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Michael P. Luisi, Chairman | G. Warren Elliott, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: November 6, 2019

To: Chris Moore, Executive Director

From: Kiley Dancy, Staff

Subject: Summer Flounder Recreational Management Measures for 2020

Background and Summary

In October 2019, the Council and the Atlantic States Marine Fisheries Commission's (Commission's) Summer Flounder, Scup, and Black Sea Bass Board (Board) reviewed the previously adopted commercial quota and recreational harvest limit for summer flounder for the 2020 fishing year. The Council and Board recommended no changes to the implemented catch and landings limits, based on the advice of the Scientific and Statistical Committee (SSC) and Monitoring Committee (MC). These 2020 specifications were approved in March 2019 based on the recommendations from the SSC following the 2018 stock assessment for summer flounder.

The final rule implementing the 2020 commercial quota and recreational harvest limit (RHL) published on October 9, 2019 (84 FR 54041) and includes a 2020 recreational harvest limit (RHL) for summer flounder of <u>7.69 million lb</u> (the same as the revised 2019 RHL). Projected 2019 harvest in pounds, as described below, is 7.06 million pounds (8% below the 2020 RHL).

Each year, the Monitoring Committee (MC) is tasked with recommending recreational management measures (possession limits, size limits, and seasons) to constrain harvest to the RHL. For summer flounder, this includes recommending the use of coastwide measures (identical measures in all states and federal waters) or conservation equivalency (state- or region-specific measures in state waters, and "non-preferred" federal measures that are waived in favor of the state measures). In either case, the combination of measures is designed to constrain harvest to the RHL.

As discussed in the staff recommendation section below, staff recommend that the Monitoring Committee consider measures that depart from the current conservation equivalency measures, particularly regarding the current minimum size limits.

Recreational Catch and Landings Trends and 2019 Projections

In July 2018, the Marine Recreational Information Program (MRIP) released revisions to their time series of recreational catch and landings estimates based on adjustments for a revised angler intercept methodology and a new effort estimation methodology (i.e., a transition from a telephone-based effort survey to a mail-based effort survey). The revised estimates of catch and landings are several times higher than the previous estimates for shore and private boat modes, substantially raising the overall summer flounder catch and harvest estimates. On average, the new landings estimates for summer flounder (in pounds) are 1.8 times higher over the full time series (1981-2017), and 2.3 times higher in recent years (2008-2017). Recreational data included in this memo reflect revised MRIP data except where otherwise stated.

MRIP data for 2019 are incomplete and preliminary, with only the first four waves (January through August) available. Preliminary wave 1-4 data for 2019 were used to project catch and landings for the entire year by assuming the same proportion of catch and landings by wave as in 2018. These projections are typically assumed to be overestimates for states with more restrictive seasonal measures in remaining waves of the current year, and underestimates for those with less restrictive seasonal measures. Between 2018 and 2019, only a few very minor changes to recreational measures were made, including shifts of 1 or 2 days in season for Rhode Island and New Jersey, and the addition of shore mode regulations for Rhode Island (see Table 5).

For 2019, projected catch is 28.69 million fish (including landings, live discards, and dead discards), and projected landings are 7.06 million lb or 2.22 million fish (Table 1). For comparison purposes, 2019 projected annual harvest was also calculated using the coastwide (i.e., Maine through North Carolina) proportions of harvest by wave in 2018, rather than projecting by state. This resulted in a projected 2019 harvest of 6.98 million pounds and 2.18 million fish.

Table 1: Preliminary summer flounder 2019 catch and harvest through wave 4, and projected 2019 catch and harvest based on proportions by wave from 2018.

	Harvest (mil lb)	**Harvest (mil fish)**	**Catch[a] (mil fish)**
Preliminary 2019 through Wave 4	6.23	1.93	24.23
Projected 2019 full year[b]	7.06	2.22	28.69

[a] Catch data provided by MRIP include harvest, dead discards, and live discards in numbers of fish.
[b] Using summed state level projections.

Table 2 provides the revised MRIP time series of recreational harvest (in number and weight) and catch (in number of fish) for 1981-2019 (with 2019 projected). Under the revised MRIP estimates, the time series high of harvest is 36.74 million lb or 25.78 million fish in 1983, with a low harvest of 5.66 million lb or 3.10 million fish (1989). Revised catch estimates show a high catch of 58.89 million fish in 2010 and a low in catch of 5.06 million fish in 1989 (Table 2). Table 2 also shows the percent of summer flounder released[1] (relative to total catch in numbers of fish) and the mean weight of landed summer flounder each year from 1981-2019 (projected).

[1] Reported as released alive, with 10% of those live releases assumed to die post-release.

Table 2: Summer flounder recreational catch and landings under revised MRIP estimates, Maine through North Carolina, 1981-2019, all waves (2019 projected based on data through wave 4).[a]

	Catch (mil fish)	Harvest (mil fish)	Harvest (mil lb)	% Released (Released Alive)	Mean Weight of Landed Fish
1981	22.77	17.02	15.85	25%	0.93
1982	26.07	19.29	23.72	26%	1.23
1983	36.35	25.78	36.74	29%	1.43
1984	39.82	23.45	28.23	41%	1.20
1985	26.28	21.39	25.14	19%	1.18
1986	32.52	16.38	26.47	50%	1.62
1987	29.94	11.93	23.45	60%	1.97
1988	25.45	14.82	20.79	42%	1.40
1989	5.07	3.10	5.66	39%	1.82
1990	15.47	6.07	7.75	61%	1.28
1991	24.83	9.83	12.91	60%	1.31
1992	21.11	8.79	12.67	58%	1.44
1993	36.18	9.80	13.73	73%	1.40
1994	26.11	9.82	14.29	62%	1.45
1995	27.84	5.47	9.02	80%	1.65
1996	29.75	10.18	15.02	66%	1.47
1997	31.87	11.04	18.53	65%	1.68
1998	39.09	12.37	22.86	68%	1.85
1999	42.88	8.10	16.70	81%	2.06
2000	43.26	13.05	27.03	70%	2.07
2001	43.68	8.03	18.56	82%	2.31
2002	34.48	6.51	16.29	81%	2.50
2003	36.21	8.21	21.49	77%	2.62
2004	37.95	8.16	21.20	79%	2.60
2005	45.98	7.04	18.55	85%	2.63
2006	37.90	6.95	18.63	82%	2.68
2007	35.27	4.85	13.89	86%	2.86
2008	39.48	3.78	12.34	90%	3.26
2009	50.62	3.65	11.66	93%	3.20
2010	58.89	3.51	11.34	94%	3.23
2011	56.04	4.33	13.48	92%	3.12
2012	44.71	5.74	16.13	87%	2.81
2013	44.96	6.60	19.41	85%	2.94
2014	44.58	5.37	16.24	88%	3.02
2015	34.14	4.03	11.83	88%	2.92
2016	31.24	4.30	13.24	86%	3.08
2017	28.03	3.17	10.06	89%	3.18
2018	23.55	2.41	7.60	90%	3.15
2019 (proj.)[b]	28.69	2.22	7.06	92%	3.18

[a] Source: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 28, 2019. [b] Projected using proportion by wave from 2018 MRIP data and 2019 MRIP wave 1-4 data.

Landings by state in recent years, in thousands of pounds and thousands of fish are shown in Table 3 including projections for 2019.

An average of 84% of summer flounder harvest in numbers of fish was taken from state waters (0-3 miles from shore) over the last 10 years (2009-2018; Figure 1). Over the same time period, most harvest originated from private/rental mode trips (87%), while party/charter mode and shore mode accounted for an average of 4% and 9% of the harvest, respectively (Figure 2). Because MRIP revisions affected only the shore and private angler modes and not the party/charter mode, the proportions of harvest by mode have shifted somewhat following the release of revised MRIP estimates.

Table 3: Summer flounder recreational harvest (in thousands of pounds and thousands of fish fish) for revised MRIP estimates, by state for all waves (January-December), 2015-2019 (projected).

