Memo

To: Atlantic States Marine Fisheries Commission
    Mid-Atlantic Fisheries Marine Council

From: Thomas B. Smith

Date: February 11, 2020

Re: Proposed Summer Flounder Recovery Plan for Management Consideration

I mentioned in an email last week framing a recovery plan for the Commission and Council’s consideration in rebuilding the summer flounder fishery. A plan which focused specifically on correcting the issues causing the stock’s decline as opposed to simply reducing catch quotas. Future quota levels will obviously be arrived at through the mandated processes in place today but the recovery plan needs to address specifics causing the decline and catch alone is not the answer as past decades have taught us. The key emphasis with the plan needs to address rebuilding egg production, survival rates of new recruits and overall recruitment through the harvest of less sexually mature age classes, in particular the more fecund female breeders. Optimum yield can’t exist without sustainability and sustainability can’t exist when recruitment drops by 38% this past decade or in excess of 200 million less recruits barely covering natural mortality levels. Reduced discard and discard mortality rates, protection of the mega breeders and the spawn and rebuilding recruitment levels and the female gender composition of SSB are all pre-requisites to sustainability and optimum yield. Even with complexities involved in fisheries management, it really is that simple. If recruitment doesn’t improve dramatically, the fishery won’t recover. Because of the substantially below average recruitment levels since 2011, it’ll take years if not decades for this fishery to recover as those depressed recruitment classes continue to be impacted by natural mortality and the continued harvest of older age classes by commercial and recreational sectors.

Please review the below table, in particular the highlighted summary.

<table>
<thead>
<tr>
<th>Year</th>
<th>Natural Mortality (000's)</th>
<th>Recruitment (000's)</th>
<th>Surplus / (Deficit) (000's)</th>
<th>Catch (000's)</th>
<th>Impact Biomass Population (000's)</th>
<th>Ratio R to Natural Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>(33,795)</td>
<td>81,955</td>
<td>48,160</td>
<td>(39,510)</td>
<td>8,650</td>
<td>2.43</td>
</tr>
<tr>
<td>1983</td>
<td>(40,373)</td>
<td>102,427</td>
<td>62,054</td>
<td>(50,039)</td>
<td>12,015</td>
<td>2.54</td>
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<tr>
<td>1984</td>
<td>(31,084)</td>
<td>46,954</td>
<td>15,870</td>
<td>(56,531)</td>
<td>(40,660)</td>
<td>1.51</td>
</tr>
<tr>
<td>1985</td>
<td>(29,730)</td>
<td>78,263</td>
<td>48,533</td>
<td>(47,076)</td>
<td>1,457</td>
<td>2.63</td>
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<tr>
<td>1986</td>
<td>(31,772)</td>
<td>81,397</td>
<td>49,625</td>
<td>(37,820)</td>
<td>11,805</td>
<td>2.56</td>
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<tr>
<td>1987</td>
<td>(27,596)</td>
<td>53,988</td>
<td>26,392</td>
<td>(34,304)</td>
<td>(7,912)</td>
<td>1.96</td>
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<tr>
<td>1988</td>
<td>(15,768)</td>
<td>12,474</td>
<td>(3,294)</td>
<td>(42,018)</td>
<td>(45,313)</td>
<td>0.79</td>
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<tr>
<td>1989</td>
<td>(12,465)</td>
<td>36,963</td>
<td>24,498</td>
<td>(15,365)</td>
<td>9,133</td>
<td>2.97</td>
</tr>
<tr>
<td>1990</td>
<td>(15,368)</td>
<td>44,019</td>
<td>28,651</td>
<td>(13,052)</td>
<td>15,599</td>
<td>2.86</td>
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<tr>
<td>1991</td>
<td>(18,436)</td>
<td>47,704</td>
<td>29,268</td>
<td>(20,970)</td>
<td>8,298</td>
<td>2.59</td>
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<tr>
<td>1992</td>
<td>(19,518)</td>
<td>47,264</td>
<td>27,746</td>
<td>(24,682)</td>
<td>3,064</td>
<td>2.42</td>
</tr>
<tr>
<td>1993</td>
<td>(18,095)</td>
<td>43,928</td>
<td>25,833</td>
<td>(20,894)</td>
<td>4,939</td>
<td>2.43</td>
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<tr>
<td>1994</td>
<td>(21,120)</td>
<td>58,403</td>
<td>37,283</td>
<td>(22,807)</td>
<td>14,475</td>
<td>2.77</td>
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<tr>
<td>1995</td>
<td>(27,173)</td>
<td>78,348</td>
<td>51,175</td>
<td>(17,497)</td>
<td>33,678</td>
<td>2.88</td>
</tr>
<tr>
<td>1996</td>
<td>(29,954)</td>
<td>59,520</td>
<td>29,566</td>
<td>(22,632)</td>
<td>6,934</td>
<td>1.99</td>
</tr>
</tbody>
</table>
Key Points:

