Atlantic States Marine Fisheries Commission

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MEMORANDUM

February 2, 2015

To: Summer Flounder, Scup, and Black Sea Bass Management Board

From: Summer Flounder, Scup, and Black Sea Bass Technical Committee

RE: 2015 Black Sea Bass Recreational Fishery Proposals

List of Participants

Jason McNamee (RI)	Peter Clarke (NJ)	Tom Wadsworth (NC)
Mike Bednarski (MA)	Rich Wong (DE)	Mark Terceiro (NMFS)
Greg Wojcik (CT)	Steve Doctor (MD)	Kiley Dancy (MAFMC)
John Maniscalco (NY)	Sally Roman (VA)	Kirby Rootes-Murdy (ASMFC)

The following memo contains the Summer Flounder, Scup, and Black Sea Bass Technical Committee Review of the Black Sea Bass and Scup State Proposals for the 2015 recreational fishery.

Black Sea Bass Recreational Proposals

The Board and Council met in December of 2014 to establish the 2015 recreational management program for Black Sea Bass. At this meeting, the Board and Council voted to continue the ad hoc regional approach under the provisions of Addendum XXV (ad hoc regions: a northern region (Massachusetts – New Jersey) and southern region (Delaware – North Carolina)) for the 2015 black sea bass recreational fishery.

Total estimated harvest for 2014 is projected to be 1.9 million fish, resulting in a projected overage of approximately 700,000 fish. Because the overage was driven by the northern region states, all reductions for 2015 are to be applied to these states (Massachusetts- New Jersey). As the 2015 black sea bass RHL is approximately 1.3 million fish, an estimated reduction of 32.8% will be required to achieve but not exceed the RHL.

The states of Delaware through North Carolina (North of Cape Hatteras) agreed to set their measures consistent with the proposed Federal regulations (MAFMC recommended 12.5 inch TL minimum fish size,15 fish possession limit, and open seasons from May 15 to September 21 and October 22 to December 31 to NOAA Fisheries).

Methods:

The northern region attempted to construct regulations that are as similar as possible, while still to allowing some flexibility in setting management measures. This flexibility is an attempt to recognize that the states, particularly in the northern region, can have unique fisheries and a consistent set of regulations may have disparate effects across the region. In all cases below, the use of multiple metrics in an option uses the interaction calculation:

Total Increase = (X+Y) - (X*Y);

X = The percentage decrease associated with seasonal closure(s).
Y= The percentage decrease associated with size/possession limit.

The Technical Committee (TC) members noted that while this approach is utilized by the northern states in crafting their proposals, there remains a need to standardize how non-compliant harvested fish are measured when crafting changes in management strategies within states.

Proposed Management Strategies for 2015

The following are the proposals from the states of the northern region.

The TC has have raised the following concerns regarding;

1.) The effect that increasingly complex regulations would have on their ability to calculate and evaluate regulatory proposals, such as possession limit split by time of year and fishing mode.

2) The projected estimates of dead discards that would result from increases from the 2014 minimum size limits in 2015. Changes to other management measures such as season length may produce additional dead discards, but uncertainty around how to estimate the projected dead discards prevented the TC from quantifying the impact of those changes. The projected estimates of dead discards are included with proposed changes to minimum size limits for consideration due to concerns over how discards would be evaluated relative to the 2015 ABC.

Massachusetts

The 2014 Massachusetts' black sea bass regulations were: Open season May 17 – September 15, 8 fish bag limit, 14" minimum size.

These regulations resulted in the estimated recreational harvest of 438, 237 fish, with a PSE of 26.6. A 33% reduction would result in a 2015 harvest target for Massachusetts of approximately 294,000 fish.

Several options are available that are likely to constrain harvest to 294,000 fish. These options focus on increasing regulatory compliance, reducing bag limit, and/or reducing season length.

Options:

Three sets of options are presented. The first set incorporates only changes to the bag limit. The second set explores decreases in season length. The third set incorporates both changes to the bag limit and decreases in season length. Changing the minimum size limit was not explored. All analysis assumes that non-compliance with the bag limit will occur at the same level in 2015 as it did in 2014. All of these options are preliminary and may change after consultation with the MA Marine Fisheries Advisory Commission. However, all potential options will be calculated using the methodology described within this document.

Note that in 2014 the *MarineFisheries* enacted regulations holding charter and head boat operators responsible for any violations that may be committed on their vessel. Further, *MarineFisheries* is currently seeking an increase in the fines for any fish violations that may occur. And lastly, *MarineFisheries* will collaborate with the Massachusetts Environmental Police to identify waves, modes, and areas where non-compliance is problematic. These factors are very likely to reduce non-compliance in 2015, resulting in further reductions to the options presented below.

These options do not include the explicit treatment of a potential letter of authorization (LOA) fishery for 2015. In 2014, the LOA fishery allowed permit holders a larger bag limit (20 fish) and an extended fall season (2 weeks), while prohibiting participants from harvesting black sea bass from June 1 to August 31. Two party and six charter vessels participated in this fishery. Although it is difficult to track the impact of this additional program, participating vessels would have been encountered by MRIP and thus incorporated into the 2014 harvest total.

Table 1. Massachusetts Black Sea Bass Rec Management Options

Bag Limit Only	**Open Date**	**Close Date**	**Bag Limit**	**Min. Size**	**Reduction**
Option 1	17-May	15-Sep	1	14"	41%
Seasonal Reduction Only	**Open Date**	**Close Date**	**Bag Limit**	**Min. Size**	**Reduction**
Option 2	30-May	4-Sep	8	14"	34%
Option 3	25-May	31-Aug	8	14"	34%
Option 4	6-Jun	7-Sep	8	14"	37%
Bag and Season Reduction	**Open Date**	**Close Date**	**Bag Limit**	**Min. Size**	**Reduction**
Option 5	25-May	31-Aug	7	14"	35%
Option 6	25-May	31-Aug	6	14"	35%
Option 7	1-Jun	6-Sep	7	14"	34%
Option 8	1-Jun	6-Sep	6	14"	34%
Option 9	1-Jun	6-Sep	5	14"	36%
Option 10	30-May	4-Sep	7	14"	34%
Option 11	30-May	4-Sep	6	14"	35%
Option 12	23-May	31-Aug	6	14"	33%
Option 13	1-Jun	7-Sep	5	14"	35%
Option 14	6-Jun	7-Sep	7	14"	38%
Option 15	6-Jun	13-Sep	4	14"	33%

Methods:

Projected catch reductions are relative to the 2014 Marine Recreational Information Program (MRIP) estimates. The MRIP survey relies on angler interviews and an effort survey to estimate and characterize harvest of recreationally important fish species. The performance of the recreational black sea bass fishery was evaluated using harvest estimates from the 2014 MRIP surveys. In all cases it was assumed that 2015 effort will be identical to 2014 effort. All projections assume that characteristics of the 2015 fishery is similar to 2014 fishery.

Catch totals from the MRIP survey are based on the cumulative sum of the catch per intercept. Catch per intercept is calculated as the weighting factor (wp_int) multiplied by harvest (harvest.a.b1). Each intercept contains data on the number of contributors (cntrbtrs). The harvest per angler is calculated as harvest divided by the number of contributors.

Harvest per angler was modified to explore what would have happened in 2014 at a different bag limits. Catch per intercept was recalculated by multiplying the weighting factor by the modified harvest per angler, and then multiplying by the number of contributors to the intercept. To account for non-compliance with the bag limit, any bags exceeding 8 fish, the 2014 limit, were not modified. It was assumed that an angler that did not comply with a bag limit of 8 would not comply with a reduced bag limit.

In exploring the effect of reductions to bag limit, achieving a 33% reduction was unlikely until reducing the bag limit to 1 fish. A 1 fish bag limit in 2014 (Option 1) would've reduced harvest by 41%. If assuming that the 2015 fishery will behave similarly to the 2014 fishery, this option will allow Massachusetts to achieve the target catch without reducing season length.

To explore the effect of seasonal reduction on catch total, with status quo bag limits, the total number of fish that were caught per day within a specific wave were calculated. This resulted in a per day reduction of 5,319 fish per day in wave 3 and 7,143 fish per day in wave 5. I did not examine options that reduced wave four. Option 2, which removes 13 days from wave 3 and 11 days from wave 5, would result in a reduction of 34%. Option 3, which removes all 8 days from wave 3 and all 15 days from wave 5, would reduce catch 34%. Option 4, which removes 20 days from wave 3 and 8 days from wave 5, results in a 37% reduction.

Several options consist of different combinations of bag limit and seasonal reductions. Per day reduction was calculated that would have occurred at different bag limits. Per day reductions were removed from the adjusted total catch at different bag limits. Options 5 and 6, which restrict the season to May 25 to August 31, at bag limits of 7 or 6, result in reductions of approx. 35%. Options 7, 8, and 9, which constrain the season to June 1 through September 6 and reduce the bag limit to 7, 6, or 5 fish respectively, result in reductions of 34, 34 and 36%. Options 10 and 11, which constrain the season to May 30 to September 4 at bag limits of 7 or 6 fish, reduce catch by 34 and 35%. Option 12 restricts the season from May 23 to September 7 at a bag limit of 5, resulting in a 33% reduction. Option 13 restricts the season from June 1 to September 7 at a bag limit of 7, results in a 35% reduction. Option 14 restricts the season from June 1 to September 7 at a bag limit of 7 and results in a reduction of 38%. Option 15 restricts the season from June 6 to September 13 at a bag limit of 4 and results in a 33% reduction.

TC Recommendation: Approve

Rhode Island

The following is how RI as a member of the Northern region calculated its reductions. As noted in the background section, the regions will attempt to construct regulations that are as similar as possible. While this is a goal of the following analyses, the Board adopted the Ad Hoc regional approach to allow some flexibility in setting management measures. This flexibility was an attempt to recognize that the states, particularly in the northern region, can have unique fisheries and a consistent set of regulations can have disparate effects across the region. The following is a set of regulations analyzing just RI data, but this can be altered if a three state (NY, CT, and RI) set of regulations is preferred upon technical review.

Rhode Island Methodology

Rhode Island explored three methods of estimating 2014 recreational black sea bass options. Those considered included; 1.) seasonal reductions calculated from daily harvest rates based on RI's harvest from 2014 waves 1 – 5 according to MRIP data; 2.) Bag limit reduction calculations based on RI's harvest from 2014 waves 1 – 5 according to MRIP data; and 3.) A combination bag and harvest reduction calculation based on RI's harvest from 2014 waves 1 – 5 according to MRIP data.

Bag Limit Adjustments

Changes in harvest due to possession limit adjustments were analyzed using MRIP intercept data. In general, the analysis takes the intercept data for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and simulates the effects of different bag limits had they been in effect in 2014. Calculations were run under two assumptions. The first assumption was that all harvest will become fully compliant, the second includes the existing non-compliance, thereby assuming the same proportion of individuals will be non-compliant in 2015. For the tabular results below, only the assumption of full compliance is presented, but this is based on the convention of previous years; this could be an item discussed by the technical committee. The code as developed by M. Bednarski of MADMF and modified for the RI dataset is available in Appendix 1. The results of the analysis are indicated below (Table 2, Figure 1).

Table 2. The projected effects of various bag limits on the 2015 Black Sea Bass recreational landings in the RI, calculated as percent decrease from current management configuration.

Bag	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2015 Reduction	**37%**	**19%**	**9%**	**5%**	**3%**	**1%**	**0%**

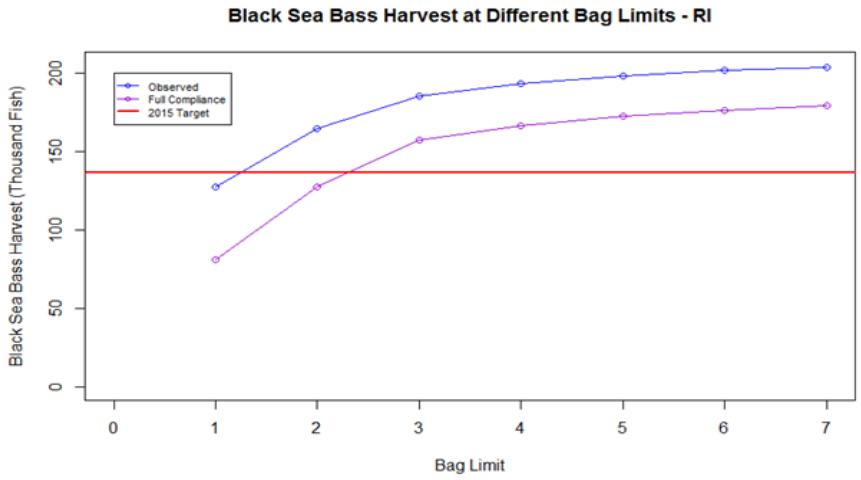

Figure 1. Results of the bag limit analysis for RI under two assumptions, continued non-compliance (blue) and full compliance (purple). The results of the analysis are shown relative to the assumed target, which is calculated as a 33% reduction from 2014 harvest

Seasonal Adjustments

Seasonal adjustments were also calculated by using the MRIP intercept data. In general, the analysis takes the intercept data for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and

expands it, and calculates a daily harvest level for the 2014 data. This harvest is then accumulated through time and compared against a 33% reduction from the 2014 total harvest amount. The point where the cumulative harvest line intersects the target line is the required 33% reduction in harvest.

Combination Seasonal and Bag Limit Adjustments

Combination seasonal and bag limit adjustments were also calculated by using the MRIP intercept data. In general, the analysis takes the intercept data for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and calculates a daily harvest level for the 2014 data under simulated bag limits. This harvest is then accumulated through time and compared against a 33% reduction from the 2014 total harvest amount. As noted above, calculations were run under two assumptions of compliance. The results below only present the assumption of full compliance (Figure 3); this is an item that the technical committee should discuss.