	Thousands of Pounds					Thousands of Fish				
	2015	**2016**	**2017**	**2018**	**2019 (proj.)**	**2015**	**2016**	**2017**	**2018**	**2019 (proj.)**
NH	-	-	-	-	-	-	-	-	-	-
MA	386	240	172	143	226	213	106	65	67	93
RI	791	341	599	604	753	222	113	156	169	198
CT	999	1,024	403	549	272	252	338	121	153	79
NY	5,011	5,744	4,214	2,385	2,298	1,517	1,800	1,186	641	533
NJ	3,246	4,718	3,571	3,155	2,561	1,180	1,456	1,200	1,045	894
DE	270	435	259	205	246	120	173	100	85	96
MD	251	98	171	122	118	98	40	57	48	50
VA	719	529	528	345	502	334	212	188	145	221
NC	157	110	147	92	84	99	65	91	58	56
Coast	**11,830**	**13,239**	**10,064**	**7,600**	**7,058**	**4,034**	**4,302**	**3,166**	**2,413**	**2,221**

[a] Source: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 28, 2019.
[b] Projected using proportion by wave from 2018 MRIP data and 2019 MRIP wave 1-4 data.

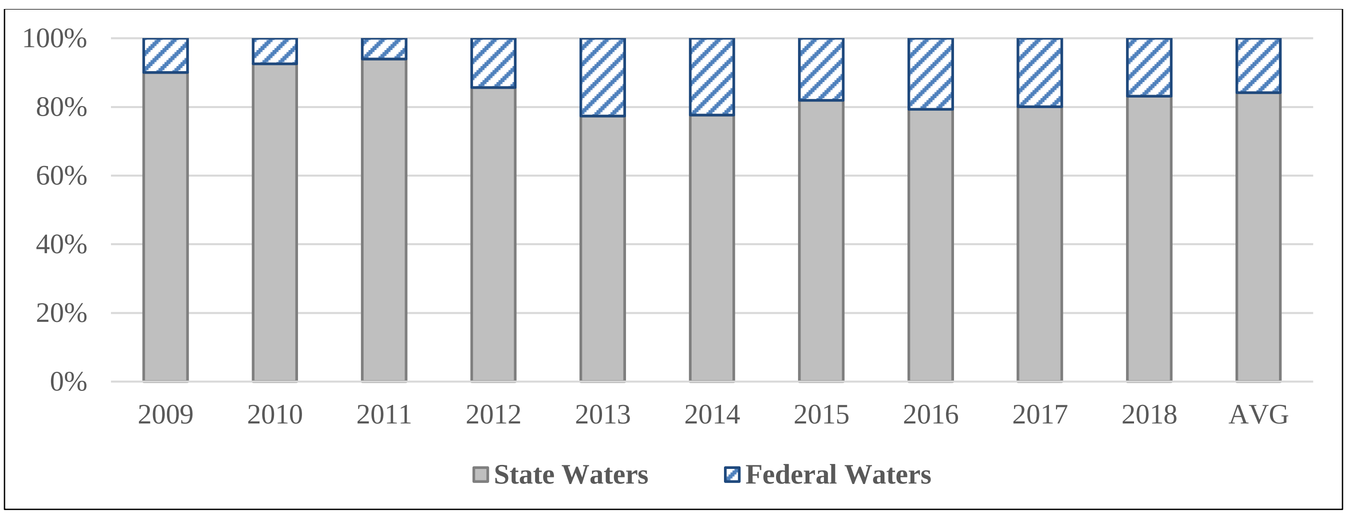

Figure 1: State vs. federal waters harvest in numbers of fish for summer flounder, 2009-2018. Fishing area information is self-reported by anglers. Source: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 28, 2019.

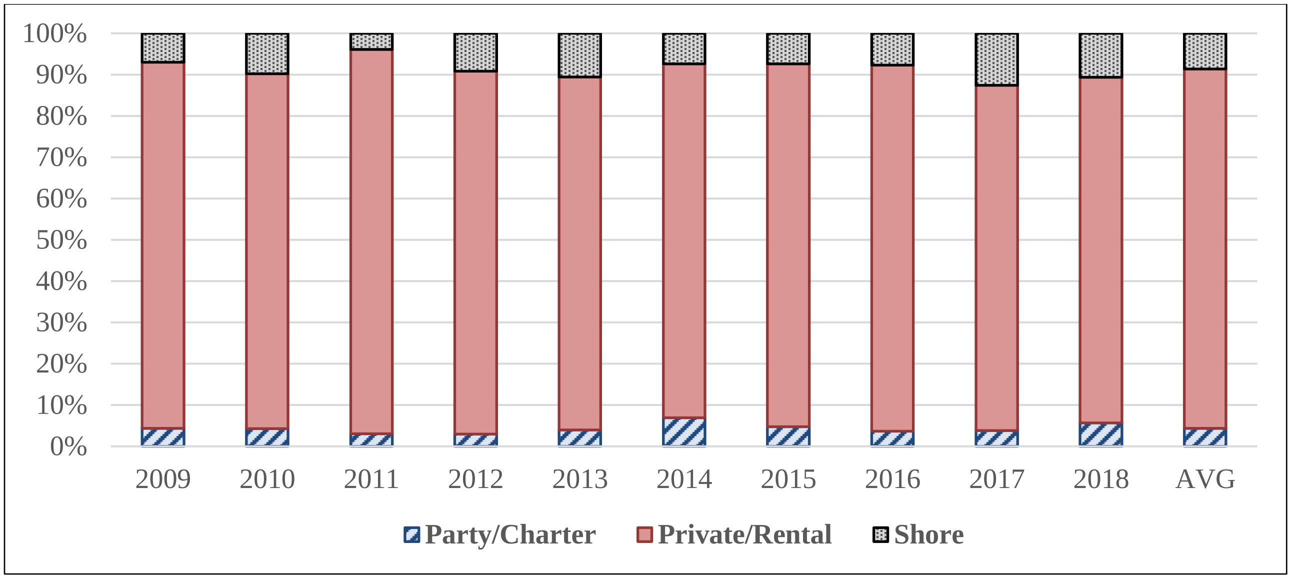

Figure 2: Summer flounder harvest by fishing mode (in numbers of fish), 2009-2018. Source: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 28, 2019.

Expanded length frequencies for summer flounder recreational harvest from 2016-2018 are shown in Figure 3, both in number of fish harvested and in percent of total harvest. Size limits were restricted in most states between 2016 and 2017, resulting in a shift in the size distribution toward larger fish in 2017. Size limits between 2017 and 2018 were largely the same except for a decrease from 17 inches to 16.5 inches in the states of Delaware, Maryland, and Virginia. In 2018, the size bin with the largest landings was 19 inches (21% of 2018 harvest, or about 509,000 pounds).

