | Langan et al. |
| A4 | Stock Synthesis Implementation of a Sex-Structured Virtual Population Analysis Applied to Summer Flounder | M.N. Maunder |
| A5 | Dynamic reference points for summer flounder | M.N. Maunder |
| A6 | Developing an aggregated summer flounder fishery independent index from multiple noisy indices using a Bayesian hierarchical modeling approach | J.E. McNamee |
| A7 | Spatial distribution of summer flounder captured in the commercial and recreational fisheries | A. Miller & M. Terceiro |
| A8 | Spatial distribution of summer flounder sampled by the NEFSC trawl survey | A. Miller & M. Terceiro |
| A9 | Accounting for sex in equilibrium per-recruit biological reference points for summer flounder | T.J. Miller |
| A10 | A state-space, sex-specific, age-structured assessment model for summer flounder | T.J. Miller & M. Terceiro |
| A11 | Even more state-space, sex-specific, age-structured assessment models for summer flounder | T.J. Miller & M. Terceiro |
| A12 | An analysis of summer flounder (*Paralichthys dentatus*) distribution on the Northeast U.S. Shelf using a spatio-temporal model | C.T. Perretti |
| A13 | A sex-age-length based fisheries stock assessment model with analysis and application to summer flounder (*Paralichthys dentatus*) in the mid-Atlantic | P.J. Sullivan |
| A14 | 57$^{th}$ SAW/SARC Summer Flounder Assessment Report | Summer Flounder Working Group |

| | | |
|---|---|---|
| A15 | Stock Assessment of Summer Flounder for 2016 | M. Terceiro |
| A16 | The summer flounder ASAP statistical catch at age model by sex | M. Terceiro |
| B1 | Amendment 6 to the Interstate Fishery Management Plan for Atlantic Striped Bass | ASMFC |
| B2 | 57th SAW/SARC Striped Bass Assessment Report | Striped Bass Working Group |
| B3 | 57th SAW/SARC Striped Bass Assessment Report Appendices | Striped Bass Working Group |
| B4 | 57th SAW/SARC Striped Bass Assessment Summary Report | SARC 57 Panel |
| B5 | Summary Report of the 57th Northeast Regional Stock Assessment Review Committee (SARC 57) | C.M. Jones |
| B6 | Tag recovery estimates of migration of striped bass from spawning areas of the Chesapeake Bay | R. Dorazio et al. |
| B7 | Tag return models allowing for harvest and catch and release: evidence of environmental and management impacts on striped bass fishing and natural mortality rates | H. Jiang et al. |
| B8 | Movement patterns and stock composition of adult striped bass tagged in Massachusetts coastal waters | J. Kneebone et al. |
| B9 | Chronicle of striped bass population restoration and conservation in the northwest Atlantic, 1979-2016 | G. Shepherd et al. |

# 5. Appendices

## Performance Work Statement

**Performance Work Statement (PWS)**
**National Oceanic and Atmospheric Administration (NOAA)**
**National Marine Fisheries Service (NMFS)**
**Center for Independent Experts (CIE) Program**
**External Independent Peer Review**

***66th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC)***
***Benchmark stock assessment for Summer flounder and Striped bass***

**Background**
The National Marine Fisheries Service (NMFS) is mandated by the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act to conserve, protect, and manage our nation's marine living resources based upon the best scientific information available (BSIA). NMFS science products, including scientific advice, are often controversial and may require timely scientific peer reviews that are strictly independent of all outside influences. A formal external process for independent expert reviews of the agency's scientific products and programs ensures their credibility. Therefore, external scientific peer reviews have been and continue to be essential to strengthening scientific quality assurance for fishery conservation and management actions.

Scientific peer review is defined as the organized review process where one or more qualified experts review scientific information to ensure quality and credibility. These expert(s) must conduct their peer review impartially, objectively, and without conflicts of interest. Each reviewer must also be independent from the development of the science, without influence from any position that the agency or constituent groups may have. Furthermore, the Office of Management and Budget (OMB), authorized by the Information Quality Act, requires all federal agencies to conduct peer reviews of highly influential and controversial science before dissemination, and that peer reviewers must be deemed qualified based on the OMB Peer Review Bulletin standards[1]. Further information on the Center for Independent Experts (CIE) program may be obtained from www.ciereviews.org.

**Scope**
The Northeast Regional Stock Assessment Review Committee (SARC) meeting is a formal, multiple-day meeting of stock assessment experts who serve as a panel to peer-review tabled

[1] http://www.cio.noaa.gov/services_programs/pdfs/OMB_Peer_Review_Bulletin_m05-03.pdf

stock assessments and models. The SARC peer review is the cornerstone of the Northeast Stock Assessment Workshop (SAW) process, which includes assessment development, and report preparation (which is done by SAW Working Groups or Atlantic States Marine Fisheries Commission (ASMFC) technical committees), assessment peer review (by the SARC), public presentations, and document publication. This review determines whether or not the scientific assessments are adequate to serve as a basis for developing fishery management advice. Results provide the scientific basis for fisheries within the jurisdiction of NOAA's Greater Atlantic Regional Fisheries Office (GARFO).

The purpose of this meeting will be to provide an external peer review of a benchmark stock assessment **Summer flounder and Striped bass**. The requirements for the peer review follow. This Statement of Work (PWS) also includes: **Appendix 1**: TORs for the stock assessment, which are the responsibility of the analysts; **Appendix 2:** a draft meeting agenda; **Appendix 3:** Individual Independent Review Report Requirements; and **Appendix 4:** SARC Summary Report Requirements.

**Requirements**
NMFS requires three reviewers under this contract (i.e. subject to CIE standards for reviewers) to participate in the panel review. The SARC chair, who is in addition to the three reviewers, will be provided by either the New England or Mid-Atlantic Fishery Management Council's Science and Statistical Committee; although the SARC chair will be participating in this review, the chair's participation (i.e. labor and travel) is not covered by this contract.

Each reviewer will write an individual review report in accordance with the PWS, OMB Guidelines, and the TORs below. All TORs must be addressed in each reviewer's report. No more than one of the reviewers selected for this review is permitted to have served on a SARC panel that reviewed this same species in the past. The reviewers shall have working knowledge and recent experience in the application of modern fishery stock assessment models. Expertise should include forward projecting statistical catch-at-age (SCAA) models. Reviewers should also have experience in evaluating measures of model fit, identification, uncertainty, and forecasting. Reviewers should have experience in development of Biological Reference Points (BRPs) that includes an appreciation for the varying quality and quantity of data available to support estimation of BRPs. For summer flounder, knowledge of flatfish biology and population dynamics would be useful. For striped bass, knowledge of anadromous species and SCAA models with spatial considerations would be useful.