Minimum Size Adjustments

Minimum size adjustments were calculated by using the MRIP size data. In general, the analysis takes the size data from the MRIP survey for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and calculates a harvest at size level for the 2014 data. This harvest is then adjusted by simulating a new minimum size, protecting the harvest underneath the new minimum size, and calculating the reduction incurred (Figure 3, Table 2). An important note on the analysis is that illegal harvest (harvest on fish smaller than the legal 13 inch minimum size) was added back in to the analysis, so the assumption is that illegal harvest will remain in 2015 in the same proportions as it occurred in 2014. A final note is that an assumed discard mortality of 15% was added in to the fish now protected under the new minimum size.

Table 3 - The projected effects of a size limit increase on the 2015 Black Sea Bass recreational landings in the RI, calculated as percent decrease from current management configuration.

Size	13.5”	14”	14” accounting for 15% discard mortality
2015 reduction	7%	12%	10%

Rhode Island Proposed Management Measures for 2015

The following are the proposals from RI (table 4). The options meet the required 33% reduction and follow the calculations as set forth above.

Table 4 – Rhode Island Black Sea Bass options for 2015 based on 2014 harvest

Bag Limit		Minimum Size	Wave 3 (open days)	Wave 4 (open days)	Wave 5 (open days)	Wave 6 (open days)	Reduction
Split Bag	3	13	2	62	-	-	0.33
	7		-	-	15	0	
Split Bag	3	13	2	62	-	-	0.33
	4		-	-	15	0	
Single Bag	3	13	2	62	15	0	0.33
Single Bag	2	13	2	62	22	0	0.33
Split Bag	3	14	2	62	-	-	0.33[1]
	7		-	-	21	0	
Single Bag	3	14	2	62	28	0	0.33[1]

[1] Additional fish lost due to discards from new minimum size = 5,722 fish

TC Recommendation: Approve

Connecticut

In 2014, Connecticut harvested a total of 372,739 black sea bass. A 32.8% reduction would reduce harvest by 122,258 fish, estimating a 2015 harvest of 250,481 fish. All options provided in Table 4 indicate a reduction over the requirement.

Season

Harvest per day rates for waves 3 through 5 came directly from the 2014 landings provided by MRIP, specifically 1,588 fish per day for wave 3, 2,373 fish per day for wave 4 and 3,438 fish per day for wave 5. These catch rates were applied to both seasonal reduction options and options having an increase in season length. Since there has not been harvest in Connecticut in wave 6 since 2007, there were no proposed changes to regulations from November 1 through December 31st.

Size / Possession

The MRIP sample size of measured black sea bass in 2014 was 148 fish. This sample size allowed an accurate length frequency table to be created for making liberalization estimates for the 2015 fishing year. The length frequency table was weighted by the MRIP effort estimates in all calculations. Two minimum lengths were evaluated. An increase to 13.5" resulting in a 15.8% reduction and 14" resulting in a 35% reduction.

The possession limit was analyzed using the MRIP Catch table. The data was queried to include only trips having one angler (contribtrs = 1) in order to remove bias from trips having multiple anglers harvest pooled. There was a total of 109 trips used in the analysis to adjust the creel limit in waves 3 and 4 combined and 92 trips used for wave 5. The proportion of 'saved' fish was then converted to number of fish and applied to the total season's harvest.

Party and Charter Vessel Program

In 2014 Connecticut continued the Party and Charter Black Sea Bass Logbook Program. The program started in 2013 when Connecticut opted to start the program in lieu of a 7% liberalization. In order for vessels to participate in the program, they were required to register with the State. They were also required to submit mandatory monthly catch reports (Figure 1). If vessels failed to submit their reports, they were immediately dropped from the program. A list of active qualifying vessels was maintained and shared with Conservation Law Enforcement. The program allowed party charter vessels an 8 fish creel limit from June 21 to August 31. In 2014 there were a total of 40 registered vessel, of which 31 participated with a total of 593 trips harvesting a total of 20,161 fish. Of these 20,161 fish, only 3,024 (14%) are attributed to the black sea bass party and charter vessel program.

Connecticut would like to continue the party and charter black sea bass program into 2015 with a reduction in the creel limit from 8 fish to 5 fish unless Option 3 was chosen from Table 1, in which case it would be 4 fish. The season for the program would be from June 21st to August 31.

Table 4. 2015 Connecticut Black Sea Bass Options.

Option	Season	Creel	Min Size	% of CT RHL	Harvest	Discard Mortality	Total
Status Quo	June 21– Aug 31	3	13"	150%	372,740	0	372,740
	Sept 1 – Dec 31	8					
1	June 21 – Aug 31	3	14"	97%	242,281	19,569	261,850
	Sept 1 – Dec 31	8					
2	May 22 – Oct 31	3	14"	94%	234,889	19,569	254,458
	Nov 1 – Dec 31	8					
3	May 22- Aug 31	3	14"	99%	247,613	19,569	267,182
	Sept 1 – Dec 31	4					
4	June 1 – Aug 31	3	14"	99%	247,108	19,569	266,677
	Sept 1 – Dec 31	5					
5	July 1 – Oct 31	3	13.5"	100%	250,801	8,834	259,635
	Nov 1 – Dec 31	8					
6	7/22 – Oct 31	3	13"	99%	248,022	0	248,022
	Nov 1 – Dec 31	8					

TC Recommendation: Approve

New York

In 2014, NY recreational anglers have harvested 503,839 black sea bass (BSB) through Wave 5 (preliminary data). Assuming harvest proportions in 2014 are similar to 2013, it is projected that NY will harvest an additional 13,124 BSB in Wave 6, bringing the 2014 total to 516,963. Based upon this and similar calculations for the rest of the coast, the states in the northern region (MA-NJ) must reduce harvest by 32.8%. The preliminary harvest target for NY in 2015 is 347,399 BSB.

NY will use a combination of changes to season, possession limit and/or minimum size limit to achieve a 32.8% reduction in the recreational harvest of BSB. NY's 2014 measures included a 13" minimum size limit, an 8 fish possession limit, and a season that extends from July 15 through to December 31 (170 days).

MRIP estimates of harvest at length were combined with NYSDEC staff conducted headboat sampling to calculate the reduction associated with increasing the minimum size limit to 13.5" and 14.0". MRIP estimates of harvest at different numbers of fish landed/angler were combined with NYSDEC staff conducted headboat sampling to calculate the reduction associated with decreasing the possession limit. MRIP estimates of harvest by Wave were divided by the number of days open in each wave to generate daily rates of fish harvest. These Wave specific daily rates were used to adjust season length in order to achieve the necessary reduction. In some options, days were added to the season, extending into Wave 3. Wave 3 was last open for recreational black sea bass fishing in NY in 2012. The proportion between daily rates from Wave 3 (2,674) and Wave 4 (3,097) in 2012 was calculated (0.86) and applied to the daily rate of 2014 Wave 4 (5,571) to generate a 2014 Wave 3 daily rate (4,810).

The options in the table below are examples of harvest measures that will achieve the required reduction. Additional measures using the same methodology may ultimately be generated and implemented, after consultation with NY's Marine Resource Advisory Council and the fishing public.

Table 6. New York's Proposed Management Measures for 2015

OPTION	REL TO TARGET	SIZE	POSSESSION	SEASON	OTHER	FISH	ADDITIONAL DEAD DISCARDS DUE TO SIZE LIMIT (0.15)
2014 Regs.	149.0%	13"	8	July 15-Dec 31		516,963	0
1	98.2%	14"	2	May 22-Dec 31	8 fish Nov&Dec	340,959	25,076
2	99.6%	14"	3	Jun 18-Dec 31	8 fish Nov&Dec	345,918	25,441
3	99.9%	14"	8	July 15-Dec 31		346,882	25,512
4	99.4%	13.5"	3	July 15-Dec 31		345,166	8,710
5	99.5%	13.5"	2	Jun 25-Dec 31	8 fish Nov&Dec	345,729	8,724
6	99.8%	14"	3	Jun 17-Dec 31		346,488	25,483
7	98.8%	13"	4	Aug 6-Dec 31		343,137	0
8	99.1%	13.5"	5	July 31-Dec 31		344,252	8,687
9	99.3%	13"	8	July 15-Sep 20		344,912	0
10	99.1%	13"	8	Aug 15-Dec 31		344,275	0
11	98.8%	13"	8	Aug 14-Nov 30		343,176	0

TC Recommendation: Approve

New Jersey

Options that are being considered for New Jersey's 2015 black sea bass recreational fishery are listed in Tables 8-12. All options were developed using the New Jersey MRIP harvest data from 2014 for waves 1-5 and 2013 wave 6 data. In the past, it is typical to use the average from multiple years of data to gap fill when specific wave data is absent. However, in the case of 2014 MRIP wave 6, New Jersey felt the higher estimate in 2013 was a conservative approach compared to the lower average estimate from 2011-2013, hence the reason for utilizing only 2013 wave 6. To create a daily possession bag reduction table, the New Jersey VAS data was used by taking the average harvest from 2011-2013. New Jersey is considering a split bag approach, as was applied in 2014, which would implement for example, a size limit of 12.5 inches and a possession limit of 15 fish during waves 3, 5, and 6 and a reduced possession limit during wave 4.

Please keep in mind that the options listed below reflect potential options. New Jersey's Marine Fisheries Council's Black Sea Bass Committee and its advisors will convene to recommend their preferred options to the New Jersey Marine Fisheries Council for 2015. The Council will then meet to select an option. The option they select may or may not be one of the examples provided, but it will have been developed using the same methodology as the options listed in Table 7. The Technical Committee has been provided the spreadsheet with the calculations for the percent reductions.

New Jersey's Proposed Management Measures for 2014

Table 7.

NJ Recreational 2014 Black Sea Bass Measures						
		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx
	2014 Season	May19-June30 (47 days)	July 1-August 31 (62 days)	Sept 1-Sept 6 and Oct 18-Oct 31 (31 days)	Nov 1 - Dec 31 (61 days)	0.00%
2014	bag	15	3	15	15	
	size	12.5	12.5	12.5	12.5	
	days	43	62	20	61	

Table 8.

NJ 2015 Black Sea Bass Example Option 1							
		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx	
2015 Example Season		June 8-June30	July 1-August 31	Oct 23-Oct 31	Nov 1 - Dec 31	33.11%	Fish Harvested Under Example Measures
							264,836
2015	bag	15	3	15	15		
	size	12.5	12.5	12.5	12.5		
	days	23	62	9	61		

Table 9.

NJ 2015 Black Sea Bass Example Option 2							
		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx	
2015 Example Season		June 6-June30	July 1-August 31	Oct 23-Oct 31	Nov 1 - Dec 31	33.21%	Fish Harvested Under Example Measures
							264,434
2015	bag	10	3	10	15		
	size	12.5	12.5	12.5	12.5		
	days	25	62	9	61		

Table 10.

NJ 2015 Black Sea Bass Example Option 3							
		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx	
2015 Example Season		June 4-June30	July 1-August 31	Oct 23-Oct 31	Nov 1 - Dec 31	33.51%	Fish Harvested Under Example Measures
2015	bag	8	3	8	15		263,240
	size	12.5	12.5	12.5	12.5		
	days	27	62	9	61		

Table 11.

NJ 2015 Black Sea Bass Example Option 4								
		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx		
2015 Example Season		May 26-June30	July 1-August 31	Sept 1-Sept 2 and Oct 22-Oct 31	Nov 1 - Dec 31	33.80%	Fish Harvested Under Example Measures	Additional Dead Discards do to Size Increase (.15)
2015	bag	15	3	15	15		262,109	9,156
	size	13	13	13	13			
	days	35	62	9	61			

Table 12.

NJ 2015 Black Sea Bass Example Option 5								
		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx		
2015 Example Season		May 18-June30	July 1-August 31	Oct 22-Oct 31	Nov 1 - Dec 31	33.17%	Fish Harvested Under Example Measures	Additional Dead Discards do to Size Increase (.15)
2015	bag	10	3	10	10		264,594	8,626
	size	13	13	13	13			
	days	38	62	10	61			

<u>TC Recommendation:</u> Approve

Commonwealth of Massachusetts

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TO: ASMFC Summer Flounder, Scup and Black Sea Bass Technical Committee

FROM: Michael S. Bednarski, Ph.D., Stock Assessment Specialist

SUBJECT: Massachusetts' 2015 Black Sea Bass Recreational Management

DATE: January 26th, 2015

Introduction:

The coastwide recreational harvest limit (RHL) for black sea bass for 2014 was 1.2 million fish. Total estimated harvest for 2014 is projected to be 1.9 million fish, resulting in a projected overage of approximately 0.7 million fish. Because the overage was driven by NJ-MA, all reductions for 2015 will apply only to these states. Because the 2015 black sea bass RHL will be 1.3 million fish, an estimated reduction of 33% will be required.

The 2014 Massachusetts' black sea bass regulations were:

Open season May 17 – September 15,
8 fish bag limit,
14" minimum size.

These regulations resulted in the estimated recreational harvest of 438 K fish, with a PSE of 26.6. A 33% reduction would result in a 2015 harvest target for Massachusetts of approximately 294K individuals.

Several options are available that are likely to constrain harvest to 294 K individuals. These options focus on reducing bag limit and/or reducing season length.

Options:

I present three sets of options. The first set incorporates only changes to the bag limit. The second set explores decreases in season length. The third set incorporates both changes to the bag limit and decreases in season length. I did not explore changing the minimum size limit. All analysis assumes that non-compliance with the bag limit will occur at the same level in 2015 as it did in 2014. All of these options are preliminary and may change after consultation with our Marine Fisheries Advisory Commission. However, all potential options will be calculated using the methodology described within this document.