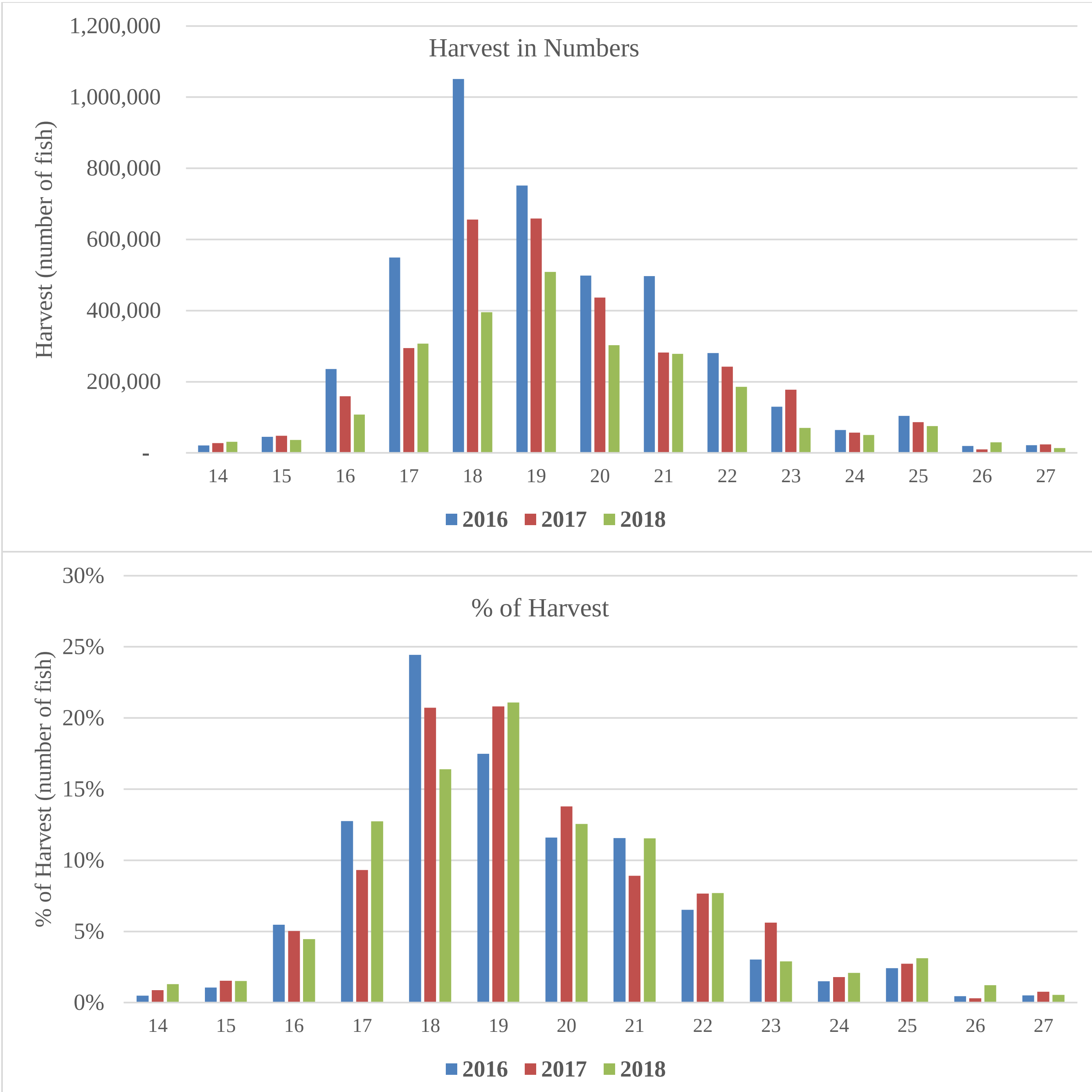

Figure 3: Expanded recreational length frequency for summer flounder, 2016-2018. Size bins below 14" and above 27" accounted for less than 0.5% each of the estimated total harvest and were omitted. Source: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 31, 2019.

Past Fishery Performance and Management Measures

RHLs for summer flounder were first implemented in 1993. Since then, they have varied from a high of 11.98 million lb in 2005 to a low of 3.77 million lb in 2017. Performance relative to past RHLs can only be evaluated using pre-revision ("old") MRIP data, since past RHLs were set using assessments that incorporated the previous MRIP time series. Recreational harvest (pre-revision data) relative to the RHL has varied from a high of 122% over the RHL (2000) to a low of 49% under the RHL (2011; Table 4).

From 1993-2000, coastwide measures were in place for all states and federal waters, with possession limits ranging from 3-10 fish and size limits ranging from 14.0-15.5 inches. Starting in 2001, conservation equivalency was implemented, and has been used as the preferred management system each year since (Table 4). Under conservation equivalency, individual states or multi-state regions set measures that collectively are designed to constrain harvest to the coastwide RHL. Federal regulations are waived and anglers are subject to the summer flounder regulations of the state in which they land. State-by-state conservation equivalency was adopted each year from 2001 through 2013, with each state implementing different sets of management measures. Each year from 2014 through 2019, the Board has approved the use of regional conservation equivalency, where the combination of regional measures is expected to constrain the coastwide harvest to the RHL.

In March 2019, the Council and Board adopted regional conservation equivalency for the summer flounder recreational fishery in 2019. Region-specific possession limits in 2019 range from 2-6 fish with size limits ranging from 15.0-19.0 inches, with various seasons (Table 5).

Under conservation equivalency, the Council and Board must adopt two associated sets of measures: the non-preferred coastwide measures, and the precautionary default measures. The <u>non-preferred coastwide measures</u> are a set of measures that would be expected to constrain harvest to the RHL if implemented on a coastwide basis (the same measures in all states and in federal waters). The combination of state or regional measures under conservation equivalency is designed to be equivalent to this set of non-preferred coastwide measures in terms of coastwide harvest. These coastwide measures are included in the federal regulations but waived in favor of state- or region-specific measures. <u>The non-preferred coastwide measures adopted in 2019 include a 4-fish possession limit, a 19-inch total length (TL) minimum size, and an open season from May 15-September 15.</u> These non-preferred coastwide measures are only waived for the duration of the applicable fishing year; thus, the non-preferred measures described above will take effect in federal waters and for federal party/charter permit holders starting on January 1, 2020 until replaced (if applicable) by the implementation of conservation equivalency or alternative coastwide measures.

The <u>precautionary default measures</u> would be implemented in any state or region that failed to develop adequate measures to constrain or reduce landings as required by the conservation equivalency guidelines. <u>The precautionary default measures in 2019 include a 2-fish possession limit with a 20-inch TL minimum fish size and an open season from July 1-August 31.</u>

Table 4: Summary of federal management measures for the summer flounder recreational fishery, 1993-2020.

Measure	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
ABC (m lb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Recreational ACL (land+disc; m lb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHL (m lb)	8.38	10.67	7.76	7.41	7.41	7.41	7.41	7.41	7.16	9.72	9.28	11.21	11.98	9.29
Harvest - OLD MRIP (m lb)	8.83	9.33	5.42	9.82	11.87	12.48	8.37	16.47	11.64	8.01	11.64	11.02	10.92	10.50
% Over/Under RHL(Old MRIP)	+5%	-13%	-30%	+33%	+60%	+68%	+13%	+122%	+63%	-18%	+25%	-2%	-9%	+13%
Harvest - NEW MRIP	13.73	14.29	9.02	15.02	18.52	22.86	16.70	27.03	18.56	16.29	21.49	21.20	18.55	18.63
Possession Limit	6	8	6/8	10	8	8	8	8	3	[a]	[a]	[a]	[a]	[a]
Size Limit (TL in)	14	14	14	14	14.5	15	15	15.5	15.5	[a]	[a]	[a]	[a]	[a]
Open Season	5/15 - 9/30	4/15 - 10/15	1/1 - 12/31	1/1 - 12/31	1/1 - 12/31	1/1 - 12/31	5/29 - 9/11	5/10 - 10/2	4/15 - 10/15	[a]	[a]	[a]	[a]	[a]
Measure	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
ABC (m lb)	-	-	21.50	25.50	33.95	25.58	22.34	21.94	22.57	16.26	11.30	13.23	25.03	25.03
Recreational ACL (land+disc; m lb)	-	-	-	-	-	11.58	10.23	9.07	9.44	6.83	4.72	5.53	11.51	11.51
RHL (m lb) - landings only	6.68	6.22	7.16	8.59	11.58	8.49	7.63	7.01	7.38	5.42	3.77	4.42	7.69	7.69
Harvest - OLD MRIP (m lb)	9.34	8.15	6.03	5.11	5.96	6.49	7.36	7.39	4.72	6.18	3.19	3.35	-	-
% Over/Under RHL(Old MRIP)	+40%	+31%	-16%	-41%	-49%	-24%	-4%	+5%	-36%	+14%	-15%	-24%	-	-
Harvest - NEW MRIP	13.89	12.34	11.66	11.34	13.48	16.13	19.41	16.24	11.83	13.24	10.06	7.60	7.06[c]	-
Possession Limit	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[b]	[b]	[b]	[b]	[b]	[b]	-
Size Limit (TL in)	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[b]	[b]	[b]	[b]	[b]	[b]	-
Open Season	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[b]	[b]	[b]	[b]	[b]	[b]	-

[a] State-specific conservation equivalency measures. [b] Region-specific conservation equivalency measures. [c] Projected.