**Tasks for Reviewers**
- Review the background materials and reports prior to the review meeting
- Attend and participate in the panel review meeting
    - The meeting will consist of presentations by NOAA and other scientists, stock assessment authors and others to facilitate the review, to provide any additional

information required by the reviewers, and to answer any questions from reviewers

- Reviewers shall conduct an independent peer review in accordance with the requirements specified in this PWS and TORs, in adherence with the required formatting and content guidelines; reviewers are not required to reach a consensus.
- Each reviewer shall assist the SARC Chair with contributions to the SARC Summary Report
- Deliver individual Independent Review Reports to the Government according to the specified milestone dates
- This report should explain whether each stock assessment Term of Reference of the SAW was or was not completed successfully during the SARC meeting, using the criteria specified below in the "Tasks for SARC panel."
- If any existing Biological Reference Points (BRP) or their proxies are considered inappropriate, the Independent Report should include recommendations and justification for suitable alternatives. If such alternatives cannot be identified, then the report should indicate that the existing BRPs are the best available at this time.
- During the meeting, additional questions that were not in the Terms of Reference but that are directly related to the assessments may be raised. Comments on these questions should be included in a separate section at the end of the Independent Report produced by each reviewer.
- The Independent Report can also be used to provide greater detail than the SARC Summary Report on specific stock assessment Terms of Reference or on additional questions raised during the meeting.

**Tasks for SARC panel**

- During the SARC meeting, the panel is to determine whether each stock assessment Term of Reference (TOR) of the SAW was or was not completed successfully. To make this determination, panelists should consider whether the work provides a scientifically credible basis for developing fishery management advice. Criteria to consider include: whether the data were adequate and used properly, the analyses and models were carried out correctly, and the conclusions are correct/reasonable. If alternative assessment models and model assumptions are presented, evaluate their strengths and weaknesses and then recommend which, if any, scientific approach should be adopted. Where possible, the SARC chair shall identify or facilitate agreement among the reviewers for each stock assessment TOR of the SAW.
- If the panel rejects any of the current BRP or BRP proxies (for BMSY and FMSY and MSY), the panel should explain why those particular BRPs or proxies are not suitable, and the panel should recommend suitable alternatives. If such alternatives cannot be identified, then the panel should indicate that the existing BRPs or BRP proxies are the best available at this time.
- Each reviewer shall complete the tasks in accordance with the PWS and Schedule of Milestones and Deliverables below.

**Tasks for SARC chair and reviewers combined:**
Review both the Assessment Report and the draft Assessment Summary Report. The draft Assessment Summary Report is reviewed and edited to assure that it is consistent with the outcome of the peer review, particularly statements about stock status recommendations and descriptions of assessment uncertainty.

The SARC Chair, with the assistance from the reviewers, will write the SARC Summary Report. Each reviewer and the chair will discuss whether they hold similar views on each stock assessment Term of Reference and whether their opinions can be summarized into a single conclusion for all or only for some of the Terms of Reference of the SAW. For terms where a similar view can be reached, the SARC Summary Report will contain a summary of such opinions. In cases where multiple and/or differing views exist on a given Term of Reference, the SARC Summary Report will note that there is no agreement and will specify - in a summary manner – what the different opinions are and the reason(s) for the difference in opinions.

The chair's objective during this SARC Summary Report development process will be to identify or facilitate the finding of an agreement rather than forcing the panel to reach an agreement. The chair will take the lead in editing and completing this report. The chair may express the chair's opinion on each Term of Reference of the SAW, either as part of the group opinion, or as a separate minority opinion. The SARC Summary Report will not be submitted, reviewed, or approved by the Contractor.

If any existing Biological Reference Points (BRP) or BRP proxies are considered inappropriate, the SARC Summary Report should include recommendations and justification for suitable alternatives. If such alternatives cannot be identified, then the report should indicate that the existing BRP proxies are the best available at this time.

**Foreign National Security Clearance**
When reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for reviewers who are non-US citizens. For this reason, the reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, country of birth, country of citizenship, country of permanent residence, country of current residence, dual citizenship (yes, no), passport number, country of passport, travel dates.) to the NEFSC SAW Chair for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations available at the Deemed Exports NAO website:
http://deemedexports.noaa.gov/ and
http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreignnational-

registration-system.html. The contractor is required to use all appropriate methods to safeguard Personally Identifiable Information (PII).

**Place of Performance**
The place of performance shall be at the contractor's facilities, and at the Northeast Fisheries Science Center in Woods Hole, Massachusetts.

**Period of Performance**
The period of performance shall be from the time of award through January 31, 2019. Each reviewer's duties shall not exceed **16** days to complete all required tasks.

**Schedule of Milestones and Deliverables:** The contractor shall complete the tasks and deliverables in accordance with the following schedule.

| | |
|---|---|
| No later than Oct. 26, 2018 | Contractor selects and confirms reviewers |
| No later than Nov. 13, 2018 | NMFS Project Contact will provide reviewers the pre-review documents |
| Nov. 27-30, 2018 | Each reviewer participates and conducts an independent peer review during the panel review meeting in Woods Hole, MA |
| Nov. 30, 2018 | SARC Chair and reviewers work at drafting reports during meeting at Woods Hole, MA, USA |
| Dec. 14, 2018 | Reviewers submit draft independent peer review reports to the contractor's technical team for review |
| Dec. 14, 2018 | Draft of SARC Summary Report, reviewed by all reviewers, due to the SARC Chair * |
| Dec. 21, 2018 | SARC Chair sends Final SARC Summary Report, approved by reviewers, to NMFS Project contact (i.e., SAW Chairman) |
| Jan. 2, 2019 | Contractor submits independent peer review reports to Government |
| Jan. 9, 2019 | The COR and/or technical POC distributes the final reports to the NMFS Project Contact the NMFS Project Contact |

* The SARC Summary Report will not be submitted to, reviewed, or approved by the Contractor.