- Recruitment level this decade to prior will decline by more than 200 million recruits. Lowest levels in over 50 years.
- Catch levels (000's) over same time period are down by 70% from 403 million to 120 million fish, 283 million less fish caught (landings and dead discards).
- Ratio of recruitment "R" to natural mortality "M" has declined significantly.
  - 25% of years in current decade natural mortality numbers alone exceeded recruitment.
  - ratio of 1.11:1 means recruitment is barely keeping pace with natural mortality before removals, an extremely dangerous statistic and trend,
- Decade of '80 to '89, net deficit between removals and recruits was ~51 million leading to the crash in 1988
  - current decade net deficit increased to ~88 million which includes ~280 million less fish caught than the decade of the 80's, an almost unimaginable relationship.
  - recruitment between current decade and 80's is lower by ~240 million recruits, the major cause of the deficit.

Recovery Model:
Excessive harvest of older age classes and related issues has twice over the past 45 years caused this fishery to experience significant declines. Once crashing in 1989 when SSB hit its lowest level on record of ~7,000 metric tons preceded by annual recruitment hitting its lowest level in 1988 at ~12.5 million recruits. We're currently in the throes of a 17-yr decline, involving every key metric of the fishery causing a trend which predicts the fishery will experience a second crash within the next 5 years if causes of the decline aren't addressed and remedial measures taken. Significant changes in harvest composition involving older age classes is the primary reason driving a significantly lower proportion of females in the population, historically high discard rates both commercial and recreational and lower levels of egg production resulting in
historically low recruitment numbers. Discard mortality rates are assumed at 80% commercial are 10% recreational. Recreational dead discard rates while significantly lower are causing considerably higher levels of discards due to the increased size minimums regulating recreational anglers. Obscene numbers considering the ratio of fish being harvested to fish being discarded. Proposed solutions as such for each sector in addressing the below objectives and their individual contribution to the overall recovery plan will require different measures to be considered.

**Objectives of Recovery Plan:**

1. Rebuild female gender composition of biomass and SSB
2. Protect efficacy of spawn
3. Reduce harvest of older age classes
4. Reduce discard rates
5. Increase recruitment
6. Remove disparities between sectors in size minimums and harvest rights to biomass

In general, when this fishery experienced explosive growth between 1989 and 2003, we were harvesting a higher percentage of younger age classes which comprised a high percentage of the biomass population and largely left the older age classes untouched. Today the younger age classes have been destroyed due to record low recruitment levels and we're harvesting the older age classes, the prime producers, which makes up a significantly lower percentage of the biomass driving discard rates to record high levels. The data suggests the build-up of the off shore commercial harvest during the fall / winter months in the mid-nineties as well as increases to recreational size minimums have had deleterious impacts on the efficacy of the spawn. Below three charts support that.

![Summer flounder survival (R/SSB) for 1983-2017 Year Classes](image)

**Figure A5.** Recruits per Spawning Stock Biomass ratio (R/SSB) plot indicative of the relative survival of the summer flounder 1983-2017 year classes.

*Source 66th SAW Summary Report – page 23*
The above chart was included in the presentation at the December Annapolis meeting. A few observations. The title of the slide is “MC Comments: Biological Implications of Size Limits”. The first bullet suggests there’s no defined stock recruitment relationship for summer flounder (flat relationship). If that statement were true, why would the below chart reflect the exact opposite which couldn’t more clearly show the inverse relationship between recruitment levels and SSB to recreational size minimum increases and the increased harvest of older age class fish commercially. The chart illustrates a strong and linear relationship between recruitment and SSB through the mid-nineties when size limits were 13” or 14” and younger age classes were the target of both sectors harvest. When recreational size limits began a series of increases (yellow line) accompanied by the selective harvest commercially of older age classes in 1997, the relationship of recruitment to SSB (grey line) developed an inverse relationship becoming more pronounced as size minimums continued increasing and the percentage harvest of older age classes intensified. This isn’t supposition, it’s a fact.