Table 5: Summer flounder recreational fishing measures in 2018 and 2019, by state, under regional conservation equivalency. 2018 and 2019 regions include: 1) Massachusetts, 2) Rhode Island, 3) Connecticut and New York, 4) New Jersey, 5) Delaware, Maryland, The Potomac River Fisheries Commission, and Virginia, and 6) North Carolina.

	2018			2019		
State	**Minimum Size (inches)**	**Possession Limit**	**Open Season**	**Minimum Size (inches)**	**Possession Limit**	**Open Season**
Massachusetts	17	5 fish	May 23-October 9	17	5 fish	May 23-October 9
Rhode Island (Private, For-Hire, and all other shore-based fishing sites)	19	6 fish	May 1-December 31	19	6 fish	May 3-December 31
RI 7 designated shore sites	N/A	N/A		19	4 fish[a]	
				17	2 fish[a]	
Connecticut	19	4 fish	May 4-September 30	19	4 fish	May 4- September 30
CT Shore Program (45 designed shore sites)	17			17		
New York	19			19		
New Jersey	18	3 fish	May 25-September 22	18	3 fish	May 24- September 21
NJ Shore program site (ISBSP)	16	2 fish		16	2 fish	
New Jersey/Delaware Bay COLREGS	17	3 fish		17	3 fish	
Delaware	16.5	4 fish	January 1-December 31	16.5	4 fish	January 1- December 31
Maryland						
PRFC						
Virginia						
North Carolina	15	4 fish	January 1-December 31	15	4 fish	January 1- September 3[b]

[a] Combined possession limit of 6 fish, no more than 2 fish at 17-inch minimum size limit.

[b] Although originally specified as open year-round, the recreational flounder fishery in North Carolina (southern, gulf, and summer flounder) closed on September 4, 2019 as the result of measures implemented to end overfishing on southern flounder. NC manages all flounder in the recreational fishery under the same regulations resulting in a de facto closure of the summer flounder recreational fishery. The fishery will open in 2020 at a date to be determined. See the proclamation here: http://portal.ncdenr.org/web/mf/proclamation-ff-32-2019.

Accountability Measures

Federal regulations include proactive accountability measures (AMs) to prevent the summer flounder recreational Annual Catch Limit (ACL) from being exceeded and reactive AMs to respond when an ACL is exceeded. Proactive recreational accountability measures include adjusting management measures (bag limits, size limits, and season) for the upcoming fishing year that are designed to prevent the RHL and ACL from being exceeded. The NMFS Regional Administrator no longer has in-season closure authority for the recreational fishery if the RHL or ACL is expected to be exceeded. For reactive AMs, paybacks of ACL overages may be required in a subsequent fishing year, depending on stock status and the magnitude of the overage, as described below. ACL overages in the recreational fishery are evaluated by comparing the most recent 3-year average recreational ACL against the most recent 3-year average of recreational dead catch (i.e., landings and dead discards). If average catch exceeds the average ACL, then the appropriate AM is determined based on the following criteria:

1. <u>If the stock is overfished ($B < ½ B_{MSY}$), under a rebuilding plan, or the stock status is unknown:</u> The exact amount, in pounds, by which the most recent year's recreational ACL has been exceeded, will be deducted in the following fishing year, or as soon as possible once catch data are available.
2. <u>If biomass is above the threshold, but below the target ($½ B_{MSY} < B < B_{MSY}$), and the stock is not under a rebuilding plan:</u>
    - If only the recreational ACL has been exceeded, then adjustments to the recreational management measures (bag, size, and seasonal limits) would be made in the following year, or as soon as possible once catch data are available. These adjustments would take into account the performance of the measures and the conditions that precipitated the overage.
    - If the Acceptable Biological Catch (ABC = recreational ACL + commercial ACL) is exceeded in addition to the recreational ACL, then a single year deduction will be made as a payback, scaled based on stock biomass. The calculation for the payback amount in this case is: (overage amount) * $(B_{msy}-B)/½\, B_{msy}$.
3. <u>If biomass is above the target ($B > B_{MSY}$):</u> Adjustments to the recreational management measures (bag, size, and seasonal limits) would be considered for the following year, or as soon as possible once catch data are available. These adjustments would take into account the performance of the measures and the conditions that precipitated the overage.

The 2016-2018 recreational ACLs were set using assessments that used the pre-revision MRIP data; therefore, it is necessary to use catch estimates based on the old MRIP estimation methodology to compare pre-2019 recreational catch to the ACLs. MRIP stopped publicly releasing pre-calibration MRIP data after 2017, but back-calibrated 2018 recreational harvest data were provided to Council staff by request. 2018 dead discards were estimated by assuming the same ratio of recreational discards to landings for the 2018 pre- and post-revision MRIP data (using post-revision data from the 2019 Northeast Fisheries Science Center data update).

The resulting AMs evaluation shown in Table 6 indicates that the 2016-2018 average recreational catch (5.37 million pounds) was lower than the 2016-2018 average ACL (5.69 million pounds), meaning that a recreational accountability measure has not been triggered for application in 2020.

Table 6: Evaluation of summer flounder recreational accountability measures using 3-year moving average of the recreational ACL compared to 3-year moving average of recreational catch (using old MRIP estimation methodology).

	Recreational Harvest (Old MRIP)	**Recreational Dead Discards (Old MRIP)**	**Total Dead Recreational Catch (Old MRIP)**	**Recreational ACL**
2016	6.18	1.48	7.66	6.83
2017	3.19	0.94	4.13	4.72
2018	3.35	0.97	4.32	5.53
AVG	4.24	1.13	**5.37**	**5.69**

Predicting 2020 Harvest and the Impacts of Management Measures

When developing recommendations for recreational summer flounder measures, it is typically assumed that if regulations remain unchanged, effort and harvest in the upcoming year will be similar to projected harvest in the current year. This assumption does not always hold true. Harvest is impacted by many interacting factors including management measures, availability, factors influencing fishing effort other than regulations, weather, economic conditions, angler demographics, and availability and management measures for other recreational species. The impacts of these factors on harvest in future years can be difficult to accurately predict.

Table 7 provides estimates of the number of trips where summer flounder was reported as the primary target from Maine through North Carolina, and the estimated percentage of these directed summer flounder trips relative to directed trips from all species Maine through North Carolina. The number of directed recreational summer flounder trips has been generally declining since 2011 but summer flounder trips remain a relatively substantial portion of total fishing trips within the management unit (12% in 2018; Table 7). Summer flounder year class strength can be variable and can impact availability of the fish to anglers. Recruitment for summer flounder has been below average since about 2010, and availability of fish to anglers in the past few years has also been reported as relatively low.

The Monitoring Committee should consider these and other potentially relevant factors when discussing expected 2020 recreational harvest and any potential changes in management measures.

Table 7: Number of summer flounder directed recreational fishing trips, and percentage of total directed trips, Maine through North Carolina, 2007 to 2018.

	Number of Summer Flounder Directed Trips (millions)[a]	Percentage of Directed Trips Relative to Total Trips[a,b]
2007	9.85	11%
2008	8.84	10%
2009	10.42	11%
2010	11.92	12%
2011	13.03	14%
2012	11.89	13%
2013	11.23	13%
2014	11.49	13%
2015	10.61	13%
2016	10.19	12%
2017	8.62	10%
2018	8.59	12%

[a] Revised MRIP estimated number of recreational fishing trips (expanded) where the primary target species was summer flounder, Maine through North Carolina. Source: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 24, 2018 and October 31, 2019.

[b] Source of total trips for all species combined, revised MRIP data: Pers. Comm. with the National Marine Fisheries Service, Fisheries Statistics Division, October 24, 2018 and October 31, 2019.