**Applicable Performance Standards**
The acceptance of the contract deliverables shall be based on three performance standards: (1) The reports shall be completed in accordance with the required formatting and content (2) The reports shall address each TOR as specified (3) The reports shall be delivered as specified in the schedule of milestones and deliverables.

**Travel**
All travel expenses shall be reimbursable in accordance with Federal Travel Regulations (http://www.gsa.gov/portal/content/104790). International travel is authorized for this contract. Travel is not to exceed $12,000.

**Restricted or Limited Use of Data**
The contractors may be required to sign and adhere to a non-disclosure agreement.

**NMFS Project Contact**
Dr. James Weinberg, NEFSC SAW Chair
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## Appendix 1.

*The SARC Review Panel shall assess whether or not the SAW Working Group has reasonably and satisfactorily completed the following actions.*

The stock assessments for SAW/SARC66 require new calibrated catch and effort data from the Marine Recreational Information Program (MRIP). For these assessments to happen, the assessment scientists need the new MRIP data in a form ready for analysis by July 1, 2018.

### A. Summer flounder

1. Estimate catch from all sources, including landings and discards. Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these sources of data. Compare previous recreational data to re-estimated Marine Recreational Information Program (MRIP) data (if available).

2. Present the survey data available, and describe the basis for inclusion or exclusion of those data in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.). Investigate the utility of commercial or recreational LPUE as a measure of relative abundance. Characterize the uncertainty and any bias in these sources of data.

3. Describe life history characteristics and the stock's spatial distribution (for both juveniles and adults), including any changes over time. Describe factors related to productivity of the stock and any ecosystem factors influencing recruitment. If possible, integrate the results into the stock assessment.

4. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series, and estimate their uncertainty. Include retrospective analyses (both historical and within-model) to allow a comparison with previous assessment results and projections, and to examine model fit. Examine sensitivity of model results to changes in re-estimated recreational data.

5. State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for $B_{MSY}$, $B_{THRESHOLD}$, $F_{MSY}$ and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.

6. Make a recommendation[1] about what stock status appears to be, based on the existing model (i.e., model from previous peer reviewed accepted assessment) and with respect to a new modeling approach(-es) developed for this peer review.

    a. Update the existing model with new data and make a stock status recommendation (about overfished and overfishing) with respect to the existing BRP estimates.
    b. Then use the newly proposed modeling approach(-es) and make a stock status recommendation with respect to "new" BRPs and their estimates (from TOR-5).
    c. Include descriptions of stock status based on simple indicators/metrics (e.g., age-and size-structure, temporal trends in population size or recruitment indices, etc).

7. Develop approaches and apply them to conduct stock projections.

    a. Provide numerical annual projections (5 years) and the statistical distribution (i.e., probability density function) of the catch at FMSY or an FMSY proxy (i.e. the overfishing level, OFL) (see Appendix to the SAW TORs). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment).
    b. Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions. Identify reasonable projection parameters (recruitment, weight-at-age, retrospective adjustments, etc.) to use when setting specifications.
    c. Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.

8. Review, evaluate and report on the status of the SARC and Working Group research recommendations listed in most recent SARC reviewed assessment and review panel reports and MAFMC SSC reports. Identify new research recommendations.

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[1]NOAA Fisheries has final responsibility for making the stock status determination for this stock based on best available scientific information.

**B. Striped bass**

1. Investigate all fisheries independent and dependent data sets, including life history, indices of abundance, and tagging data. Discuss strengths and weaknesses of the data sources.

2. Estimate commercial and recreational landings and discards. Characterize the uncertainty in the data and spatial distribution of the fisheries. Review new MRIP estimates of catch, effort and the calibration method, if available.

3. Use an age-based model to estimate annual fishing mortality, recruitment, total abundance and stock biomass (total and spawning stock) for the time series and estimate their uncertainty. Provide retrospective analysis of the model results and historical retrospective. Provide estimates of exploitation by stock component and sex, where possible, and for total stock complex.

4. Use tagging data to estimate mortality and abundance, and provide suggestions for further development.

5. Update or redefine biological reference points (BRPs; point estimates or proxies for $B_{MSY}$, $SSB_{MSY}$, $F_{MSY}$, MSY) for each stock component where possible and for the total stock complex. Make a stock status determination based on BRPs by stock component, where possible, and for the total stock complex.

6. Provide annual projections of catch and biomass under alternative harvest scenarios. Projections should estimate and report annual probabilities of exceeding threshold BRPs for F and probabilities of falling below threshold BRPs for biomass.

7. Review and evaluate the status of the Technical Committee research recommendations listed in the most recent SARC report. Identify new research recommendations. Recommend timing and frequency of future assessment updates and benchmark assessments.

***SAW Assessment TORs:***

## Clarification of Terms used in the Stock Assessment Terms of Reference

**Guidance to SAW Working Group about "Number of Models to include in the Assessment Report":**

In general, for any TOR in which one or more models are explored by the Working Group, give a detailed presentation of the "best" model, including inputs, outputs, diagnostics of model adequacy, and sensitivity analyses that evaluate robustness of model results to the assumptions. In less detail, describe other models that were evaluated by the Working Group and explain their strengths, weaknesses and results in relation to the "best" model. If selection of a "best" model is not possible, present alternative models in detail, and summarize the relative utility each model, including a comparison of results. It should be highlighted whether any models represent a minority opinion.

**On "Acceptable Biological Catch" (DOC Nat. Stand. Guidelines. Fed. Reg., v. 74, no. 11, 1-16- 2009):**

*Acceptable biological catch (ABC)* is a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of Overfishing Limit (OFL) and any other scientific uncertainty…" (p. 3208) [In other words, OFL ≥ ABC.]

*ABC for overfished stocks.* For overfished stocks and stock complexes, a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates in the rebuilding plan. (p. 3209)

NMFS expects that in most cases ABC will be reduced from OFL to reduce the probability that overfishing might occur in a year. (p. 3180)

ABC refers to a level of ''catch'' that is ''acceptable'' given the ''biological'' characteristics of the stock or stock complex. As such, Optimal Yield (OY) does not equate with ABC. The specification of OY is required to consider a variety of factors, including social and economic factors, and the protection of marine ecosystems, which are not part of the ABC concept. (p. 3189)

**On "Vulnerability" (DOC Natl. Stand. Guidelines. Fed. Reg., v. 74, no. 11, 1-16-2009):**

*"Vulnerability.* A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce Maximum Sustainable Yield

(MSY) and to recover if the population is depleted, and susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery (e.g., loss of habitat quality)." (p. 3205)

**Participation among members of a Stock Assessment Working Group:**

Anyone participating in SAW meetings that will be running or presenting results from an assessment model is expected to supply the source code, a compiled executable, an input file with the proposed configuration, and a detailed model description in advance of the model meeting. Source code for NOAA Toolbox programs is available on request. These measures allow transparency and a fair evaluation of differences that emerge between models.