Not sure what the purpose of the scattergram in the above presentation is since it doesn’t factor size limits into the equation or trend based on years, just SSB and R randomly plotted. Yet it’s reflected on a slide titled “Biological Implications of Size Limits”. If anything, it reflects the fact steepness does not exist within this fishery as the relationship of SSB to R bears no trend to support that theory. If it did exist, we’d see a pattern completely different in the above scattergram.

1997 is when the relationship of R/SSB changed dramatically for the worse which coincides with the advent of recreational size minimum increases and commercial operators reverting back to the selective harvest of older age classes which in large part is what caused the collapse of this fishery in 1988. That and substantially greater harvest levels. Unabated harvest of sexually mature older age classes, a proportionatey higher percentage representing female preeders, crashed the fishery. Same reasons are well on their way to causing it again. If both these matters aren’t factored into the rebuilding plan, the stock can’t recover.
**Recreational Sector:**
Reduce size minimums back to 14”. Reduce the harvest of the most fecund female breeders and sexually mature fish of both sexes, radically reduce recreational discard rates, rebuild SSB both in size and female composition, rebuild egg production and as a result rebuild recruitment levels.

**Recommendations:**
- Reduce size minimums:
  - Convert 2 fish of each states daily possession limit to 14” minimum for 2021, retain remainder at existing size minimum with the entire possession limit phased back to 14” in 2022. Recreational and commercial size minimums at that time will be identical at 14”. Special area regulations should be maintained and assessed for fairness to proposed changes.
  - Example, NJ regulations would remain at 3 @ 18” minimum in 2020, 2 @ 14” minimum and 1 @ 18” in 2021 and the entire possession limit @ 14” minimum in 2022. New York would be 4 @ 19” minimum in 2020, 2 @ 14” minimum and 2 @ 19” in 2021 and the entire possession limit @ 14” minimum in 2022. Same for every state. Addresses objectives 1,3,4,5 and 6 above.

When recreational size minimums were 13” and 14” between 1981 and 1996, recreational discard rates as a percentage of landings averaged 129% or 212 million fish in total, a sixteen-year period averaging 13 million discards a year. From 2009 to 2019 when a majority of the
recreational quota consisted of size minimums approaching 19”, the percentage grew to an alarming 937% of landings or 400 million fish in just eleven years, representing an average of 36 million discards per year. For the years 2009 through 2011 alone, recreational anglers discarded 154 million fish to harvest 11.5 million. Numbers like that can’t possibly be benefitting the fishery. For comparison sake, sixteen years at that run rate would equate to 582 million discards, an almost 400 million increase in discard from an equivalent time period when size minimums were significantly lower. 23 million less discards a year when size minimums were set at 13” / 14”, that alone should be all the justification necessary to phase recreational size limits back to 14” coastal-wide by the year 2022.

In addition to the positive impact on discards, review the above chart from Rutgers 2016 Sex and Length study. Moving the recreational size limits back to 14” will result in the harvest or discard of a materially lower percentage of female breeders. At 14”, ratio is more than 2:1 in favor of males to females, at 18” and 19”, the ratio moves closer to 3:1 or 4:1 in favor of females to males. Clearly objectives 1, 3 4 and 5 will be favorably and significantly impacted moving size minimums and landing in that direction.

Commercial Sector:
The two most significant and immediate impacts the commercial sector can make to the recovery of this stock are protection of the spawn and the biomass in general while staging offshore during the winter months as well as the protection of older age class fish being harvested. Especially larger sexually mature age groups of both sexes being targeted as eluded to in the following bullet by the MC at the Annapolis meeting. The fishery, as any other, can’t endure the pressures of being harvested year round inshore and offshore, during the spawn, target the older age classes or SSB causing epic levels of dead discards and sustain itself especially with today’s advanced technologies. We shouldn’t need anything more than the knowledge of what happened in the 70’s and 80’s leading to the crash in 1988 to comprehend that concept. Forty to fifty years later, we’re managing the fishery in a similar manner trending the stock to the same outcome.
The above bullet was part of a slide at the December Annapolis meeting cited by the MC arguing against the inception of a slot limit. The same logic can be applied to why recreational size limit increases and disparities they created between the recreational and commercial sectors should have been more thought out 25 years ago. Disparities as eluded to earlier I believe are in direct conflict and a violation of MSA and FMP legislation. 25 years later, when conservatively 60% - 75% of the harvestable biomass has been shifted exclusively to the commercial sector and ~800 million discards were incurred since 1997 recreationally to harvest a mere 143 million fish, it’s now not a good idea.