At their respective August 2019 meetings, the Council and Board received presentations on the preliminary results of a summer flounder recreational Management Strategy Evaluation (MSE) for F-based recreational management conducted by Dr. Gavin Fay and Dr. Jason McNamee (Fay and McNamee 2019). This project includes two main components: a fleet dynamics model, which expands on previous work to forecast how changes in recreational measures impact changes in harvest, and a forecasting simulation model, which tests the performance and of current and alternative management approaches (including *status quo* and F-based management, both with and without incorporating estimates of uncertainty).

The fleet dynamics model is of particular relevance during the process of setting recreational measures for the upcoming fishing year to predict how changes in regulations are expected to influence harvest and discards. The Monitoring Committee has previously noted that the fleet dynamics model generally performs well and produces the expected results from modifications to management measures (bag limits, size limits, and seasons), and that this model will allow for better comparisons of the tradeoffs associated with increasing size limits on increasing dead discards. However, at the time of this memo, some adjustments were still needed to improve the performance of the model, which currently appears to be overestimating harvest in some states. Staff will work with the model developers to test the fleet dynamics model for the MC's consideration in developing 2020 measures. If possible, the MC should use this model alongside typical methods of analysis when considering 2020 measures at the state or coastwide level.

2020 Staff Recommendation

The projected 2019 harvest for summer flounder using data through wave 4 is 7.06 million pounds, approximately 8% below the 2020 RHL of 7.69 million pounds. Relative to projected 2019 harvest, this would leave room for an approximate 9% liberalization in harvest in weight. However, wave 5 data should be considered once available as wave 5 accounted for about 28% of summer flounder harvest in 2017-2018. As discussed below, staff recommend departing from the measures used in recent years under conservation equivalency and adopting an alternative management strategy to reduce recreational discards and increase angler satisfaction. The following sections describe the challenges of current management and possible approaches toward improving fishery outcomes in 2020.

Challenges of Conservation Equivalency as Currently Configured

The system of conservation equivalency was originally adopted through Framework 2/Addendum XIV to alleviate perceived inequities of coastwide management measures on different states within the management unit, given summer flounder migrations and differences in availability by region. Conservation equivalency has been adopted every year since 2001, as coastwide measures have not been a palatable option for most states.

Over the years, measures under conservation equivalency have become more complex. Since 2014, regional conservation equivalency has been implemented with some success in increasing consistency in measures between neighboring states; however, the current regional management system still includes many single-state regions and a set of highly complex measures including measures by state, wave, fishing mode, and sub-area. This has made analyzing recreational measures increasingly complicated, and additionally, complex measures generally lead to more difficult enforcement and higher noncompliance, especially with a high frequency of changes to the measures. MRIP data is being used at fine scales for which it was not designed, with high uncertainties in the estimates at these levels, increasing the uncertainty in the outcomes of the measures set.

Conservation equivalency was designed around constraining harvest to the RHL, prior to implementation of annual catch limits and accountability measures. As such, conservation equivalency has historically used annual adjustments to meet a harvest-based target, based on an evaluation of a single prior year's performance, without thorough consideration of how measures influence dead discards. Although the Monitoring and Technical Committees have repeatedly acknowledged the discards issue, it is also recognized that the main requirement of conservation equivalency as currently outlined in the FMP is that the combination of state and regional measures must be expected to constrain harvest to the RHL, with no discussion of accounting for discards. In addition, it has typically been very difficult to predict precisely how regulations will influence dead discards, especially given uncertainty in discard estimates and a time lag in estimates of dead discards in weight.

When reductions are required in the recreational fishery, increases in size limits are typically the most effective and efficient way to accomplish a reduction. In addition, stakeholders in many states are not receptive to decreases in season under current season lengths, as longer seasons allow more opportunities to fish even if fewer fish can be retained.

One result of the fleet dynamics model developed by Fay and McNamee (2019) indicates that although increases in minimum sizes are effective at reducing harvest, they also, not surprisingly, result in increased discards. While only a portion (10%) of recreational discards are assumed to experience discard mortality, when accounting for this mortality, it is likely that such adjustments to measures are not having as much of a reduction on total removals as assumed. Figure 4 below, adapted from their report, illustrates this point, with the report noting, "When accounting for both harvest and discards, the interaction between the two model effects largely cancel each other out, minimizing the effect of minimum size as a management tool. There is still a decrease in catch (harvest + discards) but it is much less than when viewed by harvest alone."

Many managers, advisors, and other stakeholders have repeatedly expressed concerns with the relatively high minimum size limits implemented in some states under conservation equivalency. These are limits are perceived by many as being too high and associated with negative socioeconomic and biological outcomes.[2] Since 2002, size limits have fluctuated substantially in some states, especially under state by state conservation equivalency prior to 2014. Size limits were generally highest in 2008-2010, were liberalized somewhat in the next few years, and increased again after 2016 when a large coastwide reduction in harvest was required (Table 8).

Many stakeholders have argued that the current relatively high size limits focus fishing pressure disproportionately on the largest, most fecund female summer flounder, potentially influencing the sex ratio of the population and the reproductive potential of the stock. Female summer flounder grow faster and mature faster compared to males. The sex ratio for younger fish is skewed toward males, and as the cohort ages, the balance in the sex ratio shifts toward females. In a study by Morson et al. (2015), among thousands of fish sampled in the recreational fishery in 2010 and 2011 from North Carolina to Maine, the probability that a given fish landed in the recreational fishery was female was 80% at the smallest minimum sizes and approached 100% with increasing fish size. Many have stated concerns about how selecting on larger fish in the recreational fishery may be influencing recent trends of below-average recruitment. For many species, age and size dependent maternal effects on egg and larval quality can influence recruitment (Hixon et al. 2013; Gwinn et al. 2013). For summer flounder, it is not clear at this time to what extent recreational fishery selectivity may be influencing recruitment and other stock dynamics. Several factors have been hypothesized as potentially influencing low recruitment, but recent evaluations have not been able to conclusively separate the primary driver or drivers of this trend.

Anglers have expressed frustration with the very high release rates and low retention ability for summer flounder in the recreational fishery due to size limit regulations. The high rate of discards has decreased angler satisfaction and angler ability to keep fish for personal consumption. In addition, there is increasing concern regarding perceived waste in the fishery and the mortality associated with discards. Over the past 10 years (2009-2018), approximately 89% of summer flounder caught recreationally were estimated to be released (Table 2), with a 10% assumed discard mortality rate applied to those released fish. Some stakeholders and researchers have suggested that actual discard mortality rates may be higher under some conditions (Henderson and Fabrizio 2014), and that managers should take steps to reduce recreational discard mortality. Henderson and Fabrizio (2014) also found that discard mortality on undersized recreational summer flounder catch may be higher than for larger fish, although some of this effect may be explained by different emigration rates from their study area in the Chesapeake Bay.

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[2] For examples of recent comments, see: http://www.mafmc.org/s/Summer-Flounder-Specifications-Supplemental-Comments-10-4-19.pdf.

Table 8: Summer flounder size limits by state under conservation equivalency, 2002-2019. Includes the size limit in place for most of the state for most of the fishing season; does not account for special size limit programs such as shore mode programs or different size limits by area. Information is from prior recreational memos and has not been validated by states.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
MA	16.5	16.5	16.5	17	17.5	17.5	17.5	18.5	18.5	17.5	16.5	16	16	16	16	17	17	17
RI	18	17.5	17.5	17.5	17.5	19	20	21	19.5	18.5	18.5	18	18	18	18	19	19	19
CT	17	17	17	17.5	18	18	19.5	19.5	19.5	18.5	18	17.5	18	18	18	19	19	19
NY	17	17	18	17.5	18	19.5	20.5	21	21	20.5	19.5	19	18	18	18	19	19	19
NJ	16.5	16.5	16.5	16.5	16.5	17	18	18	18	18	17.5	17.5	18	18	18	18	18	18
DE	17.5	17.5	17.5	17.5	17	18	19.5	18.5	18.5	18	18	17	16	16	16	17	16.5	16.5
MD	17	17	16	15.5	15.5	15.5	17.5	18	19	18	17	16	16	16	16	17	16.5	16.5
VA	17.5	17.5	17	16.5	16.5	18.5	19	19	18.5	17.5	16.5	16	16	16	16	17	16.5	16.5
NC	15.5	15.5	14	14	14	14	14	15	15	15	15	15	15	15	15	15	15	15
Average	16.9	16.9	16.7	16.6	16.7	17.4	18.4	18.7	18.6	17.9	17.4	16.9	16.8	16.8	16.8	17.6	17.4	17.4
Weighted Average[a]	16.8	16.7	16.8	16.7	16.6	17.8	18.8	18.5	18.6	18.2	17.9	17.9	17.5	17.5	17.7	18.2	18.1	-

[a] Average weighted by percent of harvest from each state.

