

***Atlantic States Marine Fisheries Commission***

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**MEMORANDUM**

July 28, 2008

To: Summer Flounder, Scup, and Black Sea Bass Management Board  
From: Summer Flounder, Scup, and Black Sea Bass Technical Committee  
RE: Summer Flounder Slot Limits

The following are responses of the Technical Committee to questions regarding slot limits for summer flounder posed to them at a meeting held in NH on June 24, 2008. The questions were designed to explore the biological and management implications of a slot limit in the coast wide recreational summer flounder fishery.

**1. Is the existing recreational catch data adequate to explore slot limits and if so at what scale?**

There was a general consensus of the committee that adequate catch data exists at the coast-wide level to analyze the potential of slot limits on the harvest length frequency distribution of the recreational catch, some effects on bag limits and potential effects on the stock and reference points. Only a few states (CT, MD, and VA) have data which might support a state-specific approach. Given that the application of these states data to all states is not feasible (due to noted differences in catch length frequency distributions between the states) and issues regarding relating volunteer angler data to all angler harvest, a state by state approach was not recommended. The consensus of the group was that the overarching catch data (Marine Recreational Fisheries Statistical Survey) was likely sufficient to explore some of the ramifications of slot limits at the coast-wide level. A range of slots between 14 and 18” could probably be explored.

The MRFSS has considerable catch data from the past three years (discards included); however, the discard lengths are only available from the For Hire Mode and may not be representative of coast wide angler catch in general. Ideally total catch data (both discards and harvest) by angler from all modes in proportion to the catch by mode would be used to analyze slots.

The issue of the interactions of existing bag limits and retained and discarded catch is difficult to ascertain using existing catch data since the those two factors do not work independently. This relationship could be considerable and could lead to false conclusions regarding the efficacy of a slot based on catch data from an existing “controlled” fishery. However, in the case of summer flounder harvest frequency data (Table 1 attached) indicates that few anglers harvest greater than three fish, implying an assumption of weak bag limit effects would not be unreasonable for this analysis.

Also, it must be noted that any slot limit analysis is highly dependent on the distributional pattern of the discard and harvest frequencies within the data set. Changes in year to year variability between length classes (age classes) can be profound and the use of even the most recent year's catch data as a proxy for availability of fish in the subsequent year can introduce a great deal of uncertainty to projections on catch and harvest from potential management changes. Seasonal effects also likely play a minor role at this time, however, this analysis was conducted without regard to season. See slot limit scenario analysis below for additional insight (Appendix).

## **2. What assumptions would be made regarding catch, harvest and effort for the analysis?**

With regard to assumptions about harvest within a slot limit based on catch data, the group consensus was to assume 100% retention at length within the slot limits examined.

Assumptions regarding bag limits could potentially be explored using the usual bag/size limit tables or using expanded recreational angler catch data for the coast. It is uncertain exactly how this could be done at this time given the caveat regarding discard length data noted above.

Essentially a slot based on smaller fish than currently harvested would allow the harvest limits (in numbers) to increase due to a reduced mean weight. That gain is expected to be offset by the need to reduce the bag limits to keep the recreational harvest total within the TAL because of the increased frequency of angler encounters with smaller fish (see also effort discussion below). In turn, bag limits would need to be substantially reduced for some slots to keep the harvest numbers within the expected revised target number, especially given the probable strong influence of existing states minimum sizes on total harvest numbers.

Effort would be expected to increase substantially as modes previously restricted in the fishery, due to recent increases in the minimum size, would become more active. However, the consensus was that potential effort increases could not reasonably be quantified.

Assumptions regarding angler specific behavior in response to slots could not be made (would they hy-grade within the slot or keep fishing and discard only outside the slot size range?).

The effect of slot limits on discards was also discussed. Slots may decrease the discard of smaller fish but increase the discard of larger fish so there may be neutral effects on the catch at age dependent on the size classes available to anglers and the chosen slot limit.

Some assumptions regarding incoming year class strengths could be made by increasing the numbers available at length the following year by "growing them up" in length (and age).

## **3. What are the likely effects of a slot limit on F, SSB, Biomass and the BRP's?**

The Technical Committee used a prior exploration of a 16-18" slot limit (Terceiro, pers. comm..) to gain some insight into the potential effects of slot limits.

The partial recruitment vectors in the ADAPT model changed based upon a change in the harvest and dead discards at length and age in the recreational fishery. This resulted in a 23% increase in the model outputs for total catch numbers and the fishing mortality rate.