**Appendix 2.**

**66th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC)**
**Benchmark stock assessment for A. Summer flounder and B. Striped bass**

**November 27-30, 2018**

Stephen H. Clark Conference Room – Northeast Fisheries Science Center
Woods Hole, Massachusetts

**DRAFT AGENDA*** (version: Oct. 9, 2018)

| TOPIC | PRESENTER(S) | RAPPORTEUR |
|---|---|---|

**Tuesday, Nov. 27**

**10 – 10:45 AM**

Welcome/Description of Review Process — **James Weinberg**, SAW Chair
Introductions/Agenda — **Robert Latour**, SARC Chair
Conduct of Meeting

**10:45 – 12:45 PM** Assessment Presentation (A. Summer flounder)
**Mark Terceiro** **TBD**

**12:45 – 1:45 PM** Lunch

**1:45 – 3:45 PM** Assesssment Presentation (A. Summer flounder)
**Mark Terceiro** **TBD**

**3:45 – 4 PM** Break

**4 – 5:45 PM** SARC Discussion w/ Presenters (A. Summer flounder)
**Robert Latour,** SARC Chair **TBD**

**5:45 – 6 PM** Public Comments

| TOPIC | PRESENTER(S) | RAPPORTEUR |
|---|---|---|
| **Wednesday, Nov. 28** | | |
| **8:30 – 10:30 AM** | Assessment Presentation (B. Striped bass)<br>**Katie Drew, Gary Nelson, Mike Celestino** | **TBD** |
| **10:30 – 10:45 AM** | Break | |
| **10:45 – 12:30 PM** | Assessment Presentation (B. Striped bass)<br>**Katie Drew, Gary Nelson, Mike Celestino** | **TBD** |
| **12:30 – 1:30 PM** | Lunch | |
| **1:30 – 3:30 PM** | SARC Discussion w/presenters (B. Striped bass)<br>**Robert Latour,** SARC Chair | **TBD** |
| **3:30 – 3:45 PM** | Public Comments | |
| **3:45 -4 PM** | Break | |
| **4 – 6 PM** | Revisit with Presenters (A. Summer flounder )<br>**Robert Latour,** SARC Chair | **TBD** |
| **7 PM** | **(**Social Gathering**)** | |

| TOPIC | PRESENTER(S) | RAPPORTEUR |
|---|---|---|
| **Thursday, Nov. 29** | | |
| **8:30 – 10:30** | Revisit with Presenters (B. Striped bass)<br>**Robert Latour,** SARC Chair | **TBD** |
| **10:30 – 10:45** | Break | |
| **10:45 – 12:15** | Review/Edit Assessment Summary Report (A. Summer | |

| | | |
|---|---|---|
| | flounder)<br>**Robert Latour,** SARC Chair | **TBD** |
| **12:15 – 1:15 PM** | Lunch | |
| **1:15 – 2:45 PM** | (cont.) Edit Assessment Summary Report (A. Summer flounder)<br>**Robert Latour,** SARC Chair | **TBD** |
| **2:45 – 3 PM** | Break | |
| **3 – 6 PM** | Review/edit Assessment Summary Report (B. Striped bass)<br>**Robert Latour,** SARC Chair | **TBD** |

**Friday, Nov. 30**

| | |
|---|---|
| **9:00 AM – 5:00 PM** | SARC Report writing |

*All times are approximate, and may be changed at the discretion of the SARC chair. The meeting is open to the public; however, during the Report Writing sessions we ask that the public refrain from engaging in discussion with the SARC.

## Appendix 3. Individual Independent Peer Review Report Requirements

**Appendix 3.**

1. The independent peer review report shall be prefaced with an Executive Summary providing a concise summary of whether they accept or reject the work that they reviewed, with an explanation of their decision (strengths, weaknesses of the analyses, etc.).

2. The report must contain a background section, description of the individual reviewers' role in the review activities, summary of findings for each TOR in which the weaknesses and strengths are described, and conclusions and recommendations in accordance with the TORs. The independent report shall be an independent peer review, and shall not simply repeat the contents of the SARC Summary Report.

    a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including a concise summary of whether they accept or reject the work that they reviewed, and explain their decisions (strengths, weaknesses of the analyses, etc.), conclusions, and recommendations.

    b. Reviewers should discuss their independent views on each TOR even if these were consistent with those of other panelists, but especially where there were divergent views.

    c. Reviewers should elaborate on any points raised in the SARC Summary Report that they believe might require further clarification.

    d. The report may include recommendations on how to improve future assessments.

3. The report shall include the following appendices:

    Appendix 1: Bibliography of materials provided for review
    Appendix 2: A copy of this Statement of Work
    Appendix 3: Panel membership or other pertinent information from the panel review meeting.

## Appendix 4. SARC Summary Report Requirements

**Appendix 4.**

1. The main body of the report shall consist of an introduction prepared by the SARC chair that will include the background and a review of activities and comments on the appropriateness of the process in reaching the goals of the SARC. Following the introduction, for each assessment reviewed, the report should address whether or not each Term of Reference of the SAW Working Group was completed successfully. For each Term of Reference, the SARC Summary Report should state why that Term of Reference was or was not completed successfully.

   To make this determination, the SARC chair and reviewers should consider whether or not the work provides a scientifically credible basis for developing fishery management advice. If the reviewers and SARC chair do not reach an agreement on a Term of Reference, the report should explain why. It is permissible to express majority as well as minority opinions. The report may include recommendations on how to improve future assessments.

2. If any existing Biological Reference Points (BRPs) or BRP proxies are considered inappropriate, include recommendations and justification for alternatives. If such alternatives cannot be identified, then indicate that the existing BRPs or BRP proxies are the best available at this time.

3. The report shall also include the bibliography of all materials provided during the SAW, and relevant papers cited in the SARC Summary Report, along with a copy of the CIE Statement of Work.