I note that in 2014 the *MarineFisheries* enacted regulations holding charter and head boat operators responsible for any violations that may be committed on their vessel. Further, *MarineFisheries* is currently seeking an increase in the fines for any fish violations that may occur. And lastly, *MarineFisheries* will collaborate with the Massachusetts Environmental Police to identify waves, modes, and areas where non compliance is problematic. These factors are very likely to reduce non compliance in 2015, resulting in further reductions to the options presented below.

These options do not include the explicit treatment of a potential letter of authorization (LOA) fishery for 2015. In 2014, the LOA fishery allowed permit holders a larger bag limit (20 fish) and an extended fall season (2 weeks), while prohibiting participants from harvesting black sea bass from June 1 to August 31.

Two party and six charter vessels participated in this fishery. Although it is difficult to track the impact of this additional program, participating vessels would have been encountered by MRIP and thus incorporated into the 2014 harvest total.

Bag Limit Only	Open Date	Close Date	Bag Limit	Min. Size	Reduction
Option 1	17-May	15-Sep	1	14"	41%

Seasonal Reduction Only	Open Date	Close Date	Bag Limit	Min. Size	Reduction
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Bag and Season Reduction	Open Date	Close Date	Bag Limit	Min. Size	Reduction
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Option 13	1-Jun	7-Sep	5	14"	35%
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Option 15	6-Jun	13-Sep	4	14"	33%

Methods:

Projected catch reductions are relative to the 2014 Marine Recreational Information Program (MRIP) estimates. The MRIP survey relies on angler interviews and an effort survey to estimate and characterize harvest of recreationally important fish species. I evaluated the performance of the recreational black sea bass fishery using harvest estimates from the 2014 MRIP surveys. In all cases I assume that 2015 effort will be identical to 2014 effort. All projections assume that characteristics of the 2015 fishery is similar to 2014 fishery.

Catch totals from the MRIP survey are based on the cumulative sum of the catch per intercept. Catch per intercept is calculated as the weighting factor (wp_int) multiplied by harvest (harvest.a.b1). Each intercept contains data on the number of contributors (cntrbtrs). The harvest per angler is calculated as harvest divided by the number of contributors.

I modified harvest per angler to explore what would have happened in 2014 at a different bag limits. I recalculated catch per intercept by multiplying the weighting factor by the modified harvest per angler, and then multiplying by the number of contributors to the intercept. To account for non-compliance with the bag limit, any bags exceeding 8 fish, the 2014 limit, were not modified. I assumed that an angler that did not comply with a bag limit of 8 would not comply with a reduced bag limit.

I explored the effect of reductions to bag limit. I was unable to achieve a 33% reduction until reducing the bag limit to 1 fish. A 1 fish bag limit in 2014 (Option 1) would've reduced harvest by 41%. If I assume that the 2015 fishery will behave similarly to the 2014 fishery, this option will allow Massachusetts to achieve the target catch without reducing season length.

To explore the effect of seasonal reduction on catch total, with status quo bag limits, I calculated the total number of fish that were caught per day within a specific wave. This resulted in a per day reduction of

5,319 fish per day in wave 3 and 7,143 fish per day in wave 5. I did not examine options that reduced wave four. Option 2, which removes 13 days from wave 3 and 11 days from wave 5, would result in a reduction of 34%. Option 3, which removes 8 days from wave 3 and all 15 days from wave 5, would reduce catch 34%. Option 4, which removes 20 days from wave 3 and 8 days from wave 5, results in a 37% reduction.

I provide several options consisting of different combinations of bag limit and seasonal reductions. I calculated the per day reduction that would have occurred at different bag limits. Per day reductions were removed from the adjusted total catch at different bag limits. Options 5 and 6, which restrict the season to May 25 to August 31, at bag limits of 7 or 6, result in reductions of approx. 35%. Options 7, 8, and 9, which constrain the season to June 1 through September 6 and reduce the bag limit to 7, 6, or 5 fish respectively, result in reductions of 34, 34 and 36%. Options 10 and 11, which constrain the season to May 30 to September 4 at bag limits of 7 or 6 fish, reduce catch by 34 and 35%. Option 12 restricts the season from May 23 to September 7 at a bag limit of 5, resulting in a 33% reduction. Option 13 restricts the season from June 1 to September 7 at a bag limit of 7, results in a 35% reduction. Option 14 restricts the season from June 1 to September 7 at a bag limit of 7 and results in a reduction of 38%. Option 15 restricts the season from June 6 to September 13 at a bag limit of 4 and results in a 33% reduction.

Proposals for 2015 Recreational Black Sea Bass Management Options – RI (Northern region)

Background:

In February of 2014 the summer flounder, scup, and black sea bass Management Board (Board) approved Addendum XXV to the fishery management plan for summer flounder, scup, and black sea bass. The addendum sets forth management measures for the recreational fishery for black sea bass that were meant to reduce the coastwide recreational harvest by 3.2% in an effort to reduce recreational harvest under the recreational harvest limit (RHL). The addendum sought to achieve this reduction through the creation of ad hoc regions. The ad hoc regional approach was carried forward in to 2015. The required reduction was not achieved in 2014, and due to increased harvest in 2014, a new reduction of 33% is needed for 2015.

Two regions were established by the addendum. Each region implements recreational black sea bass management programs that utilize minimum size limits, maximum possession limits, and seasonal closures that are designed to achieve a specific harvest reduction that, when combined with the other regions in the management unit, will achieve the required coastwide reduction for 2015. The northern region will contain the states of Massachusetts through New Jersey and the southern region will contain the states of Delaware through North Carolina (North of Cape Hatteras). All states will agree to the regulations implemented within the region. While not required, states will work to develop consistent regulations for their recreational management programs within the region. Under this option, the states of Massachusetts through New Jersey are required to reduce their harvest by 33% based on the fishery performance from 2014.

Action:

Regional conservation equivalent measures were adopted by the Atlantic States Marine Fisheries Commission (ASMFC) and Mid-Atlantic Fisheries Management Council (MAFMC) in lieu of a coastwide option for 2015. Therefore, the two regions as presented above are required to develop regional management plans which include management measures (i.e. possession limits, size limits, and seasons) to achieve not in excess of the recreational harvest target of 2.33 million pounds of black sea bass.

Methods:

The following is how RI as a member of the Northern region will calculate its reductions. As noted in the background section, the regions will attempt to construct regulations that are as similar as possible. While this is a goal of the following analyses, the Board adopted the Ad Hoc regional approach to allow some flexibility in setting management measures. This flexibility was an attempt to recognize that the states, particularly in the northern region, can have unique fisheries and a consistent set of regulations can have disparate effects across the region. The following is a set of regulations analyzing just RI data, but this can be altered if a three state (NY, CT, and RI) set of regulations is preferred upon technical review.

Rhode Island Methodology

Rhode Island explored four methods of estimating 2015 recreational black sea bass options. Those considered included; 1.) seasonal reductions calculated from daily harvest rates based on RI's harvest from 2014 waves 1 – 5 according to MRIP data; 2.) bag limit reduction calculations based on RI's harvest from 2014 waves 1 – 5 according to MRIP data; 3.) reductions achieved from increasing the minimum size based on MRIP size distribution data, and 4.) a combination size, bag, and harvest reduction calculation based on RI's harvest from 2014 waves 1 – 5 according to MRIP data.

Bag Limit Adjustments

Changes in harvest due to possession limit adjustments were analyzed using MRIP intercept data. In general, the analysis takes the intercept data for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and simulates the effects of different bag limits had they been in effect in 2014. Calculations were run under two assumptions. The first assumption was that all harvest will become fully compliant, the second includes the existing non-compliance, thereby assuming the same proportion of individuals will be non-compliant in 2015. For the tabular results below, only the assumption of continued non-compliance is presented, as discussed by the technical committee. The code as developed by M. Bednarski of MADMF and modified for the RI dataset is available in Appendix 1. The results of the analysis are indicated below (Table 1, Figure 1).

Table 1 - The projected effects of various bag limits on the 2015 Black Sea Bass recreational landings in the RI, calculated as percent decrease from current management configuration.

Bag	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2015 reduction	**37%**	**19%**	**9%**	**5%**	**3%**	**1%**	**0%**

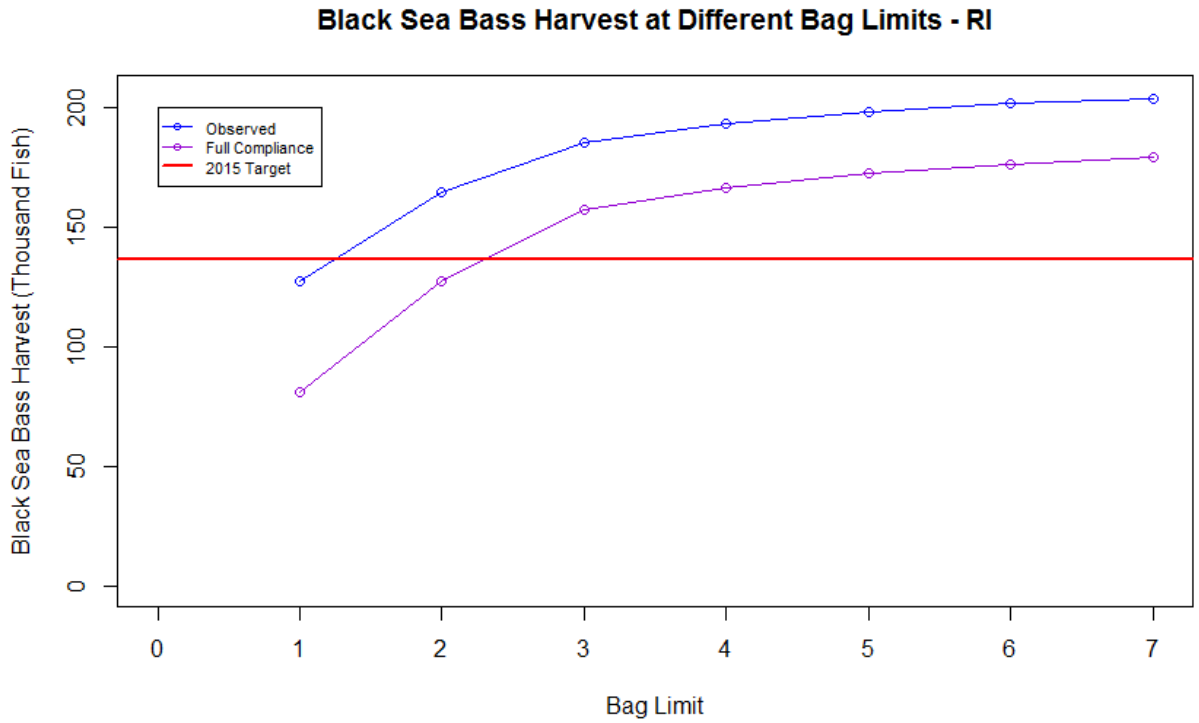


Figure 1 - Results of the bag limit analysis for RI under two assumptions, continued non-compliance (blue) and full compliance (purple). The results of the analysis are shown

relative to the assumed target, which is calculated as a 33% reduction from 2014 harvest estimate.

Seasonal Adjustments

Seasonal adjustments were also calculated by using the MRIP intercept data. In general, the analysis takes the intercept data for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and calculates a daily harvest level for the 2014 data. This harvest is then accumulated through time and compared against a 33% reduction from the 2014 total harvest amount. The point where the cumulative harvest line intersects the target line is the required 33% reduction in harvest. As noted above, calculations were run under two assumptions of compliance (Figure 2), but only the assumption of continued non-compliance is used for the reduction scenarios. The code as developed by M. Bednarski of MADMF and modified for the RI dataset is available in Appendix 1.

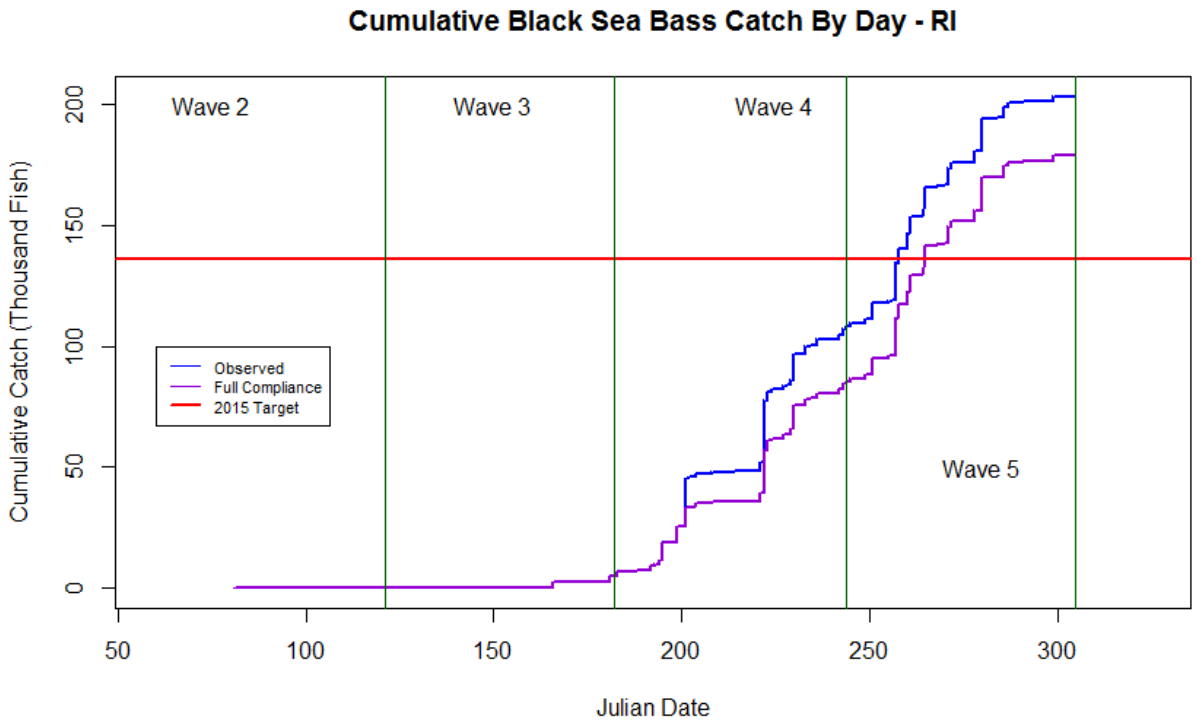


Figure 2 - Results of the season analysis for RI under two assumptions, continued non-compliance (blue) and full compliance (purple). The results of the analysis are shown relative to the assumed target, which is calculated as a 33% reduction from 2014 harvest estimate.