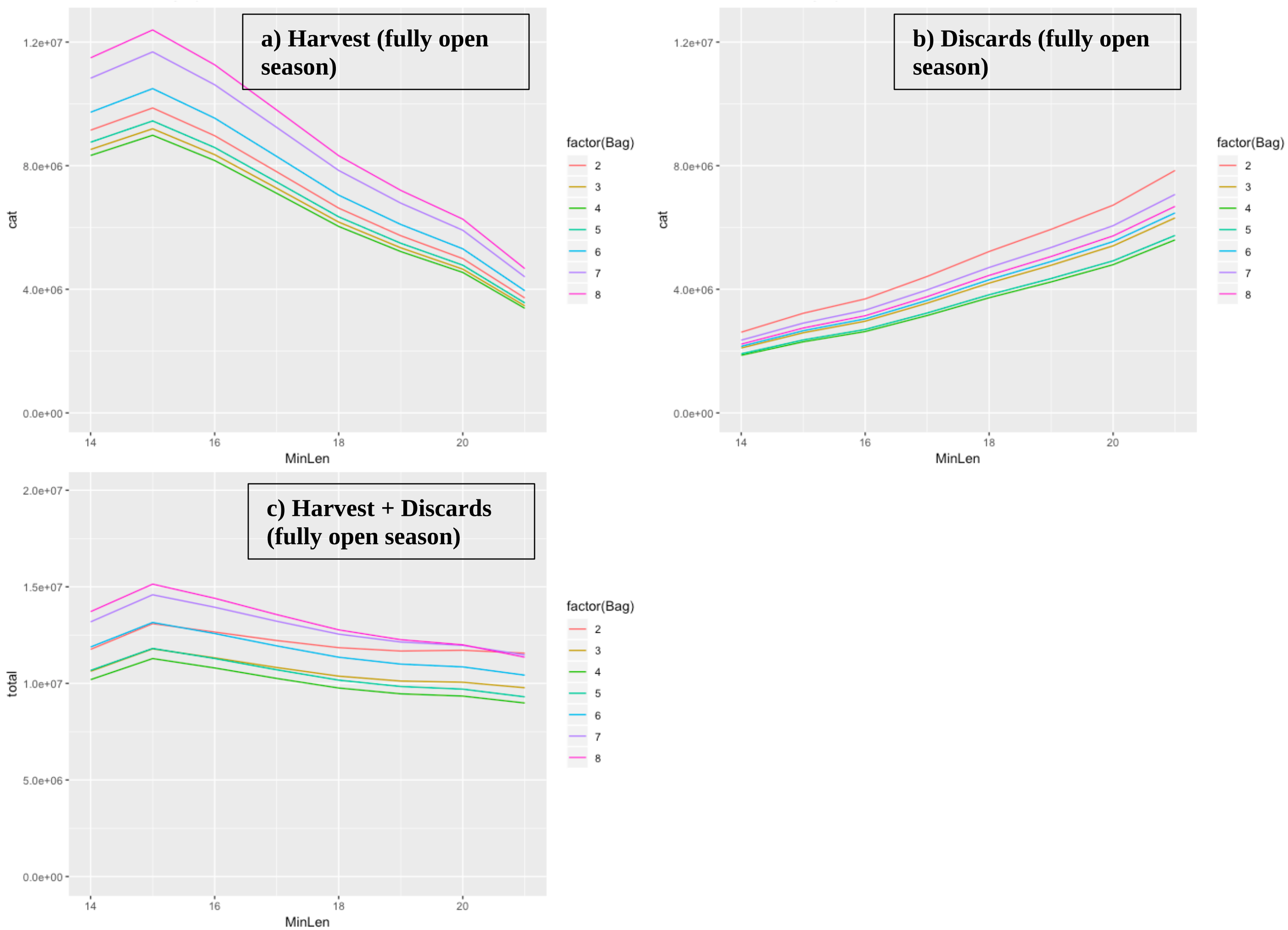

Figure 4: Modeled effects of size limit increases from Fay and McNamee (2019) indicating that increases in size limits decrease harvest and increase discards, the effects of which largely cancel each other out, resulting in only slight to moderate decreases in total catch with increasing size.

Alternative Size Limit Regulations

Many advisors and other stakeholders have requested evaluation of alternatives to high minimum size limits. Examples include slot limits (specification of a minimum and maximum size limit, with or without trophy fish allowance) or cumulative length limit (where all summer flounder of any length would count toward a total length allowance per angler).

Harvest slots are designed to protect both immature fish and older, larger fish that tend to have greater relative reproductive value. Several studies have suggested potential benefits of implementing slot limits to achieve multiple, sometimes conflicting, recreational management objectives. For example, Gwinn et al. (2013) modeled various recreational harvest strategies and found that harvest slots and minimum length limits were both effective at comprising between yield, numbers of fish harvested, and catch of trophy fish while also conserving reproductive biomass. An increase in fish harvested was assumed to have a positive impact on angler satisfaction given that it allowed for more fish to be harvested, while the biomass yield in weight was lower under a slot limit than under a minimum size only limit. The results of this study were not contingent on maternal effects, meaning that any size-dependent maternal effects on egg and larval quality that may be present would only enhance the benefits of slot limits.

The Monitoring Committee has discussed slot limits in the past and expressed reservations about their implementation in practice for summer flounder under current harvest limits and the current configuration of the FMP. An increase in harvest in numbers of fish is predicted under slot limits, and it is likely that very restrictive slots, combined with restrictive bag limits and seasons, may be required constrain harvest to the RHL. In addition, it is difficult to predict how angler behavior (including discarding behavior and compliance) would change under implementation of a slot limit for summer flounder when such measures have never been implemented for this species before.

A detailed slot limit analysis using for-hire catch data from 2008 was considered by the Monitoring Committee in 2009, including a range of slot limit options, bag limits, and options for trophy fish in combination with slot limits (Wong 2009). The results indicated that compared to a standard minimum size limit, the slot limit options considered would “certainly result in greatly increased numbers of fish harvested” due to the higher availability of smaller fish compared to larger fish. A management strategy evaluation analysis by Wiedenmann et al. (2013) also found that slot limits could result in an increase in the number of summer flounder harvested per angler, as well as a small reduction in the total number of female summer flounder harvested. They found that slot limits generally resulted in lower harvest and more discards by weight, and higher and more frequent ACL overages, compared to minimum size limits.

It is difficult to predict how an increase in the number of fish harvested would translate to harvest in weight, which is used to evaluate performance relative to the RHL. An increase in harvest in numbers of fish under a slot limit may not necessarily lead to a substantial increase in harvest in weight if the slot harvested fish are on average smaller than they would be under a standard minimum size limit, but this has been difficult to analyze due to the difficulty in predicting changes in landings and discards at length. Total weight of harvest and dead discards under a slot limit would depend heavily on availability of summer flounder by age class, along with other variable factors that impact effort and catch rates as discussed in the previous section of this memo.

The potential impacts of slot limits were also evaluated in the recent Framework 14/Addendum XXXI document. In this action, the Council and Board approved the use of a maximum size in the recreational regulations for summer flounder and black sea bass. This action is pending implementation by NMFS but is expected to be available for use in 2020.[3] Thus, the Monitoring Committee should consider whether a slot limit or other alternative to a single minimum size may be appropriate on a coastwide basis in 2020. Alternatively, the Monitoring Committee could consider encouraging states to evaluate slot limits and other alternative management approaches under conservation equivalency.