   The report shall also include as a separate appendix the assessment Terms of Reference used for the SAW, including any changes to the Terms of Reference or specific topics/issues directly related to the assessments and requiring Panel advice.

once on any calendar day, which is defined as the 24-hr period beginning at 0001 hours and ending at 2400 hours.

(ii) *Entire commercial fishery.* During a closure of the directed commercial Atlantic mackerel fishery pursuant to § 648.24(b)(1)(i), when 100 percent of the DAH is harvested, vessels issued an open or limited access Atlantic mackerel permit may not take and retain, possess, or land more than 5,000 lb (2.26 mt) of Atlantic mackerel per trip at any time, and may only land Atlantic mackerel once on any calendar day, which is defined as the 24-hr period beginning at 0001 hours and ending at 2400 hours.

* * * * *

[FR Doc. 2018–21616 Filed 10–3–18; 8:45 am]

BILLING CODE 3510–22–P

## DEPARTMENT OF COMMERCE

### National Oceanic and Atmospheric Administration

### 50 CFR Part 697

**[Docket No. 180709616–8616–01]**

**RIN 0648–BI07**

## Fisheries of the United States; Regulations for Striped Bass Fishing in the Block Island Transit Zone

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Advance notice of proposed rulemaking; request for comments.

**SUMMARY:** NMFS issues this advance notice of proposed rulemaking (ANPR) to provide background information and make the public aware of a proposal to remove the current prohibition on recreational Atlantic striped bass fishing in the Block Island Transit Zone (Transit Zone) within the Federal exclusive economic zone (EEZ). The ANPR is in response to the 2018 Omnibus Appropriations Act which included the provision directing NOAA, in consultation with the Atlantic States Marine Fisheries Commission, to consider lifting the ban on striped bass fishing in the Federal Block Island Transit Zone. NMFS communicated the intent to issue this ANPR at the Atlantic States Marine Fisheries Commission's August 2018 public meeting. By this action, NMFS is soliciting public comment on options presented to regulate fishing for striped bass in the Transit Zone. In addition, comments on other options to improve management of Atlantic striped bass in the Transit Zone are welcomed and encouraged.

**DATES:** Written comments regarding the issues in this ANPR must be received by 5 p.m., local time, on November 19, 2018.

**ADDRESSES:** You may submit comments on this document, identified by NOAA–NMFS–2018–0106, by any of the following methods:

- *Electronic Submission:* Submit all electronic public comments via the Federal e-Rulemaking Portal. Go to *www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2018-0106,* click the ''Comment Now!'' icon, complete the required fields, and enter or attach your comments.
- *Mail:* Submit written comments to Kelly Denit, Division Chief, Office of Sustainable Fisheries, 1315 East-West Highway, SSMC3, Silver Spring, MD 20910.
- *Fax:* 301–713–1193; Attn: Kelly Denit.

*Instructions:* Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address, etc.), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous).

**FOR FURTHER INFORMATION CONTACT:** Kelly Denit, Division Chief, Office of Sustainable Fisheries, National Marine Fisheries Service, 301–427–8517.

**SUPPLEMENTARY INFORMATION:**

### Background

Atlantic striped bass occur predominately within 12 nautical miles from shore, an area which includes both waters (0–3 miles from shore) under state jurisdiction, as well as portions of the Exclusive Economic Zone (3–200 miles from shore) under Federal jurisdiction. Management responsibility for Atlantic striped bass resides primarily with the coastal states, and interstate management occurs through the Atlantic State Marine Fisheries Commission's (Commission) Interstate Fisheries Management Plan for the Atlantic Striped Bass (ISFMP), first adopted in 1981. In 1995, the Commission declared the Atlantic striped bass population fully restored and implemented Amendment 5 to the ISFMP to perpetuate the stock so as to allow a commercial and recreational harvest consistent with the long-term maintenance of the striped bass stock. The latest stock assessment update completed in 2016 determined that the Atlantic striped bass stock is not overfished or experiencing overfishing.

NMFS promulgates regulations in Federal waters that are compatible with the Commission's ISFMP. The Atlantic Striped Bass Conservation Act (Pub. L. 100–589, 16 U.S.C. 5151, *et seq.*) sets forth the basis for Federal striped bass regulatory authority. Under the act, Federal Atlantic striped bass regulations must comply with the following: (1) Be consistent with the national standards in Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1851); (2) be compatible with the fishery management plan for managing Atlantic striped bass and each Federal moratorium in effect on fishing for Atlantic striped bass within the coastal waters of a coastal state; (3) ensure the effectiveness of State regulations on fishing for Atlantic striped bass within the coastal waters of a coastal state; and (4) be sufficient to assure the long-term conservation of Atlantic striped bass populations. Further, in developing the regulations, the Secretary is to consult with the Commission, the appropriate Regional Fishery Management Councils (Councils), and each affected Federal, state, and local government entity.

Existing Federal regulations prohibit recreational and commercial fishing for Atlantic striped bass in the EEZ. The regulations do, however, allow fishers to transport Atlantic striped bass caught in adjoining state fisheries while transiting the Block Island Transit Zone (Transit Zone; 50 CFR 697.7). The Transit Zone is defined in NMFS regulations as the area of Federal waters within Block Island Sound, located between areas south of Montauk Point, New York, and Point Judith, Rhode Island. The Transit Zone area is unique because it is a small area of Federal waters (Block Island Sound) substantially bounded by state waters (Long Island, New York on one side, Block Island, Rhode Island on another, and the mainland of Connecticut and Rhode Island on a third side).

NMFS is considering revising current regulations to authorize recreational fishing in the Block Island Transit Zone. This would allow recreational fishermen to harvest, retain, and transport striped bass within the Block Island Transit Zone. The ANPR is in response to the 2018 Omnibus Appropriations Act (Pub. L. 115–141) which included the provision directing ''NOAA, in consultation with the Atlantic States Marine Fisheries

Commission, to consider lifting the ban on striped bass fishing in the Federal Block Island Transit Zone.'' NMFS communicated the intent to issue this ANPR to the Atlantic States Marine Fisheries Commission at the August 2018 meeting. NMFS is not proposing to allow commercial striped bass fishing in the Transit Zone, consistent with Executive Order 13449 (October 24, 2007; 72 FR 60531), ''Protection of Striped Bass and Red Drum Fish Populations,'' which declared it the policy of the United States to prohibit the sale of striped bass caught in the EEZ.