Minimum Size Adjustments

Minimum size adjustments were calculated by using the MRIP size data. In general, the analysis takes the size data from the MRIP survey for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and calculates a harvest at size level for the 2014 data. This harvest is then adjusted by simulating a new minimum size, protecting the harvest underneath the new minimum size, and calculating the reduction incurred (Figure 3, Table 2). An important note on the analysis is that illegal harvest (harvest on fish smaller than the legal 13 inch minimum size) was added back in to the analysis, so the assumption is that illegal harvest will remain in 2015 in the

same proportions as it occurred in 2014. A final note is that an assumed discard mortality of 15% was added in to the fish now protected under the new minimum size. The code for the MRIP length frequency extraction function as developed by G. Nelson of MADMF and the code for the analysis for the RI dataset is available in Appendix 1.

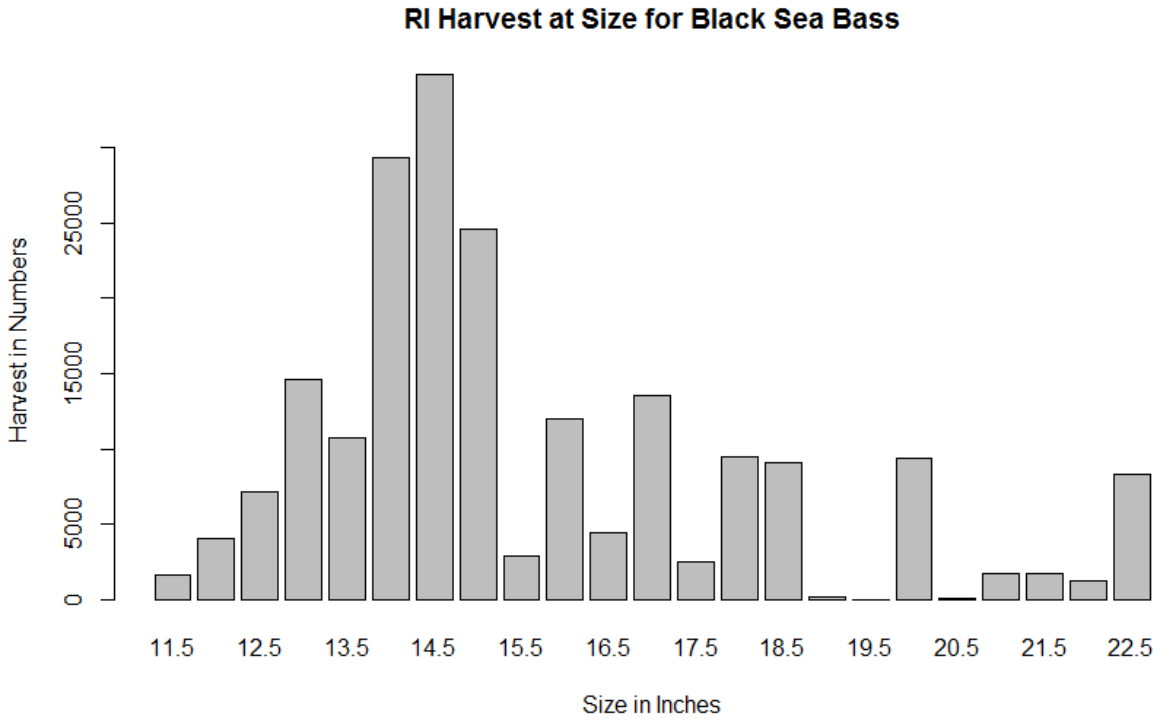


Figure 3 - Harvest at length in 2014 for RI black sea bass.

Table 2 - The projected effects of a size limit increase on the 2015 Black Sea Bass recreational landings in the RI, calculated as percent decrease from current management configuration.

Size	**13.5”**	**14”**	**14” accounting for 15% discard mortality**
2015 reduction	**7%**	**12%**	**10%**

Combination Seasonal and Bag Limit Adjustments

Combination seasonal and bag limit adjustments were also calculated by using the MRIP intercept data. In general, the analysis takes the intercept data for 2014 (only waves 1 – 5 were available at the time of the analysis), weights and expands it, and calculates a daily harvest level for the 2014 data under simulated bag limits. This harvest is then accumulated through time and compared against a 33% reduction from the 2014 total harvest amount, and simulates this harvest for various bag limit scenarios. As noted above, calculations were run under two assumptions of compliance. The results below only present the assumption of continued non-compliance (Figure 4). The code as developed by M. Bednarski of MADMF and modified for the RI dataset is available in Appendix 1.

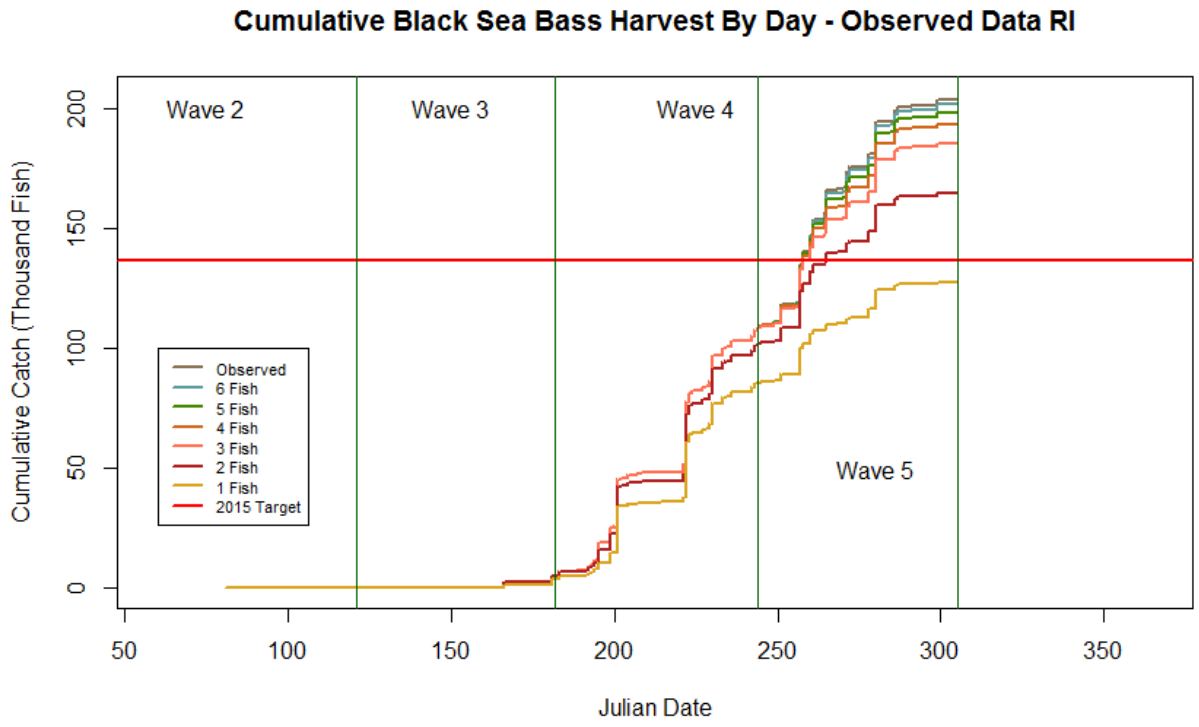


Figure 4 - Results of the combination season and bag limit analysis for RI under seven bag limit simulations. The results of the analysis are shown relative to the assumed target, which is calculated as a 33% reduction from 2014 harvest estimate.

Proposed Management Strategies for 2015

The following are the proposals from RI (Table 3). The options meet the required 33% reduction and follow the calculations as set forth above. When combining proportions for minimum size with the other reduction strategies, the following equation is used to account for the interaction:

Total Increase = (X+Y) - (X*Y);

X = The percentage decrease associated with possession limit/seasonal closure(s).

Y= The percentage decrease associated with size limit.

Table 3 – RI options for 2015 based on 2014 harvest

Bag Limit	Minimum	Wave 3	Wave 4	Wave 5	Wave 6	Reduction

		Size	(open days)	(open days)	(open days)	(open days)	
Split Bag	3	13	2	62	-	-	0.33
	7		-	-	15	0	
Split Bag	3	13	2	62	-	-	0.33
	4		-	-	15	0	
Single Bag	3	13	2	62	15	0	0.33
Single Bag	2	13	2	62	22	0	0.33
Split Bag	3	14	2	62	-	-	0.33[1]
	7		-	-	21	0	
Single Bag	3	14	2	62	28	0	0.33[1]