The resulting recruitment vectors and mean weights were then entered into a YPR model. The revised parameters resulted in a slight decrease in YPR and a slight increase in SSB/R, and higher F values at the reference points. A shift to a lower slot limit at those lengths, which are less than the existing minimum size, increased the numbers of harvested younger fish. This particular proposal was essentially stock neutral (i.e. no real stock benefit or detriment) but the effects of other slots will vary dependent on the slot and assumptions made about harvest. It was noted that the recreational and commercial allocations are based on weight so a slot limit would need to be analyzed starting at that point.

Yield per recruit can also drop substantially as a result of slot limit effects and maximizing yield was one goal of the FMP; therefore, the drop in YPR would be inconsistent with the FMP goal.

#### **4. What are the likely Law enforcement issues of implementing a slot limit?**

The consensus of the Committee was to let the LEC answer those questions but frame the questions to review a slot, a slot with a trophy allowance, and the traditional questions regarding what measures (size, season and possession limits) are most enforceable.

#### **5. What are the cultural and social issues associated with a slot limit?**

A “pure” slot would eliminate a “trophy” fish component. This would have obvious negative effects on fishing tournaments and may be considered unacceptable to some non-tournament anglers as well. The effects of a trophy allowance are potentially minimal based upon the infrequent nature of encounters with large fish and dependent on the threshold size chosen, but conceivably the numbers of large fish may increase over time with the imposition of a slot and/or rebuilt stocks (note caveat regarding commercial size retention below), potentially negating the positive effects of a slot limit.

A slot limit could increase access for some modes (Shore and Private/Rental Boat) and potentially increase effort, which would have positive economic and social benefits. However, adoption of a slot limit would likely result in a drop in the possession limit which may have adverse impacts on the For Hire mode and avid anglers in the Private/Rental modes. The effects of a coast-wide slot would obviously have varying effects by state or region dependent on composition of the fishery and the availability of fish of within a proposed slot.

The question of the likelihood of the recreational community as a whole reacting favorable to a slot was left for the Management Board.

### **Conclusions**

In general the committee felt that the exercises of simulating a slot limit were instructive regarding potential effects on harvest, stock status and biological reference points, based on the assumptions made and using the available catch and harvest data. Clearly the effects of slot limits on harvest and discarded catch are highly variable depending on the width of the slot, the size chosen for the minimum and maximum sizes and how those factors interact with the length frequency distribution of available fish.

What could not be explored were potential effects of a slot limit on effort and angler behavior, and the resulting removals and impacts on F (and F at age) from those factors. Essentially the full effects of a slot limit on the recreational fluke fishery will not be well known until after implementation based on the observed response of the recreational fishing community (e.g. landings outside the slot, shifts in removals at length, compensatory effects (offsets) in effort, angler behavior, etc.). The committee also noted that any potential gains from release of larger fish could be negated by an increase in availability and removal of those fish by the commercial fishery, unless that fishery component was also limited by a slot. This is an unlikely scenario given the fact the commercial discard mortality is much higher than the recreational fishery and discarded larger fish would likely wind up resulting in additional discard mortality, which ultimately increases the total F.

**Table 1. The percent of successful anglers landing 1 to 9 summer flounder (MRFSS Type A fish) per trip, 2007.**

<u>Catch per</u> <u>Angler/Trip</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative</u> <u>Frequency</u>	<u>Cumulative</u> <u>Percent</u>
1	1590	65.27	1590	65.27
2	501	20.57	2091	85.84
3	211	8.66	2302	94.50
4	81	3.33	2383	97.82
5	25	1.03	2408	98.85
6	9	0.37	2417	99.22
7	13	0.53	2430	99.75
8	5	0.21	2435	99.96
9	1	0.04	2436	100.00

## Appendix

To examine the possible effects of a slot limit on coast wide harvest and TAL compliance, the expanded 2007 coast wide angler harvest and discard numbers at length from the MRFSS were used along with estimated mean weights at length from NMFS.

Assuming a slot limit set at 16-18" and assuming 100% retention of all discarded fish within the slot, the projected 2008 harvest would be 8,178,461 fish. This is 1.73 times the actual 07 harvest. Given a 2008 Recreational TAL of 6,308,000 pounds and the new mean weight (calculated for the slot), this would translate to a recreational TAL, in number, of 3,584,041 fish, requiring a 128% reduction in harvest numbers (see examples table below).