The point is regulations and the results they’re intended to attain need to be in sync for both the commercial and recreational sectors whether the biomass is being harvested inshore or offshore. If not, any benefits derived from one will be offset by the other which is the point I believe the MC comment is attempting to make. When the proposed regulatory changes for recreational anglers accomplish the outlined results of protecting older age classes while driving discard rates significantly lower, complimentary regulations need to be in place during the commercial fall / winter harvest offshore. If not, benefits will be negated during the offshore harvest and the fishery will continue its decline.

The question then turns to how to protect the older age classes and the primary spawn when the biomass migrates east to their offshore wintering grounds. Reallocating seasonal quota would cause the least disruption to the commercial sector but other options if necessary should be considered. I’m not suggesting or recommending changes to ACL’s, I’m advocating changing the allocation of monthly / seasonal quotas to protect the spawn and reduce the harvest of the biomass at the time of year it’s most concentrated and vulnerable. My understanding is different states have different seasonal allocations, that would probably need to change or be modified in order to accomplish the above two objectives.

Please reference the below chart illustrating monthly commercial landings averages from 2010 to 2018 (source ACCSP) and proposed reallocation of monthly quotas to accomplish the above stated objectives.
The above chart as mentioned outlines the current average landings by month based on statistics obtained from the Atlantic Coastal Cooperative Statistics Program “ACCSP”. Observations:

- 43% of the commercial harvest occurs when summer flounder are staging offshore during the months January through March.
- 15% occurs during September thru November, the primary spawning months of the fishery. The spawn extends into November and occurs sporadically throughout the entire winter, but September through mid-November appear to be the primary period for the northern biomass which by far represents the significant portion of the biomass remaining today.

**Recommendations:**
- Close the fishery from September through November to protect the spawn, and redistribute the allocation.
- Increase December quota to 15%, 2% less than the average landings over the last nine years between November and December.
- Reduce the quota for January through March from an average of 43% over the period mentioned to 10% a month or 30% in total and redistribute that allocation between the months April through August. In 2017, 72% of annual commercial landings consisted of age classes 3-6. Age classes 3-6 make up a mere 25% of the biomass population. Harvesting 43% of the commercial quota during three months when the biomass is at its most concentrated level with proportionately 72% of landings coming from 25% of the population is a recipe for disaster regarding discard rates. It’s precisely why commercial discard rates, per the below chart, trended higher post 1997 commensurate with the decision to harvest older age classes and a significantly higher percentage during the offshore fishery.
Another option worthy of discussion given the high mortality rates (80%) associated with commercial discards and selective targeting of older age classes is adopting a “keep what you catch” policy. Immediately eliminates commercial discards and high grading. Whatever comes up in the nets is retained, even if daily trip limits are exceeded on the last tow. Between 2000 and 2018, commercial sector generated 22,000 metric tons of dead discard or 1,160 metric tons on average a year. Divide that by the average landings weight over the same time frame discounted 10% for presumed lower weights of discards and on average ~1.3 million fish are discarded dead annually or ~25 million fish over the period referenced. That’s a significant amount of wasted resource for a fishery in a substantial state of decline.

In the short term, we can’t continue harvesting all sexually mature fish with a high degree of female breeders and expect the 200 million plus drop in recruitment this decade or the gender composition of the biomass to correct itself. The older age classes need protection as does the spawn. “Keep what you catch” for the commercial sector, smoothing out the seasonal allocations and reducing recreational size minimums will accomplish the above.
The above chart reflects the commercial catch distribution for 2018 revealing 64% of the total catch coming from three areas, 613, 616 and 537 representing statistical areas located in SNE and NYB. I would venture to say those percentages increased in 2019 and will continue increasing in the immediate future.