[1] Additional fish lost due to discards from new minimum size = 5,722 fish

Appendix 1 – Code for analysis

```
##############################################################################
#########################################
#     RI BSB analysis for 2015                                               #
```

```
#     J. McNamee Jan 19, 2015                                                  #
#     modified from code provided by M. Bednarski, MADMF
#
##############################################################################
########################################

##############################################################################
########################################
#      Gary Nelson function Modified for 2014 prelim data
#
##############################################################################
########################################


MRIP.intercepts<-function(intdir=NULL,common=NULL, st=NULL, wave=c(1,2,3,4,5),
#### Modified to use 5 waves, rather than 6.
  mode=c(1,2,3,4,5,7),area=c(1,2,3,4,5),styr=NULL,       ###### Modes 1,2,3,4,5,7 and
areas 1,2,3,4,5
  endyr=NULL, trips=1){
   if(is.null(intdir)) stop("Need main directory location of intercept files.")
   if(is.null(common)) stop("Need Common name for species.")
   if(is.null(st)) stop("No state code was specified.")
   if(is.null(area)) stop("No area code was specified.")
   if(is.null(mode)) stop("No mode code was specified.")
   if(is.null(wave)) stop("No wave code was specified.")
   if(is.null(styr)) stop("Starting year is missing.")
   if(is.null(endyr)) stop("Ending year is missing.")

 if(length(grep("/",intdir))==1){
      din<-ifelse(substr(intdir,nchar(intdir),nchar(intdir)) %in% c("/"),
        c(paste(intdir,"int",sep="")),c(paste(intdir,"/int",sep="")))
    }
   if(length(grep("\\\\",intdir))==1){
      din<-ifelse(substr(intdir,nchar(intdir),nchar(intdir)) %in% c("\\"),
        c(paste(intdir,"int",sep="")),c(paste(intdir,"\\int",sep="")))
    }
 common<-tolower(common)
 st<-as.character(st)
 styr<-as.character(styr)
 endyr<-as.character(endyr)
 wave<-as.character(wave)
 area<-as.character(area)
 mode<-as.character(mode)
 dom_id<-NULL
 dataset<-NULL
 temp<-NULL
 temp1<-NULL
  rbind2<- function(input1, input2){
  if(!is.null(ncol(input1))){
  n.input1 <- ncol(input1)
  n.input2 <- ncol(input2)
```

```
  if (n.input2 < n.input1) {
    TF.names <- which(names(input2) %in% names(input1))
    column.names <- names(input2[, TF.names])
    }
  else {TF.names <- which(names(input1) %in% names(input2))
    column.names <- names(input1[, TF.names])}
  return(rbind(input1[, column.names], input2[, column.names]))
 }
   if(is.null(ncol(input1))) return(rbind(input1,input2))
}
          for(yr in styr:endyr){
            for (j in 1:as.numeric(length(wave))){
           #Get catch
              wv<-wave[j]
           t3<-read.csv(paste(din,yr,"/","catch_",yr,wv,".csv",sep=""),
             colClasses=c("character"),na.strings=".")
             t3<-t3[t3$ST %in% c(st) & t3$MODE_FX %in% c(mode) & t3$AREA_X
%in% c(area),]
             names(t3)<-tolower(names(t3))
           temp<-rbind2(temp,t3)
     #get trips
           t4<-read.csv(paste(din,yr,"/","trip_",yr,wv,".csv",sep=""),
            colClasses=c("character"),na.strings=".")
           t4<-t4[t4$ST %in% c(st) & t4$MODE_FX %in% c(mode) & t4$AREA_X %in%
c(area),]
          names(t4)<-tolower(names(t4))
         temp1<-rbind2(temp1,t4)
             }
           }
   convtolow<-function(x){
   for(i in 1:ncol(x)) x[,i]<-tolower(x[,i])
   return(x)
  }
  temp<-convtolow(temp)
  temp1<-convtolow(temp1)

  temp<-temp[,c("common","strat_id","psu_id","st","id_code","sp_code",

"claim","release","harvest","tot_len_a","wgt_a","tot_len_b1","wgt_b1","fl_reg","tot_cat"
,
    "wgt_ab1","tot_len","landing")]
  temp<-temp[order(temp$strat_id,temp$psu_id,temp$id_code),]
  temp1<-temp1[order(temp1$strat_id,temp1$psu_id,temp1$id_code),]

  dataset<-merge(temp1,temp,by.x=c("strat_id","psu_id","id_code","st"),
              by.y=c("strat_id","psu_id","id_code","st"),all.x=FALSE,all.y=FALSE)
  dataset$common<-as.character(dataset$common)
  dataset$common<-ifelse(is.na(dataset$common),"",dataset$common)
  if(!any(dataset$common==common)) stop("common not found.")
```

```
 dataset$tot_cat<-as.numeric(dataset$tot_cat)
  dataset$landing<-as.numeric(dataset$landing)
  dataset$claim<-as.numeric(dataset$claim)
  dataset$harvest<-as.numeric(dataset$harvest)
  dataset$release<-as.numeric(dataset$release)
  dataset$wgt_ab1<-as.numeric(dataset$wgt_ab1)
  dataset$wp_int<-as.numeric(dataset$wp_int)
  dataset$dcomm<-common
  dataset$dtotcat<-ifelse(dataset$common==common,dataset$tot_cat,0)
  dataset$dlandings<-ifelse(dataset$common==common,dataset$landing,0)
  dataset$dclaim<-ifelse(dataset$common==common,dataset$claim,0)
  dataset$dharvest<-ifelse(dataset$common==common,dataset$harvest,0)
  dataset$drelease<-ifelse(dataset$common==common,dataset$release,0)
  dataset$dwgt_ab1<-ifelse(dataset$common==common,dataset$wgt_ab1,0)

  dataset1<-
aggregate(cbind(dataset$dtotcat,dataset$dlandings,dataset$dclaim,dataset$dharvest,

dataset$drelease,dataset$dwgt_ab1),list(dataset$strat_id,dataset$psu_id,dataset$id_code,
dataset$wp_int,dataset$dcomm),sum)

  names(dataset1)<-
c("strat_id","psu_id","id_code","wp_int","common","total.catch","harvest.A.B1","claim.
A","reported.B1",
    "release.B2","weight.AB1")

  dataset2<-merge(dataset1,temp1,by.x=c("strat_id","psu_id","id_code","wp_int"),
            by.y=c("strat_id","psu_id","id_code","wp_int"),all.x=FALSE,all.y=FALSE)


   if(trips>1){
    if(trips==2) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|(dataset2$common==common &
as.numeric(dataset2$total.catch)>0),"1","2")
    if(trips==3) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|(dataset2$common==common &
as.numeric(dataset2$claim.A)>0),"1","2")
    if(trips==4) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|(dataset2$common==common &
as.numeric(dataset2$reported.B1)>0),"1","2")
    if(trips==5) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|(dataset2$common==common &
as.numeric(dataset2$release.B2)>0),"1","2")
    if(trips==6) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|dataset2$prim2_common==common|(dataset
2$common==common & as.numeric(dataset2$total.catch)>0),"1","2")
    if(trips==7) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|dataset2$prim2_common==common|(dataset
2$common==common & as.numeric(dataset2$claim.A)>0),"1","2")
    if(trips==8) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|dataset2$prim2_common==common|(dataset
2$common==common & as.numeric(dataset2$reported.B1)>0),"1","2")
```

```
   if(trips==9) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|dataset2$prim2_common==common|(dataset
2$common==common & as.numeric(dataset2$release.B2)>0),"1","2")
   if(trips==10) dataset2$dom_id<-
ifelse(dataset2$prim1_common==common|dataset2$prim2_common==common,"1","2")
   if(trips==11) dataset2$dom_id<-ifelse(dataset2$prim1_common==common,"1","2")
   if(trips==12) dataset2$dom_id<-ifelse(dataset2$prim2_common==common,"1","2")
   dataset2<-dataset2[dataset2$dom_id!="2",]
  }
 return(dataset2)
}
##############################################################################
#########################
#  end Gary Nelson Function                                                  #
##############################################################################
#########################

##############################################################################
#########################
#     start analysis for RIBSB                                               #
#     Note: RI has two seasons June 29 - Aug 31 @3, Sept 1 - Dec 31 @ 7
#
##############################################################################
#########################



Intercepts <- MRIP.intercepts(intdir="C:\\Users\\jason.mcnamee\\Desktop\\Z Drive
stuff\\MRIP Data\\",common="BLACK SEA BASS", st=c(44),styr=2014,endyr=2014)
#### Extracts the relevant Intercepts. Needs to contain the location of the raw MRIP data
on your hard drive

Intercepts2 <- subset(Intercepts, select=c("wp_int", "harvest.A.B1", "mode_f",
"mode_fx", "area", "area_x", "wave", "id_code", "cntrbtrs"))   ### select only those
columns relevant to what-if analysis
Intercepts2$day <- as.double(substr(Intercepts2$id_code,12,13))   #### extracts day for
calculating julian date
Intercepts2$month <- as.double(substr(Intercepts2$id_code,10,11))  #### extracts month
for calculating julian date
Intercepts2$julian_date1 <- ifelse(Intercepts2$month ==3, 60, ifelse(Intercepts2$month
== 4 , 91, ifelse(Intercepts2$month == 5, 121, ifelse(Intercepts2$month == 6, 152,
ifelse(Intercepts2$month == 7, 182, ifelse(Intercepts2$month==8, 213,
ifelse(Intercepts2$month==9, 244, ifelse(Intercepts2$month==10, 274,
ifelse(Intercepts2$month==11, 305, ifelse(Intercepts2$month==12,335,0)))))))))   ####
if else statements to convert month to julian date
Intercepts2$julian_date2 <- Intercepts2$day + Intercepts2$julian_date1   ### combines
month and day for julian date
Intercepts3 <- Intercepts2[order(Intercepts2$julian_date2),]     #### orders intercepts by
julian date
Intercepts2 <- Intercepts3    ###changes name back to intercept 2 because everything
after this is coded as intercept2
```

```
Intercepts2$Mult.Cont <- ifelse(Intercepts2$cntrbtrs > 1, 1, 0)  ##### ifelse for identifying intercepts with multiple contributors
Intercepts2$Observed.Bag <- ifelse(Intercepts2$Mult.Cont > 0, Intercepts2$harvest.A.B1 / as.double(Intercepts2$cntrbtrs), Intercepts2$harvest.A.B1)  ##### Corrects for multiple contributor. If multiple contributor, divides harvest by contributors. If not, just the raw number for harvest

#### Season 1 June 29 to August 31, Julian 180 to 243
Season1 <- subset(Intercepts2, Intercepts2$julian_date2 < 244, select=c("wp_int", "harvest.A.B1", "mode_f", "mode_fx", "area", "area_x", "wave", "id_code", "cntrbtrs", "Observed.Bag"))

#### Season 2 September 1 to December 31, Julian 244 or greater
Season2 <- subset(Intercepts2, Intercepts2$julian_date2 > 243, select=c("wp_int", "harvest.A.B1", "mode_f", "mode_fx", "area", "area_x", "wave", "id_code", "cntrbtrs", "Observed.Bag"))

############################################################
#       Season 1 Adjustments                               #
############################################################

Season1$Compliance3 <- ifelse(Season1$Observed.Bag > 3, 3, Season1$Observed.Bag) #### Full Compliance. Any time an observed bag exceeded 3, corrects to 3
Season1$NCompliance3 <- ifelse(Season1$Observed.Bag > 3 & Season1$Observed.Bag <3.01, 3, Season1$Observed.Bag) #### Above observed non compliance.
Season1$Compliance2 <- ifelse(Season1$Observed.Bag > 2, 2, Season1$Observed.Bag) #### Full compliance with an adjusted bag of 2
Season1$NCompliance2 <- ifelse(Season1$Observed.Bag > 2 & Season1$Observed.Bag <3.01, 2, Season1$Observed.Bag)  #### Above with observed non compliance. Anyone who kept 3 would be assumed to comply with a reduction. Anyone who exceeded 3 would be unlikely to comply with a reduction.
Season1$Compliance1 <- ifelse(Season1$Observed.Bag > 1, 1, Season1$Observed.Bag) #### Full compliance with an adjusted bag of 1
Season1$NCompliance1 <- ifelse(Season1$Observed.Bag > 1 & Season1$Observed.Bag <3.01, 1, Season1$Observed.Bag)  #### Above with observed non compliance


Season1$Compliance2.3 <- Season1$wp_int * Season1$Compliance3  * as.double(Season1$cntrbtrs)  ### Calculates harvest per intercept
MRIP_Estimate_Compliance3_Season1 <- sum(Season1$Compliance2.3)    ### Sums harvest per intercept. Full compliance - what the total would have been if there were no bag limit exceedences.
Season1$Cumulative_Catch3_C <- cumsum(Season1$Compliance2.3)  #### Tracks cumulative catch over the season.
Season1$NCompliance2.3 <- Season1$wp_int * Season1$NCompliance3 * as.double(Season1$cntrbtrs)   ### Sums harvest per intercept. Observed non compliance.
Season1$Cumulative_Catch3<- cumsum(Season1$NCompliance2.3) ### Tracks cumulative catch over the season

MRIP_Estimate_NCompliance3_Season1 <- sum(Season1$NCompliance2.3)  #### Sums harvest per intercept. If single season, this total would match the MRIP catch.
```

```
MRIP_Estimate_Compliance3_Season1
MRIP_Estimate_NCompliance3_Season1

Season1$Compliance2.2 <- Season1$wp_int * Season1$Compliance2  *
as.double(Season1$cntrbtrs)   #### This section adjusts bag limit from 3 to 2, with
compliance and non compliance
MRIP_Estimate_Compliance2_Season1 <- sum(Season1$Compliance2.2)
Season1$Cumulative_Catch2_C <- cumsum(Season1$Compliance2.2)
Season1$NCompliance2.2 <- Season1$wp_int * Season1$NCompliance2 *
as.double(Season1$cntrbtrs)
Season1$Cumulative_Catch2<- cumsum(Season1$NCompliance2.2)
MRIP_Estimate_NCompliance2_Season1 <- sum(Season1$NCompliance2.2)

MRIP_Estimate_Compliance2_Season1
MRIP_Estimate_NCompliance2_Season1

Season1$Compliance2.1 <- Season1$wp_int * Season1$Compliance1  *
as.double(Season1$cntrbtrs)   #### This section adjusts bag limit from 3 to 1, with