Staff Recommendation

Staff recommend that the Monitoring Committee consider alternative approaches to recreational management in 2020, including alternatives to the current size limits that would reduce regulatory discards and increase retention of fish while preventing the ACL from being exceeded. Given the language in the FMP requiring that conservation equivalency constrain harvest to the RHL, in the longer term, it may be necessary to consider a plan amendment that would re-evaluate conservation equivalency requirements to include, among other modifications, a better ability to account for how changes to measures influences discards and total removals and consideration of the recreational ACL in addition to the RHL.

Based on preliminary analysis, **staff recommend consideration of a coastwide slot limit** that would preserve the spawning capacity of larger, older female fish while also protecting immature fish from harvest and limiting total removals of summer flounder to prevent overfishing.

As discussed above, the outcomes of slot limits are difficult to evaluate given current data and uncertainties about availability by size and angler behavior. Harvest and discard length frequencies can be used to evaluate what lengths are being landed vs. discarded under the current regulations, but it is difficult to predict how this distribution would change under modified regulations. However, the distribution data from 2018 gives some sense of the recent availability of different sizes classes to anglers (Figure 5). It is expected that harvest and total removals would increase under a slot limit as discussed above. Therefore, adjustments to possession limits and seasons are evaluated to provide a buffer against an expected increase in harvest.

Based on harvest at length and expanded dead discard at length data from 2018, an estimated 1.37 million fish in the 17"-19" range were either harvested or subject to discard mortality. Assuming that many of the discards in that range were regulatory, and that under a 17"-19" slot most of the fish encountered in that size range would not have been discarded, the dead discard estimate here could be scaled up by a factor of 10 (given the 10% discard mortality rate) to produce an estimated total theoretical harvest of 2.80 million fish under a slot limit in that size range. This represents a 16% increase from estimated 2018 harvest in numbers, and a 26% increase from projected 2019 harvest in numbers. This should be considered a very rough estimate and does not account for non-compliance or changes in effort or availability.

[3] See: http://www.mafmc.org/actions/sfsbsb-recreational-management-fw.

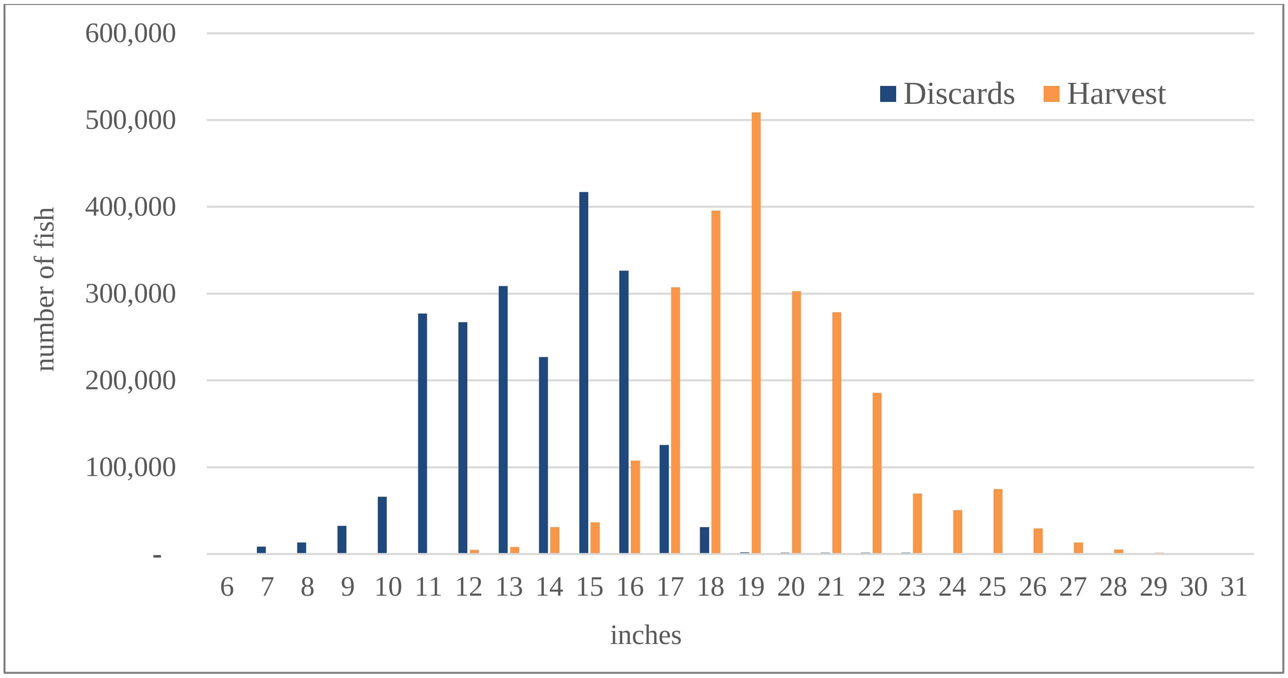

Figure 5: 2018 expanded recreational dead discard and landings length frequency data for summer flounder. Length frequency data is from an MRIP query as of 10/31/19. Discard length frequency from M. Terceiro, pers. comm., 11/4/19. Length bins include harvest or discards from X.0 to X.99 inches.

As indicated by the 2018 expanded harvest per angler trip data in Table 9, 67% of trips and 45% of the number of fish landed in 2018 were from angler-trips where only one summer flounder was landed. Some of this trend is likely related to the size limit regulations, meaning that many anglers are not able to find and land more than one or two legal sized summer founder on a given trip due to the lower availability of higher size classes. If a slot limit were implemented with no changes to possession limits, it is likely that this distribution would shift toward higher numbers of fish retained per angler. Under a coastwide slot limit, a reduced coastwide possession limit should be considered to account for increases in encounters with legal size fish within the slot.

A possession limit analysis of the 2018 harvest per angler trip data was conducted to estimate the reduction from moving to a 1 or 2 fish possession limit on a coastwide basis. Assuming that definitively non-compliant harvest remains non-compliant, a 2 fish possession limit was associated with an estimated 9% coastwide harvest reduction, while a 1 fish possession limit was associated with a 31% coastwide harvest reduction (Table 9). These reduction percentages may be overestimated given that the non-compliance evaluation was based on the highest current state possession limit (6 fish) and there is likely other non-compliant harvest in the data that would likely remain.

As previously noted, the potential impacts of measures on recreational discards and discard mortality should be considered to the extent possible, but there are limited data to predict the effects of this type of bag limit reduction. Many stakeholders have commented that under a lower size limit and lower bag limit, the length of fishing trips is expected to decrease, such that anglers will catch their limit and stop targeting summer flounder, but under a very low bag limit it is difficult to predict the extent to which this would occur.

Table 9: Expanded catch per recreational angler trip for summer flounder in 2018, based on MRIP data as of 10/31/19, and associated estimated reduction for a coastwide 1 or 2 fish possession limit. Definitively non-compliant harvest (harvest per angler of over 6 fish) was assumed to remain noncompliant under a reduced bag limit. Actual non-compliance may be higher given differences in possession limit by state in 2018.