Table 4: Statistical areas that accounted for at least 5 percent of the total summer flounder catch in 2018, with associated number of trips.7

<table>
<thead>
<tr>
<th>Statistical Area</th>
<th>Percent of 2018 Commercial Summer Flounder Catch</th>
<th>Number of Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>616</td>
<td>34%</td>
<td>1,062</td>
</tr>
<tr>
<td>537</td>
<td>17%</td>
<td>1,199</td>
</tr>
<tr>
<td>613</td>
<td>13%</td>
<td>1,553</td>
</tr>
<tr>
<td>612</td>
<td>6%</td>
<td>1,281</td>
</tr>
<tr>
<td>539</td>
<td>6%</td>
<td>2,473</td>
</tr>
<tr>
<td>622</td>
<td>6%</td>
<td>263</td>
</tr>
</tbody>
</table>

Figure 5: NMFS statistical areas showing percent of total commercial summer flounder catch in 2018, according to VTR data.7


The above chart reflects the commercial catch distribution for 2018 revealing 64% of the total catch coming from three areas, 613, 616 and 537 representing statistical areas located in SNE and NYB. I would venture to say those percentages increased in 2019 and will continue increasing in the immediate future.

Source 57th SAW - Pages 132 -
The above graph from the 57th SAW shows the significant shift in the trend of commercial landings in metric tons in areas 613, 616 and 537 (the SNE and NYB biomass) and corresponding reduction from areas 625, 626 and 631 (the Delmarva and Norfolk Canyon biomass). Per table 4 above, areas 613, 616 and 537 increased to a significant 64% of annual catch with no reason to believe the increase won’t continue.

**Commercial Fishery**

The available VTR time series begins in 1994, just when summer flounder populations began rebuilding. Heaviest commercial catches (and by inference, effort) are reported just off of Cape Hatteras, concentrated around the entrances to Hudson Bay and Narragansett Bay, and offshore along the shelf edge from the Chesapeake Bay entrance through SNE (Figure A7; brown to purple squares). Large catches of summer flounder continued along the shelf from 2001-2005 with concentrations slightly farther north off DelMarVa (Figure A8). This northerly trend of offshore commercial catches continued through the present decade with the largest shelf catches now in SNE just south of Rhode Island. While a few inshore hot spots still remain (mainly at the entrance to Delaware and Chesapeake Bays and down the coast to Cape Hatteras), VTR reported commercial catches of summer flounder at its southern extent are reduced after 2005 (Figures A9-A11).

Please read the above excerpt from the 66th SAW. A well distributed biomass along the coast didn’t suddenly decide to migrate north. The southern biomass was decimated and what’s left is the northern biomass located in SNE / NYB. If that biomass fails, this fishery fails with it and data from fisheries management’s own science strongly supports this.

There two choices the Commission and Council have. Continue on the current path and by 2024, 2025 at latest, the fishery will test its lowest levels over the last 50 or more years under current regulations. Catch levels are down 70% in the current decade compared to the 80’s and still the fishery is in a freefall decline. Catch is not the issue management should be focused on, catch composition and the timing of the commercial harvest are. 200 million less recruits in the current decade combined with the 50% increase in the commercial catch quota handed out for the years 2019 – 2021 along with a materially impaired female gender composition of every relevant age group in the fishery guarantee this fishery’s continued decline until it eventually crashes for a second time. That time is just around the corner. When it happens, the fishery loses, the commercial and recreational sectors lose and the stock will be so impaired it’ll take decades if ever to recover. We’re at the crossroads.

**OR** management can acknowledge the data science has provided, the trends and negative impacts to the fishery that data reveals, and act accordingly in managing this fishery by adopting the changes outlined or alternate measures addressing the issue identified leading to the stock’s decline.

This fishery in many ways is no less impacted than the issues currently impacting the striped bass fishery. Harvesting too many breeders, a plunging recruitment line and a declining biomass with significantly less females. The Commission and Council have to ask themselves why the proposed amendments currently being discussed for adoption in the striped bass fishery to protect breeders, the female population overall, increase recruitment levels and reduce discard levels to rebuild the stock are not precisely the same discussions and measures being considered to manage and rebuild the summer flounder fishery. The recommended steps I’ve outlined, both
recreational and commercial, will facilitate the pre-requisite objectives needed in order for this stock to recover.

Fortune of the fishery rests in your hands. You can turn a blind eye, the fisheries fate is sealed and everyone loses. Or management can make the necessary changes and take a more prudent course of action to achieve a sustainable fishery for both commercial and recreational interests to reap the benefit from. Decision is yours to make how you wish to proceed.