compliance and non compliance
MRIP_Estimate_Compliance1_Season1 <- sum(Season1$Compliance2.1)
Season1$Cumulative_Catch1_C <- cumsum(Season1$Compliance2.1)
Season1$NCompliance2.1 <- Season1$wp_int * Season1$NCompliance1 *
as.double(Season1$cntrbtrs)
Season1$Cumulative_Catch1<- cumsum(Season1$NCompliance2.1)
MRIP_Estimate_NCompliance1_Season1 <- sum(Season1$NCompliance2.1)

MRIP_Estimate_Compliance1_Season1
MRIP_Estimate_NCompliance1_Season1

Full_Compliance <- c(MRIP_Estimate_Compliance3_Season1,
MRIP_Estimate_Compliance2_Season1, MRIP_Estimate_Compliance1_Season1)/1000
### Creates a vector with season 1 harvest at different bags, with full compliance
Full_NCompliance <- c(MRIP_Estimate_NCompliance3_Season1,
MRIP_Estimate_NCompliance2_Season1,
MRIP_Estimate_NCompliance1_Season1)/1000 ### Creates a vector with season 1
harvest, with observed non compliance.
Creel <- c(3,2,1)   #### A vector with the different bag limits to match for a future table
Season <- c(1,1,1)  #### A vector with season to match for a future table

SummaryTableSeason1 <- cbind(Creel, Full_Compliance, Full_NCompliance, Season)
### Summary Table that contains all the season one totals

#############################################################
#      Season 2 Adjustments                                 #
#############################################################

Season2$Compliance7 <- ifelse(Season2$Observed.Bag > 7, 7, Season2$Observed.Bag)
#### See notes from season one on adjusted totals. This section does this for bag limits of
seven or less
Season2$NCompliance7 <- ifelse(Season2$Observed.Bag > 7 & Season2$Observed.Bag
<7.01, 7, Season2$Observed.Bag)
Season2$Compliance6 <- ifelse(Season2$Observed.Bag > 6, 6, Season2$Observed.Bag)
```

```
Season2$NCompliance6 <- ifelse(Season2$Observed.Bag > 6 & Season2$Observed.Bag
<7.01, 6, Season2$Observed.Bag)
Season2$Compliance5 <- ifelse(Season2$Observed.Bag > 5, 5, Season2$Observed.Bag)
Season2$NCompliance5 <- ifelse(Season2$Observed.Bag > 5 & Season2$Observed.Bag
<7.01, 5, Season2$Observed.Bag)
Season2$Compliance4 <- ifelse(Season2$Observed.Bag > 4, 4, Season2$Observed.Bag)
Season2$NCompliance4 <- ifelse(Season2$Observed.Bag > 4 & Season2$Observed.Bag
<7.01, 4, Season2$Observed.Bag)
Season2$Compliance3 <- ifelse(Season2$Observed.Bag > 3, 3, Season2$Observed.Bag)
Season2$NCompliance3 <- ifelse(Season2$Observed.Bag > 3 & Season2$Observed.Bag
<7.01, 3, Season2$Observed.Bag)
Season2$Compliance2 <- ifelse(Season2$Observed.Bag > 2, 2, Season2$Observed.Bag)
Season2$NCompliance2 <- ifelse(Season2$Observed.Bag > 2 & Season2$Observed.Bag
<7.01, 2, Season2$Observed.Bag)
Season2$Compliance1 <- ifelse(Season2$Observed.Bag > 1, 1, Season2$Observed.Bag)
Season2$NCompliance1 <- ifelse(Season2$Observed.Bag > 1 & Season2$Observed.Bag
<7.01, 1, Season2$Observed.Bag)

Season2$Compliance2.7 <- Season2$wp_int * Season2$Compliance7 *
as.double(Season2$cntrbtrs)  ### See notes from season 1
MRIP_Estimate_Compliance7_Season2 <- sum(Season2$Compliance2.7)
Season2$Cumulative_Catch7_C <- cumsum(Season2$Compliance2.7)
Season2$NCompliance2.7 <- Season2$wp_int * Season2$NCompliance7  *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch7<- cumsum(Season2$NCompliance2.7)
MRIP_Estimate_NCompliance7_Season2 <- sum(Season2$NCompliance2.7)

MRIP_Estimate_Compliance7_Season2
MRIP_Estimate_NCompliance7_Season2

Season2$Compliance2.6 <- Season2$wp_int * Season2$Compliance6 *
as.double(Season2$cntrbtrs)
MRIP_Estimate_Compliance6_Season2 <- sum(Season2$Compliance2.6)
Season2$Cumulative_Catch6_C <- cumsum(Season2$Compliance2.6)
Season2$NCompliance2.6 <- Season2$wp_int * Season2$NCompliance6  *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch6<- cumsum(Season2$NCompliance2.6)
MRIP_Estimate_Compliance6_Season2
MRIP_Estimate_NCompliance6_Season2 <- sum(Season2$NCompliance2.6)
MRIP_Estimate_NCompliance6_Season2

Season2$Compliance2.5 <- Season2$wp_int * Season2$Compliance5 *
as.double(Season2$cntrbtrs)
MRIP_Estimate_Compliance5_Season2 <- sum(Season2$Compliance2.5)
Season2$Cumulative_Catch5_C <- cumsum(Season2$Compliance2.5)
Season2$NCompliance2.5 <- Season2$wp_int * Season2$NCompliance5  *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch5<- cumsum(Season2$NCompliance2.5)
MRIP_Estimate_Compliance5_Season2
MRIP_Estimate_NCompliance5_Season2 <- sum(Season2$NCompliance2.5)
MRIP_Estimate_NCompliance5_Season2
```

```
Season2$Compliance2.4 <- Season2$wp_int * Season2$Compliance4 *
as.double(Season2$cntrbtrs)
MRIP_Estimate_Compliance4_Season2 <- sum(Season2$Compliance2.4)
Season2$Cumulative_Catch4_C <- cumsum(Season2$Compliance2.4)
Season2$NCompliance2.4 <- Season2$wp_int * Season2$NCompliance4  *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch4<- cumsum(Season2$NCompliance2.4)
MRIP_Estimate_Compliance4_Season2
MRIP_Estimate_NCompliance4_Season2 <- sum(Season2$NCompliance2.4)
MRIP_Estimate_NCompliance4_Season2

Season2$Compliance2.3 <- Season2$wp_int * Season2$Compliance3  *
as.double(Season2$cntrbtrs)
MRIP_Estimate_Compliance3_Season2 <- sum(Season2$Compliance2.3)
Season2$Cumulative_Catch3_C <- cumsum(Season2$Compliance2.3)
Season2$NCompliance2.3 <- Season2$wp_int * Season2$NCompliance3 *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch3<- cumsum(Season2$NCompliance2.3)
MRIP_Estimate_Compliance3_Season2
MRIP_Estimate_NCompliance3_Season2 <- sum(Season2$NCompliance2.3)
MRIP_Estimate_NCompliance3_Season2

Season2$Compliance2.2 <- Season2$wp_int * Season2$Compliance2  *
as.double(Season2$cntrbtrs)
MRIP_Estimate_Compliance2_Season2 <- sum(Season2$Compliance2.2)
Season2$Cumulative_Catch2_C <- cumsum(Season2$Compliance2.2)
Season2$NCompliance2.2 <- Season2$wp_int * Season2$NCompliance2 *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch2<- cumsum(Season2$NCompliance2.2)
MRIP_Estimate_Compliance2_Season2
MRIP_Estimate_NCompliance2_Season2 <- sum(Season2$NCompliance2.2)
MRIP_Estimate_NCompliance2_Season2

Season2$Compliance2.1 <- Season2$wp_int * Season2$Compliance1  *
as.double(Season2$cntrbtrs)
MRIP_Estimate_Compliance1_Season2 <- sum(Season2$Compliance2.1)
Season2$Cumulative_Catch1_C <- cumsum(Season2$Compliance2.1)
Season2$NCompliance2.1 <- Season2$wp_int * Season2$NCompliance1 *
as.double(Season2$cntrbtrs)
Season2$Cumulative_Catch1<- cumsum(Season2$NCompliance2.1)
MRIP_Estimate_Compliance1_Season2
MRIP_Estimate_NCompliance1_Season2 <- sum(Season2$NCompliance2.1)
MRIP_Estimate_NCompliance1_Season2

Full_Compliance <- c(MRIP_Estimate_Compliance7_Season2,
MRIP_Estimate_Compliance6_Season2, MRIP_Estimate_Compliance5_Season2,
MRIP_Estimate_Compliance4_Season2, MRIP_Estimate_Compliance3_Season2,
MRIP_Estimate_Compliance2_Season2, MRIP_Estimate_Compliance1_Season2)/1000
### Creates a vector with season 2 harvest at different bags, with full compliance
Full_NCompliance <- c( MRIP_Estimate_NCompliance7_Season2,
MRIP_Estimate_NCompliance6_Season2, MRIP_Estimate_NCompliance5_Season2,
MRIP_Estimate_NCompliance4_Season2, MRIP_Estimate_NCompliance3_Season2,
```

```
MRIP_Estimate_NCompliance2_Season2,
MRIP_Estimate_NCompliance1_Season2)/1000  ### Creates a vector with season 2
harvest at different bags, with observed non compliance
Creel <- c(7,6,5,4,3,2,1) ### Vector of bag limits for season 2
Season <- c(2,2,2,2,2,2,2) ### Vector of season for constructing summary table

SummaryTableSeason2 <- cbind(Creel, Full_Compliance, Full_NCompliance, Season)
### Summary table for season 2

##########################################################################
####################
#    summary info for the bag limit info                                 #
##########################################################################
####################

Full_C_Both <- c(MRIP_Estimate_Compliance7_Season2 +
MRIP_Estimate_Compliance3_Season1, MRIP_Estimate_Compliance6_Season2+
MRIP_Estimate_Compliance3_Season1, MRIP_Estimate_Compliance5_Season2+
MRIP_Estimate_Compliance3_Season1, MRIP_Estimate_Compliance4_Season2+
MRIP_Estimate_Compliance3_Season1, MRIP_Estimate_Compliance3_Season2+
MRIP_Estimate_Compliance3_Season1, MRIP_Estimate_Compliance2_Season2+
MRIP_Estimate_Compliance2_Season1, MRIP_Estimate_Compliance1_Season2+
MRIP_Estimate_Compliance1_Season1)/1000   #### Calculates catch with full
compliance at different bag limits

Full_NC_Both <- c(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1, MRIP_Estimate_NCompliance6_Season2+
MRIP_Estimate_NCompliance3_Season1, MRIP_Estimate_NCompliance5_Season2+
MRIP_Estimate_NCompliance3_Season1, MRIP_Estimate_NCompliance4_Season2+
MRIP_Estimate_NCompliance3_Season1, MRIP_Estimate_NCompliance3_Season2+
MRIP_Estimate_NCompliance3_Season1, MRIP_Estimate_NCompliance2_Season2+
MRIP_Estimate_NCompliance2_Season1, MRIP_Estimate_NCompliance1_Season2+
MRIP_Estimate_NCompliance1_Season1)/1000  #### Calculates catch with observed
non compliance at different bag limits. Total at 7 should match MRIP estimate

Creel <- c(7,6,5,4,3,2,1)  ### Vector of creels. Bag adjustments do not influence season 1
until getting below 3 fish
SummaryTable <- cbind(Creel, Full_C_Both, Full_NC_Both)   #### Summary Table
showing adjusted catches

##########################################################################
######################
#        Catch at bag limit Plot                                         #
##########################################################################
######################
plot.new()
plot(Creel, Full_NC_Both, type="o", col="blue", xlim=c(0,7), ylim=c(0, 205), xlab="Bag
Limit", ylab="Black Sea Bass Harvest (Thousand Fish)") ### Plots adjusted harvest at
observed non compliance
lines(Creel, Full_C_Both, type="o", col="darkviolet")  #### Plots adjusted harvest at full
compliance
```

```
abline(h=((0.67*(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1))/1000), col="red", lwd=2)    #### Plots target
line
title("Black Sea Bass Harvest at Different Bag Limits - RI")
legend(0, 200, c("Observed", "Full Compliance", "2015 Target"), col=c("blue",
"darkviolet", "red"), pch=c(21, 21, -1), lty=1:1, cex=0.7, lwd=c(1,1,2))

##############################################################################
##########################
#              create new cumulative catch vectors for plots - non compliant                #
##############################################################################
##########################
comb.catch=c(Season1$NCompliance2.3, Season2$NCompliance2.7)
comb.catch6=c(Season1$NCompliance2.3, Season2$NCompliance2.6)
comb.catch5=c(Season1$NCompliance2.3, Season2$NCompliance2.5)
comb.catch4=c(Season1$NCompliance2.3, Season2$NCompliance2.4)
comb.catch3=c(Season1$NCompliance2.3, Season2$NCompliance2.3)
comb.catch2=c(Season1$NCompliance2.2, Season2$NCompliance2.2)
comb.catch1=c(Season1$NCompliance2.1, Season2$NCompliance2.1)


cumul.catch=cumsum(comb.catch)
cumul.catch6=cumsum(comb.catch6)
cumul.catch5=cumsum(comb.catch5)
cumul.catch4=cumsum(comb.catch4)
cumul.catch3=cumsum(comb.catch3)
cumul.catch2=cumsum(comb.catch2)
cumul.catch1=cumsum(comb.catch1)

##############################################################################
##########################
#              create new cumulative catch vectors for plots - compliant                    #
##############################################################################
##########################
comb.catch_c=c(Season1$Compliance2.3, Season2$Compliance2.7)
comb.catch6_c=c(Season1$Compliance2.3, Season2$Compliance2.6)
comb.catch5_c=c(Season1$Compliance2.3, Season2$Compliance2.5)
comb.catch4_c=c(Season1$Compliance2.3, Season2$Compliance2.4)
comb.catch3_c=c(Season1$Compliance2.3, Season2$Compliance2.3)
comb.catch2_c=c(Season1$Compliance2.2, Season2$Compliance2.2)
comb.catch1_c=c(Season1$Compliance2.1, Season2$Compliance2.1)


cumul.catch_c=cumsum(comb.catch_c)
cumul.catch6_c=cumsum(comb.catch6_c)
cumul.catch5_c=cumsum(comb.catch5_c)
cumul.catch4_c=cumsum(comb.catch4_c)
cumul.catch3_c=cumsum(comb.catch3_c)
cumul.catch2_c=cumsum(comb.catch2_c)
cumul.catch1_c=cumsum(comb.catch1_c)
```

```
#############################################################################
#########################
#         Cumulative harvest by day w/current bag limits                    #
#############################################################################
#########################
plot(Intercepts2$julian_date2, (cumul.catch/1000), type="o", col="blue",
xlim=c(60,325), xlab="Julian Date", ylab="Cumulative Catch (Thousand Fish)", pch=".",
lwd=2 )
lines(Intercepts2$julian_date2, (cumul.catch_c/1000), type="o", col="darkviolet",
xlim=c(60,325), pch=".", lwd=2)
title("Cumulative Black Sea Bass Catch By Day - RI")
legend(60, 100, c("Observed", "Full Compliance", "2015 Target"), col=c("blue",
"darkviolet", "red"), lty=1:1, lwd=c(1,1,2), cex=0.7)
abline(h=((0.67*(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1))/1000), col="red", lwd=2)
abline(v=121, col="darkgreen")
abline(v=182, col="darkgreen")
abline(v=244, col="darkgreen")
abline(v=305, col="darkgreen")
text(75,200, "Wave 2")
text(150,200, "Wave 3")
text(225, 200, "Wave 4")
text(280, 50, "Wave 5")