## Public Comments

To help determine the scope of issues to be addressed and to identify significant issues related to this action, NMFS is requesting public comments on this ANPR. The public is encouraged to submit comments related to the potential regulatory revisions described in this ANPR, as well as additional ideas to improve management of striped bass in the Block Island Transit Zone.

**Authority:** 16 U.S.C. 1827a.

Dated: September 28, 2018.

**Samuel D. Rauch, III,**

*Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.*

[FR Doc. 2018–21613 Filed 10–3–18; 8:45 am]

**BILLING CODE 3510–22–P**

# Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

*James J. Gilmore, Jr., Chair (NY)* *Patrick Kelliher (ME), Vice-Chair* *Robert E. Beal, Executive Director*


*Vision: Sustainably Managing Atlantic Coastal Fisheries*

MONTH DAY, YEAR

Kelly Denit
Division Chief
Office of Sustainable Fisheries
National Marine Fisheries Service
1315 East-West Highway, SSMC3
Silver Spring, Maryland 20910

Dear Ms. Denit,

The Atlantic States Marine Fisheries Commission's (Commission) Atlantic Striped Bass Management Board (Board) recommends that NOAA Fisheries maintain the current prohibition on fishing, harvest and possession of Atlantic striped bass in the Federal Block Island Sound Transit Zone (Transit Zone) and not move forward with rulemaking at this time.

Based on the results of the 2018 Atlantic Striped Bass Benchmark Stock Assessment, the stock is overfished and is experiencing overfishing and the proposed measures could compromise the Board's efforts to end overfishing and rebuild spawning stock biomass to the target level. The benchmark assessment also indicated that roughly 90% of total striped bass removals in 2017 are attributed to the recreational sector and opening the Transit Zone to striped bass fishing may result in increased effort and subsequent fishing mortality.

The long-term sustainability of this resource is vital to the Commission stakeholders and we look forward to continuing to work with you on this issue.

Please contact me or Toni Kerns, ISFMP Director, at tkerns@asmfc.org, if you have questions.

Sincerely,

Robert E. Beal

L19-XXX

## Max Appelman

**From:** John Papciak <jpapciak@optonline.net>
**Sent:** Monday, March 4, 2019 4:07 PM
**To:** Max Appelman; Michael Armstrong
**Cc:** Sen. TODD KAMINSKY; Maureen Davidson; James Gilmore; Emerson Hasbrouck
**Subject:** Atlantic Striped Bass Overfished Again?

Subject: Atlantic Striped Bass Overfished Again?

Dear Dr. Armstrong and Mr. Appleman,

I am a citizen from New York. I have been fishing for striped bass since the late 1970s, just when the striped bass fishery began its historic decline. The 1980s were essentially the "lost years" for striped bass. Dwindling stock assessments were ignored. It took congressional action to implement effective conservation measures.

Now it seems we are trending in this direction again. I can cite my own anecdotal observations, but they track closely with the stock declines as documented by the ASMFC Striped Bass Technical Committee.

After that historic stock crash, there was renewed optimism in the early 1990s. It was still rare to expect a 'keeper' fish, but that didn't stop large numbers of fishermen from planning trips. Regulations for striped bass were relaxed after the fishery was declared restored. I remember a long and fierce debate, which gave way to more fish and smaller fish being kept.

The proponents of relaxed regulation assured conservation-minded stakeholders not to worry. There was a biomass target, and plenty of opportunity to change course if management plans proved to be too liberal.

That never happened. The spawning stock target was ignored.

ASMFC minutes, covering many years, illustrate in detail how the scientific assessments by the Technical Committee projected the fishery would decline. Reading many of the past ASMFC Striped Bass Board meeting minutes is disheartening - here we clearly see an oversight body that resisted proactive measures, despite repeated warning signs.

For example, the November 8, 2011 Management Board meeting minutes document the trend observed by the Technical Committee - overfishing would likely occur by 2017.[1]

Here we are in 2019. The striped bass is overfished by the agreed measures, just as predicted.

This is both puzzling and highly disturbing, since ASMFC Guiding Documents suggest that the singular most import objective of the Commission "... shall be to make inquiry and ascertain from time to time such methods, practices, circumstances and conditions as may be disclosed for bringing about the conservation of, the prevention of the depletion and physical waste of the fisheries..."

Decisions made by the ASMFC Board have consequences. ASMFC appointees at the helm during this now second major decline in the striped bass must accept this as their legacy. Elected officials who served as sponsors must also share the blame.

The only remaining question is whether ASMFC and the Striped Bass Board have the capacity to embrace the drastic change required to reverse the downward trend in the population, and do so in a timely manner.

Here are my own observations and suggestions. I hope you will all give this serious consideration.

(1) The next ASMFC Striped Bass Board meeting should begin with a rigorous self-assessment of what went wrong, followed by the release of a public statement of those findings. This is one way to reassure the public that the Board takes the job of managing the stock very seriously, and has the tools and the mindset to now change course accordingly.

(2) The "Procedures" section of the Fishery Management Plan Charter outlines the process for Emergency Action. Such a "Declaration of Emergency Measures" must be thoroughly discussed, even if it is an implicit admission of past mistakes. Given the glaring disconnect between the Commissioner views and the actual Stock Assessments, as evidenced by little or no action over the last five years in particular, there is an excellent case to be made that the Striped Bass situation cannot be effectively managed without breaking from the old process and mindset.

Standard timelines for implementing corrective action suggests the situation will only get much worse, as Striped Bass would be overfished for at least one to two more years before new regulations are vetted and finalized.

This is unacceptable.

Delaying action, or entertaining any discussion of relaxing reference points, would just be another data point supporting the idea that ASMFC cannot effectively manage a stock.

(3) In looking for a root cause to the problems we now have with Striped Bass, there is compelling evidence of the need to better clarify Board roles, in order to strengthen the overall decision-making capabilities at the Management Board level. ASMFC Guiding Documents clearly spell out the educational/technical qualifications for those conducting stock assessments, and assessing management options. There does not appear to any list of similar qualifications for Commissioners. The end result can be (has been) Commissioners who have the power to caucus to dismiss or veto the science, even in the absurd case when they admit they do not fully understand it.[2]

To be more direct, science-based decisions on biological reference points, or levels of fishing mortality needed to adhere to those reference points, should not be made or influenced by political appointees who have no relevant background or training.