Similarly, using the same method but assuming only 75% of the previously discarded fish would be retained (due to potential bag or seasonal effects) the projected 2008 harvest would need to be reduced 78%.

Slot limits set at 17-20" with 100% retention of previously discarded fish, would require a 389% reduction in harvest and one set at 15-20 inches would require a 279% decrease in harvest.

These analyses assume that the existing possession limits do not significantly affect the discarded component of the catch within the allowed size limits (see notes above); however some bag limit effect is likely taking place. In addition, many of the assumptions discussed above also apply; there may be much greater discarding associated with fish outside the slot. There may also be intrannual shifts in effort and fish availability at size that were not anticipated in these calculations.

Also, the MRFSS expanded discard estimates should be used with caution since they could seriously underestimate the numbers of smaller fish within the lower end of some slot limits, since the length data comes solely from the For Hire intercepts and smaller fish at length could appear more frequently in the other modes. I.e. the total number of estimated discards would be the same but the length distribution used in these analyses could underestimate the numbers discarded at length because of the data source.

Slot size limit simulations and effects on the Recreational TAL

16"-18"					
lengths	# harvested	discard kept	total harvest	conv pounds	total pounds
cm	in 2007	at 100%	projected	estimated at ln	at length
40	67,125	588884	656,010	1.40	918237
41	84,931	2031903	2,116,834	1.52	3210107
42	69,844	745411	815,255	1.64	1336829
43	138,779	1446245	1,585,024	1.77	2805237
44	201,725	1150648	1,352,373	1.91	2578807
45	186,421	445942	632,364	2.05	1297031
46	199,993	820610	1,020,603	2.20	2248045
		total #	8,178,461	total lbs	14,394,293
				new mean wt	1.765
6,308,000	quota in pounds				
3,584,041	number based on new mean wt				
1.28	decrease required				

16"-18"					
lengths	# harvested	discard kept	total harvest	conv pounds	Total pounds
cm	in 2007	at 75%	projected	estimated at length	at length
40	67,125	441663	508789	1.40	712167
41	84,931	1523927	1608858	1.52	2439779
42	69,844	559058	628902	1.64	1031254
43	138,779	1084684	1223463	1.77	2165332
44	201,725	862986	1064711	1.91	2030271
45	186,421	334457	520878	2.05	1068365
46	199,993	615457	815450	2.20	1796163
		total #	6,371,050	total pounds	11,243,331
				new mean wt	1.765
6,308,000	quota in pounds				
3,574,438	number based on new mean wt				
0.78	decrease required				

17"-20"					
lengths	# harvested	discard kept	total harvest	conv pounds	Total pounds
cm	in 2007	at 100%	projected	estimated at length	at length
43	138779	1446245	1585024	1.77	2,805,237
44	201725	1150648	1352373	1.91	2,578,807
45	186421	445942	632364	2.05	1,297,031
46	199993	820610	1020603	2.20	2,248,045
47	257209	202462	459671	2.36	1,085,661
48	277711	409723	687434	2.53	1,738,358
49	312339	144603	456943	2.70	1,235,434
50	364956	9340	6194410	2.89	17,882,185
		total #	12388820	total lbs	30,870,758
6,308,000	quota in pounds			new mean wt	2.49
2,531,479	number based on new mean wt				
3.89	decrease required				

15"-20"					
lengths	harvested	discard kept	total harvest	conv pounds	total pounds
cm	in 2007	at 100%	projected	estimated at length	at length
38	42371	2178844	2221215	1.19	2,632,513
39	42542	1294880	1337422	1.29	1,724,423
40	67125	588884	656010	1.40	918,237
41	84931	2031903	2116834	1.52	3,210,107
42	69844	745411	815255	1.64	1,336,829
43	138779	1446245	1585024	1.77	2,805,237
44	201725	1150648	1352373	1.91	2,578,807
45	186421	445942	632364	2.05	1,297,031
46	199993	820610	1020603	2.20	2,248,045
47	257209	202462	459671	2.36	1,085,661
48	277711	409723	687434	2.53	1,738,358
49	312339	144603	456943	2.70	1,235,434
50	364956	9340	374296	2.89	1,080,528
		total #	13715440	total lbs	23,891,211
6,308,000	quota in pounds			new mean wt	1.74
3,621,289.79	number based on new mean wt				
2.79	decrease required				