#############################################################################
#########################
#         Cumulative harvest by day w/varying bag limits                    #
#          Non compliant trips                                              #
#############################################################################
#########################

plot(Intercepts2$julian_date2, (cumul.catch/1000), type="o", col="burlywood4",
xlim=c(60,365), ylim=c(0,205), xlab="Julian Date", ylab="Cumulative Catch (Thousand
Fish)", lwd=2, pch="." )
lines(Intercepts2$julian_date2, (cumul.catch6/1000), type="o", col="cadetblue",lwd=2,
pch=".")
lines(Intercepts2$julian_date2, (cumul.catch5/1000), type="o", col="chartreuse4",lwd=2,
pch=".")
lines(Intercepts2$julian_date2, (cumul.catch4/1000), type="o", col="chocolate",lwd=2,
pch=".")
lines(Intercepts2$julian_date2, (cumul.catch3/1000), type="o", col="coral1",
lwd=2,pch=".")
lines(Intercepts2$julian_date2, (cumul.catch2/1000), type="o", col="firebrick",
lwd=2,pch=".")
lines(Intercepts2$julian_date2, (cumul.catch1/1000), type="o", col="goldenrod",
lwd=2,pch=".")
title("Cumulative Black Sea Bass Harvest By Day - Observed Data RI")
```

```
legend(60, 100, c("Observed", "6 Fish", "5 Fish", "4 Fish", "3 Fish", "2 Fish", "1 Fish",
"2015 Target"), col=c("burlywood4", "cadetblue", "chartreuse4", "chocolate", "coral1",
"firebrick", "goldenrod", "red"), lty=1, lwd=c(2,2,2,2,2,2,2,2), cex=0.7)
abline(h=((0.67*(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1))/1000), col="red", lwd=2)
abline(v=121, col="darkgreen")
abline(v=182, col="darkgreen")
abline(v=244, col="darkgreen")
abline(v=305, col="darkgreen")
text(75,200, "Wave 2")
text(150,200, "Wave 3")
text(225, 200, "Wave 4")
text(280, 50, "Wave 5")



##############################################################################
##########################
#         Cumulative harvest by day w/varying bag limits                     #
#          assuming full  compliance                                  #
##############################################################################
##########################

plot(Intercepts2$julian_date2, (cumul.catch_c/1000), type="o", col="burlywood4",
xlim=c(60,365), ylim=c(0,205), xlab="Julian Date", ylab="Cumulative Catch (Thousand
Fish)", lwd=2, pch="." )
lines(Intercepts2$julian_date2, (cumul.catch6_c/1000), type="o", col="cadetblue",lwd=2,
pch=".")
lines(Intercepts2$julian_date2, (cumul.catch5_c/1000), type="o",
col="chartreuse4",lwd=2, pch=".")
lines(Intercepts2$julian_date2, (cumul.catch4_c/1000), type="o", col="chocolate",lwd=2,
pch=".")
lines(Intercepts2$julian_date2, (cumul.catch3_c/1000), type="o", col="coral1",
lwd=2,pch=".")
lines(Intercepts2$julian_date2, (cumul.catch2_c/1000), type="o", col="firebrick",
lwd=2,pch=".")
lines(Intercepts2$julian_date2, (cumul.catch1_c/1000), type="o", col="goldenrod",
lwd=2,pch=".")
title("Cumulative Black Sea Bass Harvest By Day - Assumed Compliance RI")
legend(60, 100, c("Observed", "6 Fish", "5 Fish", "4 Fish", "3 Fish", "2 Fish", "1 Fish",
"2015 Target"), col=c("burlywood4", "cadetblue", "chartreuse4", "chocolate", "coral1",
"firebrick", "goldenrod", "red"), lty=1, lwd=c(2,2,2,2,2,2,2,2), cex=0.7)
abline(h=((0.67*(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1))/1000), col="red", lwd=2)
abline(v=121, col="darkgreen")
abline(v=182, col="darkgreen")
abline(v=244, col="darkgreen")
abline(v=305, col="darkgreen")
text(75,200, "Wave 2")
text(150,200, "Wave 3")
text(225, 200, "Wave 4")
text(280, 50, "Wave 5")
```

```
#########################################################################
################
#       Size analysis bsb                                               #
#########################################################################
################

#############################################################
#  extract data from MRIP                          #
#    per Gary Nelson MRIP functions 2014              #
#         modified for prelim 2014 data (line 36)       #
#############################################################
library(survey)

MRIP.lenfreq<-function(intdir=NULL,common=NULL, st=NULL,

styr=NULL,endyr=NULL,dom=NULL,lenunit=1,lenint=1,conv=1,parms=c(NA,NA)){
  if(is.null(intdir)) stop("Need main directory location of intercept files.")
  if(is.null(st)) {stop("No state code was specified.")}
  if(is.null(styr)) stop("Starting year is missing.")
  if(is.null(endyr)) stop("Ending year is missing.")
  if(is.null(common)) stop("Enter common name for species.")
  if(conv==2 & any(is.na(parms))) stop("Conversion equation parameter(s) are missing")
  if(length(grep("/",intdir))==1){
    din<-ifelse(substr(intdir,nchar(intdir),nchar(intdir)) %in% c("/"),
              c(paste(intdir,"int",sep="")),c(paste(intdir,"/int",sep="")))
  }
  if(length(grep("\\\\",intdir))==1){
    din<-ifelse(substr(intdir,nchar(intdir),nchar(intdir)) %in% c("\\"),
              c(paste(intdir,"int",sep="")),c(paste(intdir,"\\int",sep="")))
  }
  common<-tolower(common)
  st<-as.character(st)
  styr<-as.character(styr)
  endyr<-as.character(endyr)
  wave<-as.character(c(1,2,3,4,5))
  dom_id<-NULL
  dataset<-NULL
  temp<-NULL
  temp1<-NULL
  rbind2<- function(input1, input2){
    if(!is.null(ncol(input1))){
      n.input1 <- ncol(input1)
      n.input2 <- ncol(input2)

      if (n.input2 < n.input1) {
        TF.names <- which(names(input2) %in% names(input1))
        column.names <- names(input2[, TF.names])
      }
      else {TF.names <- which(names(input1) %in% names(input2))
           column.names <- names(input1[, TF.names])}
      return(rbind(input1[, column.names], input2[, column.names]))
```

```
    }
    if(is.null(ncol(input1))) return(rbind(input1,input2))
  }
  for(yr in styr:endyr){
    for (j in 1:as.numeric(length(wave))){
      #Get size
      wv<-wave[j]
      t3<-read.csv(paste(din,yr,"/","size_",yr,wv,".csv",sep=""),
                   colClasses=c("character"),na.strings=".")
      t3<-t3[t3$ST %in% c(st),]
      names(t3)<-tolower(names(t3))
      temp<-rbind2(temp,t3)

      #get trips
      t4<-read.csv(paste(din,yr,"/","trip_",yr,wv,".csv",sep=""),
                   colClasses=c("character"),na.strings=".")
      t4<-t4[t4$ST %in% c(st),]
      names(t4)<-tolower(names(t4))
      temp1<-rbind2(temp1,t4)
    }

  }
  convtolow<-function(x){
    for(i in 1:ncol(x)) x[,i]<-tolower(x[,i])
    return(x)
  }
  temp<-convtolow(temp)
  temp1<-convtolow(temp1)
  temp<-temp[,c("common","strat_id","psu_id","st","id_code","sp_code",
                "lngth","wgt","lngth_imp","wgt_imp","wp_size","l_in_bin","l_cm_bin")]
  temp<-temp[order(temp$strat_id,temp$psu_id,temp$id_code),]
  temp1<-temp1[order(temp1$strat_id,temp1$psu_id,temp1$id_code),]
  dataset<-merge(temp1,temp,by.x=c("strat_id","psu_id","id_code","st"),
                 by.y=c("strat_id","psu_id","id_code","st"),all.x=FALSE,all.y=FALSE)
  dataset$common<-as.character(dataset$common)
  dataset$common<-ifelse(is.na(dataset$common),"",dataset$common)

  #Construct Domain
  dom_ids<-NULL
  mainlev<-length(dom)
  if(length(dom)>0){
    for(l in 1:mainlev){
      if (!any(names(dom)[l]==names(dataset))) stop(paste("Variable ",names(dom[l]),"not
found in MRIP dataset"))
      if (any(names(dom)[l]==names(dataset))){
        dataset[,ncol(dataset)+1]<-"DELETE"
        names(dataset)[ncol(dataset)]<-c(paste(names(dom)[l],"1",sep=""))
        colpos<-which(names(dataset)==names(dom[l]))
        sublev<-length(dom[[l]])
        for (k in 1:sublev) dataset[,ncol(dataset)]<-ifelse(dataset[,colpos] %in%
c(as.character(dom[[l]][[k]])),c(paste(names(dom)[l],k,sep="")),dataset[,ncol(dataset)])
        dom_ids<-c(dom_ids,names(dom[l]))
```

```
    }
   }
   test<-c("year","wave","st","sub_reg","mode_fx","area_x")
   for(gg in 1:as.numeric(length(dom_ids))){
    if(!any(dom_ids[gg]==test)) test[as.numeric(length(test)+1)]<-
c(paste(dom_ids[gg],"1",sep=""))
    if(any(dom_ids[gg]==test)){
     colpos<-which(test==dom_ids[gg])
     test[colpos]<-c(paste(dom_ids[gg],"1",sep=""))
    }
   }
   ## add Non-domain names to values in columns
   for(gg in 1:as.numeric(length(test))){
    if(substr(test[gg],nchar(test[gg]),nchar(test[gg]))!="1"){
     eval(parse(text=paste("dataset$",test[gg],'<-
paste('",as.character(test[gg]),'",dataset$',test[gg],',sep="")',sep="")))
    }
   }
   for(hh in 1:as.numeric(length(test))){
    if(hh==1) texter<-paste("dataset$",test[hh],sep="")
    if(hh>1) texter<-paste(texter,",","dataset$",test[hh],sep="")
   }
   eval(parse(text=paste("dataset$dom_id<-c(paste(",texter,",sep="))",sep="")))
  }# dom>0

  if(length(dom)==0){
   dataset$year<-c(paste("year",dataset$year,sep=""))
   dataset$wave<-c(paste("wave",dataset$wave,sep=""))
   dataset$st<-c(paste("st",dataset$st,sep=""))
   dataset$sub_reg<-c(paste("sub_reg",dataset$sub_reg,sep=""))
   dataset$mode_fx<-c(paste("mode_fx",dataset$mode_fx,sep=""))
   dataset$area_x<-c(paste("area_x",dataset$area_x,sep=""))
   dataset$dom_id<-
c(paste(dataset$year,dataset$wave,dataset$st,dataset$sub_reg,dataset$mode_fx,dataset$a
rea_x,sep=""))
  }

  if(lenunit==1){
   if(conv==1) dataset$lenbin<-floor((as.numeric(dataset$lngth)*0.03937)/lenint)*lenint
   if(conv==2) dataset$lenbin<-
floor((parms[1]+parms[2]*(as.numeric(dataset$lngth)*0.03937))/lenint)*lenint
  }
  if(lenunit==2){
   if(conv==1) dataset$lenbin<-floor(as.numeric(dataset$lngth)/lenint)*lenint
   if(conv==2) dataset$lenbin<-
floor((parms[1]+parms[2]*as.numeric(dataset$lngth))/lenint)*lenint
  }
  dataset$dom_id_add<-
ifelse(dataset$common==common,c(paste(dataset$dom_id,common,sep="")),c(paste(dat
aset$dom_id,"XXXXXXXXXXXX",sep="")))
  dataset$wp_size<-as.numeric(dataset$wp_size)
  dataset$numlen<-1
```

```
  dataset$wp_size<-ifelse(is.na(dataset$wp_size),0,dataset$wp_size)
  dfpc<-svydesign(ids=~psu_id,strata=~strat_id,
                  weights=~wp_size,nest=TRUE,data=dataset)
  options(survey.lonely.psu = "certainty")
  results<-svyby(~numlen,
                 ~dom_id_add+lenbin,dfpc,svytotal,vartype=c("se","cv"),keep.names=FALSE)
  names(results)<-c("Domain","Length","Number","SE","PSE")
  if(length(grep("DELETE",results$Domain,fixed=TRUE))>0){
    results<-results[-c(grep("DELETE",results$Domain,fixed=TRUE)),]
  }
  results<-results[substr(results$Domain,as.numeric(nchar(results$Domain)-4),
                          nchar(results$Domain))!="XXXXX",]
  return(results[order(results$Domain),])
}

###############################################################################
#              get RI data                                    #
###############################################################################


ridat=MRIP.lenfreq(intdir= "C:\\Users\\jason.mcnamee\\Desktop\\Z Drive stuff\\MRIP
Data",common="Black Sea Bass",
st=44,styr=2014,endyr=2014,lenunit=1,lenint=0.5,conv=1)

###############################################################################
# get sums for proportions                                    #
###############################################################################
sumrilen=sum(ridat$Number)

rilen.13.5=subset(ridat, ridat$Length>13.4 | ridat$Length<13)  #this subset the fish 13.5
and greater, and adds back in illegal harvest
rilen.14=subset(ridat, ridat$Length>13.9 | ridat$Length<13)  #this subset the fish 14 and
greater, and adds back in the illegal harvest less than 12
rilen.14disc=subset(ridat, ridat$Length<13.9 & ridat$Length>11.4)  #this subset the fish
14 and greater, and adds back in the

sumrilen.13.5=sum(rilen.13.5$Number)
sumrilen.14=sum(rilen.14$Number)
sumrilen.14disc=(.15*(sum(rilen.14disc$Number)))+sumrilen.14

##reduction calcs
rilen.red.13.5=1-(sumrilen.13.5/sumrilen);rilen.red.13.5
rilen.red.14=1-(sumrilen.14/sumrilen);rilen.red.14
rilen.red.14disc=1-(sumrilen.14disc/sumrilen);rilen.red.14disc


###############################################################################
#        use tapply to get sums and props by length                #
###############################################################################

rilen1=tapply(ridat$Number, ridat$Length, sum)  #numbers at length
```

```
rilen2=tapply(ridat$Number, ridat$Length, function (x) {sum(x)/sumrilen})    #props at
length

#############################################################################
#           check out data                                  #
#############################################################################
barplot(rilen1, xlab="Size in Inches", ylab="Harvest in Numbers", main="RI Harvest at
Size for Black Sea Bass")


#############################################################################
#      interaction                                  #
#############################################################################
#with discards
x=.26
y=.10

x+y-(x*y)
#new target for seasonal/bag red
0.74*(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1)/1000

#without discards
x=.24
y=.12

x+y-(x*y)
#new target for seasonal/bag red
0.76*(MRIP_Estimate_NCompliance7_Season2 +
MRIP_Estimate_NCompliance3_Season1)/1000
```