I hope you can give my suggestions serious consideration. I hope that the latest stock assessment can be seen as a wake - up call, and that it is treated accordingly.

As always, please feel free to call or write if you have any further comments or suggestions to what I have outlined above.

Sincerely,

John W. Papciak
54 Birch Lane
Massapequa Park, NY 11762
jpapciak@optonline.net
516-647-0032

Note 1
2010 Stock assessment indicates the likelihood of overfishing by 2017. Several questions are asked by Board members, and the conclusions are confirmed several times.

PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION ATLANTIC STRIPED BASS MANAGEMENT BOARD
The Langham Hotel Boston, Massachusetts November 8, 2011
Approved February 7, 2012

CONSIDERATION OF ACCEPTANCE OF STOCK ASSESSMENT FOR MANAGEMENT USE

MR. G. RITCHIE WHITE: Gary, great report as always. In looking at your projections for the spawning stock biomass out to 2017, two questions. One, if you can to expand that another two years, which we know the recruitment already is low for those two years coming into the spawning stock biomass, so 2019 is our first chance for a new big year class; so if we projected mortality out to 2019, we would be overfishing at that point given –
MR. NELSON: Yes, we'd be overfished.
MR. R. WHITE: Okay, the second part of the question; is there any thought that mortality could go up from present rates due to the amount of the spawning stock biomass in that there is a large percentage of fish there of legal size, so anglers are going to have better access to fish they can keep, which then in turn may increase mortality from existing rates?
MR. NELSON: That's possible but it all depends on human behavior and how they respond to the situation, so it's kind of hard to predict that.
MR. R. WHITE: Followup, Mr. Chairman, and that will be last; so if mortality did increase to some degree during this period, then we could be overfishing prior to 2019, and we could be back to 2017, '16 or something; that could be a possibility?
MR. NELSON: Yes, that's possible, yes.
MR. DOUGLAS GROUT: Well, my question on that is I see under the female spawning stock biomass, under the current fishing mortality rate that we'd be overfished by 2017; right, if we're going below the line, it looks like?
MR. NELSON: On the low recruitment scenario it would go below the line. Under the average – and the reason it doesn't go below, it just touches it, is because the female spawning stock biomass – let me just back up and say age four starts to contribute to the female spawning stock biomass. So that's why at least with the SSB the average recruitment does have an impact on that, so it's just going to touch it by 2017.

Note 2
A Commissioner suggests on record he does not understand the single species assessment, though it is the long-standing basis for management, but wants to divert discussion to a multi-species model.

PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION ATLANTIC STRIPED BASS MANAGEMENT BOARD

Hyatt Regency Hotel Newport, Rhode Island November 2, 2009
Board Approved February 2, 2010

2009 STOCK ASSESSMENT UPDATE

MR. PATRICK AUGUSTINE: Very great report, Gary, a lot of information that always overwhelms us old guys, so I will try to ask a couple of simple, dumb questions. One would be with single-species management, if there is an overall decline in the biomass of that particular stock, in the case of striped bass, either biomass or spawning stock biomass, what effect would that have on other species of fish that are prey for the striped bass? Should we see an increase in some of those other than the fact we have other natural predators on some of those species? Would there be a balance there you could measure or recognize from doing your striped bass stock assessment and could you carry that over to give some idea about the other stocks?
MR. SHEPHERD: Not directly. You need to do an analysis of like an ecosystem, a multispecies analysis to really to see what the effect is. Even though the striped bass numbers are declining and the striped bass are a primary predator on some species, removing that competition may increase predation from a different species, so you may not see any net gain. It may be shifted, say, to bluefish instead of striped bass preying on something. It is an interesting idea to see what the implication of that is. I don't know if you want to do the ultimate experiment to find out, though.
MR. AUGUSTINE: Why not! A follow-on question, Mr. Chairman; is a possible decline in a geographic area – well, I think I know what the answer is, but I'll ask a dumb question – lack of prey could have an absolute and direct relationship to the number and size of striped bass. They're predators and they will be where the bait is and so on. I'm trying to tie that into minimum size in fish.

| | |
|---|---|
| **From:** | David Dow |
| **To:** | Comments |
| **Cc:** | David Dow |
| **Subject:** | Comments on Summer Flounder and Atlantic Striped Bass Stock Assessments and Resulting Changes to Fishery Management Plans |
| **Date:** | Friday, March 22, 2019 6:45:47 AM |

I have some concerns regarding the conversion of the Summer flounder and Atlantic striped bass stock assessments by the ASMFC/NOAA Fisheries into management advice for these stocks at the Spring ASMFC meeting. The Statistical Catch at Age equilibrium model ignores the effects of eutrophication and climate change on SSB in inshore breeding areas for Atlantic striped bass (Chesapeake Bay; Delaware Bay and Hudson River Estuary); changes in natural mortality associated with shifts in predator and prey species in space & time, alterations in the marine food chain (microbial food web and grazing food chain which were explored in the NOAA Fisheries EMaX model); and changes in the inshore "productive capacity" of Essential Fish Habitat and the shifting baseline in the ocean which has created a complex dynamic system which is not at equilibrium.

I would urge the ASMFC Technical Committee to consider the recent paper by Kristin N. Marshall et al. 2019. Inclusion of ecosystem information in the US stock assessments suggests progress toward ecosystem-based fisheries management. ICES Jour. Marine Sci. 76 (1): 1-9. The authors urge usage of ecosystem information for stocks which are both overfished (changes in Spawning Stock Biomass) and subject to overfishing (exceed fishing morality target). I feel that a backup adaptive. ecosystem-based fishery model for Atlantic striped bass recovery be developed in case the equiliibrium model predictions turn out not to useful. Certainly Nantucket Sound and Cape Cod Bay suggest that these systems are not at equilibrium which has effected stocks such as Sea herring and Gulf of Maine cod. and lead to great white sharks appearing off of our beaches to feed on seals which consume inshore forage fish migrating up from the Mid-Atlantic region.

Based on the EMAX (Energy Modeling and Analysis Exercise) carbon budget model for the Northeast Continental Shelf Ecosystem, I feel that the marine food chain should be included in the Essential Fish Habitat for pelagic fish species. The EMaX model had more primary production at the base of the food chain than yield of living marine resources at the top. so that we had to add the microbial food web to the grazing food chain to balance the carbon flow (i.e. the longer food chain lead to greater community respiration loses). Since the ocean has been warming rapidly in the waters surrounding Cape Cod where I live, this will include increased respiration at the base of the food chain and alter the role of forage fish in serving as prey for predators like Summer flounder and Atlantic striped bass. Summer flounder, black sea bass and scup are migrating into southern New England which could provide alternative targets to commercial and recreational fishing sectors.