	2018 harvest at length				2 fish bag limit				1 fish bag limit			
# of fish	Angler trips	% of Trips	Total Fish	% of Harvest (# of fish)	# of fish	Angler trips	Total Fish	% of Harvest (# of fish)	# of fish	Angler trips	Total Fish	% of Harvest (# of fish)
1	1,085,098	67%	1,085,098	45%	1	1,085,098	1,085,098	50%	1	1,085,098	1,085,098	50%
2	385,445	24%	770,889	32%	2	385,445	770,889	35%	1	385,445	385,445	18%
3	113,646	7%	340,937	14%	2	113,646	227,292	10%	1	113,646	113,646	5%
4	31,865	2%	127,458	5%	2	31,865	63,729	3%	1	31,865	31,865	1%
5	5,428	0.30%	27,142	1%	2	5,428	10,857	0%	1	5,428	5,428	0%
6	4,063	0.20%	24,379	1%	2	4,063	8,126	0%	1	4,063	4,063	0%
7	343	0.00%	2,400	0.10%	7	343	2,400	0%	7	343	2,400	0%
8	11	0.00%	91	0.00%	8	11	91	0%	8	11	91	0%
9	-	-	-	-	9		0	0%	9		0	0%
10	2,195	0.10%	21,951	1%	10	2,195	21,951	1%	10	2,195	21,951	1%
Tot.	**1,628,094**	**100%**	**2,400,346**	**100%**		**1,628,094**	**2,190,434**			**1,628,094**	**1,649,987**	
							Reduc. (# fish)	**209,913**			**Reduc. (# fish)**	**750,359**
							Reduc. (%)	**9%**			**Reduc. (%)**	**31%**

Under a coastwide slot limit, staff also propose a coastwide season. The current non-preferred coastwide season, May 15-September 15, was evaluated to estimate the effects on harvest at a coastwide level. Table 10 shows the percent reduction that would be estimated on a coastwide basis, based on 2018 data, associated with closing one day per wave in each state. The coastwide sum represents the percent reduction associated with closing one day per wave in all states. All reductions are relative to coastwide harvest. For example, closing one day in wave 5 in NJ produces a 0.107% reduction in coastwide harvest, and closing one day in wave 5 for all states results in a 0.303% reduction in coastwide harvest.

Table 11 uses the information in Table 10 to calculate an expected change in harvest by state and wave under a May 15-September 15 coastwide season. On a coastwide basis, this season is estimated to produce about an 8% reduction in harvest. Since this is based only on 2018 data, these results should be interpreted cautiously given fluctuations in state harvest by wave on an annual basis. This analysis also assumes equal harvest distribution throughout a wave, which is an assumption that typically does not match reality.

Table 10: Percent reduction, on a coastwide basis, associated with closing one day per wave in each state, based on 2018 harvest data by state and wave.

a)	WAVE 1	WAVE 2	WAVE 3	WAVE 4	WAVE 5	WAVE 6
MA	0.000	0.000	0.014	0.016	0.031	0.000
RI	0.000	0.000	0.011	0.098	0.004	0.000
CT	0.000	0.000	0.066	0.036	0.007	0.000
NY	0.000	0.000	0.246	0.152	0.088	0.000
NJ	0.000	0.000	0.333	0.455	0.107	0.000
DE	0.000	0.000	0.023	0.025	0.010	0.000
MD	0.000	0.000	0.001	0.022	0.009	0.000
VA	0.000	0.000	0.009	0.056	0.032	0.001
NC	0.000	0.001	0.006	0.012	0.016	0.005
COAST	0.000	0.001	0.710	0.873	0.303	0.005

Table 11: Percent reduction, on a coastwide basis, estimated from a May 15-September 15 coastwide season, based on 2018 harvest data by state and wave and the reduction in open days per wave compared to the 2019 measures. Negative values indicate an increase in harvest. Given annual fluctuations in state harvest proportions by wave, this should be considered a rough estimate.

a)	WAVE 1	WAVE 2	WAVE 3	WAVE 4	WAVE 5	WAVE 6	TOTAL
MA	0.000	0.000	-0.115	0.000	0.746	0.000	0.631
RI	0.000	0.000	0.145	0.000	0.180	0.000	0.325
CT	0.000	0.000	0.794	0.000	0.099	0.000	0.893
NY	0.000	0.000	2.950	0.000	1.315	0.000	4.265
NJ	0.000	0.000	-2.996	0.000	0.852	0.000	-2.144
DE	0.000	0.000	0.322	0.000	0.439	0.000	0.761
MD	0.000	0.000	0.021	0.000	0.417	0.001	0.439
VA	0.000	0.000	0.126	0.000	1.484	0.046	1.656
NC	0.010	0.031	0.082	0.000	0.752	0.280	1.155
COAST	0.010	0.031	1.330	0.000	6.284	0.326	7.982

Given the above analyses, staff recommend that the Monitoring Committee consider possession limit and season adjustments that could balance an expected increase in harvest under a harvest slot. Specifically, **staff recommend that the Monitoring Committee consider a coastwide 1-fish possession limit, 17"-19" harvest slot, and an open season of May 15-September 15 as a starting point for discussion.** Alternatively, a 2 fish possession limit could be considered but would possibly need to be associated with a narrower harvest slot or reduced season.

Although there is uncertainty in the proposal outlined above, there is currently a slight buffer for liberalization given projections through wave 4, and the stock is not overfished and overfishing is not occurring. As discussed above, effects of measures on discards should be more thoroughly considered in the process of setting recreational measures, and these measures may provide more opportunities for retention and reduce regulatory discards within this size range. However, the Monitoring Committee should consider how discards may change under a very low possession limit and how discards in other size classes will be affected. An attempt at a different set of management measures on a one-year trial basis could be attempted in 2020 as an effort to obtain data about how angler behavior and landing and discarding patterns change under a slot limit.

Alternate Recommends for Conservation Equivalency

If conservation equivalency is preferred instead, the non-preferred coastwide and precautionary default measures would need to be recommended by the MC. The current non-preferred coastwide measures consist of a 4-fish possession limit, a 19-inch total length (TL) minimum size, and an open season from May 15-September 15. Again, these measures will take effect in federal waters and for federal party/charter permit holders starting on January 1, 2020 until replaced (if applicable) by the implementation of conservation equivalency or alternative coastwide measures.

Given the implementation of state and regional measures for many years, the expected harvest from coastwide measures has been difficult to evaluate. The MC should attempt to evaluate the current non-preferred coastwide measures using the fleet dynamics tool if possible. If the MC does not support or is unable to justify a set of coastwide measures involving alternative size limit approaches, staff recommend *status quo* non-preferred coastwide measures under conservation equivalency. Although projected 2019 harvest is 8% below the 2020 RHL, given the uncertainty in the outcome of these coastwide measures, staff recommend not liberalizing the non-preferred coastwide measures at this time.

Staff also recommends that if conservation equivalency is selected, the existing precautionary default measures of a 2-fish possession limit, 20-inch TL minimum fish size, and an open season from July 1-August 31 be maintained. These measures are likely to be sufficiently restrictive to deter states from implementing measures that do not follow the agreed upon conservation equivalency guidelines for the year.

References

Fay, Gavin, and Jason E. McNamee. July 2019. Draft Report on the Project: Evaluation of F-Based Management for the Recreational Summer Flounder Fishery. Available at: http://www.mafmc.org/s/Report-on-Fluke-MSE_forMC_07-2019.pdf.

Gwinn, DC; Allen, MS; Johnston, FD; Brown, P; Todd, CR; and R Arlinghaus. 2015. Rethinking length-based fisheries regulations: The value of protecting old and large fish with harvest slots. Fish and Fisheries. 16. 259-281. 10.1111/faf.12053.

Henderson, Mark & Fabrizio, Mary. 2014. Estimation of summer flounder (*Paralichthys dentatus*) mortality rates using mark-recapture data from a recreational angler-tagging program. Fisheries Research. 159. 1–10. 10.1016/j.fishres.2014.05.003.

Hixon, MA; Johnson, DW; and SM Sogard. 2013. BOFFFFs: on the importance of conserving old-growth age structure in fishery populations. ICES Journal of Marine Science, 71: 2171-2185.

Morson, Jason M., Eleanor A. Bochenek, Eric N. Powell, Emerson C. Hasbrouck, Jennifer E. Gius, Charles F. Cotton, Kristin Gerbino & Tara Froehlich. 2015. Estimating the Sex Composition of the Summer Flounder Catch using Fishery-Independent Data, Marine and Coastal Fisheries, 7:1, 393-408, DOI: 10.1080/19425120.2015.1067261.

Wiedenmann, J., M. Wilberg, E. Bochenek, J. Boreman, B. Freeman, J. Morson, E. Powell, B. Rothschild, and P. Sullivan. 2013. Evaluation of management and regulatory options for the summer flounder recreational fishery. Available at: http://www.mafmc.org/s/A-Model-to-Evaluate-Recreational-Management-Measures.pdf