Since Summer flounder are targeted by both the commercial and recreational sectors in state (0-3 miles) and federal (3-200 miles) waters, my major concern is in allocation of the quotas between the ASMFC; Mid-Atlantic and New England Fishery Management Councils using the best available science. The November 27-30, 2018 Northeast Fisheries Science Center's SAW/SARC summary suggested that Summer flounder stocks were declining, so that I don't want to see them get into the situation that Atlantic striped bass are facing. Five years is a long time between baseline stock assessments and changes in competition between predators feeding on forage fish and top down predation by Apex predators could change the marine food chain dynamics.

The Cape Cod Times published an Op-ed piece on March 5 entitled: "A Moratorium on the Horizon" which has generated some responses from saltwater anglers and Phil Coates (former Director of the Ma. Division of Marine Fisheries). It will take co-operation between commercial fishermen/women and saltwater anglers to develop a recovery plan for Atlantic striped bass and make sure that Summer flounder don't end up in a similar situation as the catch quotas are increased and shifts occur in the ocean ecosystem both inshore and offshore. I have attached a Letter to the Editor that I had published in CapeCodToday.

Thanks for your consideration of these comments.

Dr. David Dow

East Falmouth, Ma.

# Letter: Summer Flounder and Atlantic Striped Bass: Tale of Two Fisheries

from Dr. David Dow of East Falmouth

ARTICLE | **LETTERS TO THE EDITOR** | MARCH 17, 2019 04:45 AM | BY **CAPECODTODAY STAFF**

<letter-to-the-editor_17_260.jpg>

Letter to the Editor:

In November 27-30, 2018 the Northeast Fisheries Science Center conducted baseline stock assessments for these two species which are managed by the Atlantic States Marine Fisheries Commission inshore (0-3 miles) and Mid-Atlantic Fishery Management Council offshore (3-200 miles). Both Summer flounder and Atlantic striped bass are targeted inshore by commercial fishermen/women and saltwater anglers. Summer flounder are also harvested by both fishing groups in federal waters. Even though the final report from the November 2018 stock assessment has been delayed because of the furlough of federal employees/contractors in NOAA Fisheries, Atlantic striped bass were assessed to be both overfished (relates to targets for spawning stock biomass) and subject to overfishing (relates to fishing mortality targets), while Summer flounder stocks were viewed as healthy and proposed catch quotas could be increased for both commercial and recreational sectors.

The worsening situation for Atlantic striped bass will require some type of recovery plan by the management agencies working with constituents (environmentalists/animal rights activists; fishermen/women and concerned public). The ASMFC's Technical Committee

is examining various recovery scenarios and will likely seek input from the Atlantic striped bass Management Board; NOAA Fisheries staff and academic scientists and key constituent groups. The Management Board includes some Cape Cod residents (like Rep. Sarah Peake).

There should be an opportunity for concerned citizens on Cape Cod to comment on how the proposed changes in the Atlantic striped bass recovery plan will effect them personally through some type of outreach program by the NOAA Fisheries Recreational Fisheries Coordinators/ASMFC or Massa. Division of Marine Fisheries Staff on the Management Board.

It is not my intention to get into the details of how all of this will be accomplished, but to make some comments based being the former Recreational Fisheries Coordinator in the Northeast and a member of the New England Fishery Management Council's Habitat Plan Development Team which helped develop Omnibus Habitat Amendment 2 which was approved in January 2018.

* Commercial and recreational fishing are important components of the "Blue Economy" on Cape Cod and important parts of our history which requires maintenance of our working waterfronts.

* There is a shifting baseline in the ocean surrounding Cape Cod from environmental stressors like nutrient enrichment; increased acidity in the water column and sediments and increased water temperature. One example is the interaction between forage fish/seals and Great White sharks which has caused concerns for swimming and skate boarding at beaches on the outer Cape. These large Apex predators have shifted in space and time and exert top down effects on the find chain supporting predators like Summer flounder and Atlantic striped bass. There has also been bottom up changes in the plankton/forage fish linkage that influences these first level predators.

* The production and recruitment of Summer flounder and Atlantic striped bass are supported by inshore Essential Fish Habitat

(eelgrass beds; salt marshes; shellfish beds; etc.) which is included as a component of the federal Magnuson-Stevens Sustainable Fisheries Act. EFH is included as a component of an adaptive, ecosystems-based fisheries management approach. In New England, EFH "productive capacity" doesn't include the marine food chain and the influence of environmental stressors like nutrient enrichment/climate change,

* Towns on Cape Cod are developing Comprehensive Wastewater Management Plans to reduce "N" loading from septic systems under section 208 of the Clean Water Act. This $4-6 billion investment over the next 20-30 years is intended to improve both water quality and restore habitat (i.e. link between bay scallop harvests and eelgrass beds).

* The ASMFC; MAFMC, and Massachusetts Division of Marine Fisheries have to work jointly on a recovery plan for Atlantic striped bass in state waters with the key constituent groups and to make sure that Summer flounder with declining stock sizes in recent years doesn't slip into a similar situation. The MAFMC manages the Summer flounder fishery in federal waters (3-200 miles ) where Atlantic striped bass fishing is banned, while the ASMFC and Ma. DMF manage both species in state waters (0-3) miles.

* The New England Fishery Management Council will need to coordinate its activities in the management of forage fish; primary and Apex predators as they migrate into southern New England waters from the Mid-Atlantic region. This will include redistribution in the quotas between commercial and recreational fishing which were recently addressed at the ASMFC/MAFMC Management Board meeting in Virginia. This complex bureaucracy may be slow to change in how it links science and monitoring —> fisheries management plans and public policy development —> public outreach and education.

* Since the science and monitoring that supports the baseline stock assessments is data rich, but information poor for non-experts, perhaps the MIT/WHOI Sea Grant Program could explain this to policy makers and

elected officials in a more understandable fashion. The Waquoit Bay National Estuarine Research Reserve has been successful in such science translation efforts.

Dr. David Dow

East Falmouth, Ma.