Connecticut
Department of
ENERGY &
ENVIRONMENT

To: Summer flounder, Scup and Black Sea Bass Technical Committee
From: Greg Wojcik, CT DEEP Marine Fisheries Division
Date: January 21, 2015

Connecticut Recreational Black Sea Bass Fishery Compliance Options for 2015

According to a memo from the Atlantic States Marine Fisheries Commission (ASMFC) the northern region (MA – NJ) must reduce black sea bass recreational harvest to constrain landings to the coast-wide RHL using Ad Hoc regional Measures. Each State is required to develop management measures that achieve a minimum of 32.8% reduction for their State.

In 2014, Connecticut harvested a total of 372,739 black sea bass. A 32.8% reduction would reduce harvest by 122,258 fish, estimating a 2015 harvest of 250,481 fish. All options provided in Table 1 indicate a reduction over the requirement.

LIBERALIZATION METHODS USED FOR CALCULATING 2015 REGULATIONS

Season

Harvest per day rates for waves 3 through 5 came directly from the 2014 landings provided by MRIP, specifically 1,588 fish per day for wave 3, 2,373 fish per day for wave 4 and 3,438 fish per day for wave 5. These catch rates were applied to both seasonal reduction options and options having an increase in season length. Since there has not been harvest in Connecticut in wave 6 since 2007, there were no proposed changes to regulations from November 1 through December 31st.

Size / Possession

The MRIP sample size of measured black sea bass in 2014 was 148 fish. This sample size allowed an accurate length frequency table to be created for making liberalization estimates for the 2015 fishing year. The length frequency table was weighted by the MRIP effort estimates in all calculations. Two minimum lengths were evaluated. An increase to 13.5" resulting in a 15.8% reduction and 14" resulting in a 35% reduction (Table 2).

The possession limit was analyzed using the MRIP Catch table. The data was queried to include only trips having one angler (contribtrs = 1) in order to remove bias from trips having multiple anglers harvest pooled. There was a total of 109 trips used in the analysis to adjust the creel limit in waves 3 and 4 combined and 92 trips used for wave 5 (Table 3). The proportion of 'saved' fish was then converted to number of fish and applied to the total season's harvest.

Party and Charter Vessel Program

In 2014 Connecticut continued the Party and Charter Black Sea Bass Logbook Program. The program started in 2013 when Connecticut opted to start the program in lieu of a 7% liberalization. In order for vessels to participate in the program, they were required to register with the State. They were also required to submit mandatory monthly catch reports (Figure 1).

If vessels failed to submit their reports, they were immediately dropped from the program. A list of active qualifying vessels was maintained and shared with Conservation Law Enforcement. The program allowed party charter vessels an 8 fish creel limit from June 21 to August 31. In 2014 there were a total of 40 registered vessel, of which 31 participated with a total of 593 trips harvesting a total of 20,161 fish. Of these 20,161 fish, only 3,024 (14%) are attributed to the black sea bass party and charter vessel program.

Connecticut would like to continue the party and charter black sea bass program into 2015 with a reduction in the creel limit from 8 fish to 5 fish unless Option 3 was chosen from Table 1, in which case it would be 4 fish. The season for the program would be from June 21st to August 31.

Table 1. 2015 Connecticut Black Sea Bass Options.

Option	Season	Creel	Min Size	% of CT RHL	Harvest	Discard Mortality (Length Increase)	Total
Status Quo	June 21– Aug 31	3	13”	150%	372,740	0	372,740
	Sept 1 – Dec 31	8					
1	June 21 – Aug 31	3	14”	97%	242,281	19,569	261,850
	Sept 1 – Dec 31	8					
2	May 22 – Oct 31	3	14”	94%	234,889	19,569	254,458
	Nov 1 – Dec 31	8					
3	May 22- Aug 31	3	14”	99%	247,613	19,569	267,182
	Sept 1 – Dec 31	4					
4	June 1 – Aug 31	3	14”	99%	247,108	19,569	266,677
	Sept 1 – Dec 31	5					
5	July 1 – Oct 31	3	13.5”	100%	250,801	8,834	259,635
	Nov 1 – Dec 31	8					
6	7/22 – Oct 31	3	13”	99%	248,022	0	248,022
	Nov 1 – Dec 31	8					

Table 2. 2014 Connecticut Black Sea Bass Harvest by Length.

Length	Harvest
9.5	188
10.5	533
11	293
11.5	301
12	19,293
12.5	30,536
13	58,922
13.5	71,256
14	42,497
14.5	11,733
15	40,088
15.5	73,821
16.5	1,481
17	4,722
17.5	4,416
18	4,282
18.5	1,514
20	311
20.5	4,554
21	440
22.5	1,559
Total	**372,740**

Table 3. 2014 Connecticut Wave 5 Harvest by Creel Reductions

Creel	Trips	2014 Harvest	2015 5 Fish	2015 4 Fish	2015 3 Fish	2015 2 Fish
0	46	0	0	0	0	0
0.8824	2	1.7648	1.7648	1.7648	1.7648	1.7648
1	16	16	16	16	16	16
1.0006	1	1.0006	1.0006	1.0006	1.0006	1.0006
1.0011	1	1.0011	1.0011	1.0011	1.0011	1.0011
1.0016	1	1.0016	1.0016	1.0016	1.0016	1.0016
1.0019	1	1.0019	1.0019	1.0019	1.0019	1.0019
1.0061	1	1.0061	1.0061	1.0061	1.0061	1.0061
2	16	32	32	32	32	32
2.0037	1	2.0037	2.0037	2.0037	2.0037	2
2.0044	1	2.0044	2.0044	2.0044	2.0044	2
2.0046	2	4.0092	4.0092	4.0092	4.0092	4
2.0047	1	2.0047	2.0047	2.0047	2.0047	2
2.6472	1	2.6472	2.6472	2.6472	2.6472	2
3	11	33	33	33	33	22
3.0069	2	6.0138	6.0138	6.0138	6	4
3.007	1	3.007	3.007	3.007	3	2
4	6	24	24	24	18	12
4.0092	1	4.0092	4.0092	4	3	2
5	4	20	20	16	12	8
5.0093	1	5.0093	5	4	3	2
5.0303	1	5.0303	5	4	3	2
6	3	18	15	12	9	6
6.0037	1	6.0037	5	4	3	2
6.0115	1	6.0115	5	4	3	2
7	4	28	20	16	12	8
8	8	64	40	32	24	16
8.0382	2	16.0764	16.0764	16.0764	16.0764	16.0764
14	1	14	14	14	14	14
		319.6065	**282.5517**	**259.5425**	**229.5217**	**184.8525**
Reduction:			**11.59%**	**18.79%**	**28.19%**	**42.16%**

Figure 1. Connecticut Party and Charter Black Sea Bass Logbook.

TAPE

Party and Charter Black Sea Bass Logbook

Rev. 5/2013

Name ______________________________

Plate Number [| | | |]

Vessel Name ______________________________

State Reg / USCG Doc No. [| | | | | | | |]

Month [|] Year [| | |]

Party [ ] Charter [ ]

Send Me [ ] *More Logbooks*

Did Not Harvest Black Sea Bass During Month [ ]

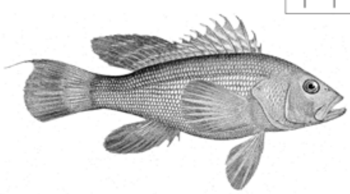
This space for office use only.

Logged ____

Entered ____

Checked ____

TAPE



Connecticut Department of Energy & Environmental Protection
Bureau of Natural Resources
Marine Fisheries Division

TAPE

CONNECTICUT PARTY / CHARTER BLACK SEA BASS REPORTING INSTRUCTIONS

Reporting Requirements

Party and Charter vessels electing to participate in the 2013 party/charter vessel black sea bass special access program regardless how long they choose to take advantage of the higher possession limit or extended open season are required to record daily fishing activity on any trip where black sea bass are retained. Logbooks must be submitted on a monthly basis for all months from June through November by the tenth of the month following the month of the report.

Individually identifiable catch information is confidential and is protected by the Connecticut General Statues (CGS section 26-157b). Your data may be used for the purpose of fisheries research, management and development and conservation law enforcement.

Cover Instruction

Enter the vessel owner's information including name and plate number.

Enter the vessel information including vessel name, state registration or USCG documentation number and vessel type, party or charter.

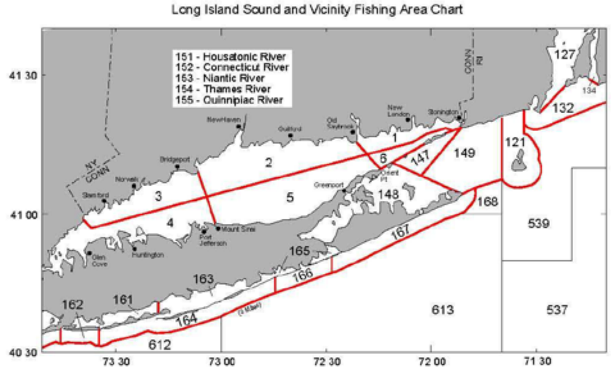
Indicate the month and year of the report, if you did not harvest black sea bass the entire month indicate this by putting a 'X' next to the text 'did not harvest black sea bass during month'.

If you require more logbooks, indicate the number of books needed to complete your reporting for the fishing season.

Data Sheet Instructions

Day	Enter the day of the month that the fishing trip occurred.
Area	Enter the code for the area in which you made your catch. Refer to the Fishing Area Chart below for the appropriate area code.
Number of Anglers	Enter the number of anglers that are in the fishing party.
Hours Fished	Enter the actual fishing time or 'lines wet' to the nearest half hour. Do not include travel time.
Nbr of BSB Kept	Enter the total number of black sea bass that were kept from all anglers within the party.

Long Island Sound and Vicinity Fishing Area Chart



Day	Area	Number of Anglers	Hours Fished	Nbr of BSB Kept

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Bureau of Marine Resources
205 North Belle Mead Road, Suite 1, East Setauket, New York 11733
Phone: (631) 444-0430 • **Fax:** (631) 444-0434
Website: www.dec.ny.gov

Joe Martens
Commissioner

NY 2015 Recreational Black Sea Bass Reduction Proposal

In 2014, NY recreational anglers have harvested 503,839 black sea bass (BSB) through Wave 5 (preliminary data). Assuming harvest proportions in 2014 are similar to 2013, it is projected that NY will harvest an additional 13,124 BSB in Wave 6, bringing the 2014 total to 516,963. Based upon this and similar calculations for the rest of the coast, the states in the northern region (MA-NJ) must reduce harvest by 32.8%. The preliminary harvest target for NY in 2015 is 347,399 BSB.

NY will use a combination of changes to season, possession limit and/or minimum size limit to achieve a 32.8% reduction in the recreational harvest of BSB. NY's 2014 measures included a 13" minimum size limit, an 8 fish possession limit, and a season that extends from July 15 through to December 31 (170 days).

MRIP estimates of harvest at length were combined with NYSDEC staff conducted headboat sampling to calculate the reduction associated with increasing the minimum size limit to 13.5" and 14.0".

MRIP estimates of harvest at different numbers of fish landed/angler were combined with NYSDEC staff conducted headboat sampling to calculate the reduction associated with decreasing the possession limit.

MRIP estimates of harvest by Wave were divided by the number of days open in each wave to generate daily rates of fish harvest. These Wave specific daily rates were used to adjust season length in order to achieve the necessary reduction. In some options, days were added to the season, extending into Wave 3. Wave 3 was last open for recreational black sea bass fishing in NY in 2012. The proportion between daily rates from Wave 3 (2,674) and Wave 4 (3,097) in 2012 was calculated (0.86) and applied to the daily rate of 2014 Wave 4 (5,571) to generate a 2014 Wave 3 daily rate (4,810).

The options in the table below are examples of harvest measures that will achieve the required reduction. Additional measures using the same methodology may ultimately be generated and implemented, after consultation with NY's Marine Resource Advisory Council and the fishing public.

OPTION	REL TO TARGET	SIZE	POSSESSION	SEASON	OTHER	FISH	ADDITIONAL DEAD DISCARDS DUE TO SIZE LIMIT (0.15)
2014 Regs.	149.0%	13"	8	July 15-Dec 31		516,963	0
1	98.2%	14"	2	May 22-Dec 31	8 fish Nov&Dec	340,959	25,076
2	99.6%	14"	3	Jun 18-Dec 31	8 fish Nov&Dec	345,918	25,441
3	99.9%	14"	8	July 15-Dec 31		346,882	25,512
4	99.4%	13.5"	3	July 15-Dec 31		345,166	8,710
5	99.5%	13.5"	2	Jun 25-Dec 31	8 fish Nov&Dec	345,729	8,724
6	99.8%	14"	3	Jun 17-Dec 31		346,488	25,483
7	98.8%	13"	4	Aug 6-Dec 31		343,137	0
8	99.1%	13.5"	5	July 31-Dec 31		344,252	8,687
9	99.3%	13"	8	July 15-Sep 20		344,912	0
10	99.1%	13"	8	Aug 15-Dec 31		344,275	0
11	98.8%	13"	8	Aug 14-Nov 30		343,176	0

NEW JERSEY DIVISION OF
Fish and Wildlife
P.O. Box 400
Trenton, NJ 08625-0400
David Chanda, Director

Memorandum

TO: Kirby Rootes-Murdy, FMP Coordinator
Atlantic States Marine Fisheries Commission

FROM: Peter Clarke, Senior Biologist
New Jersey Bureau of Marine Fisheries

DATE: January 28, 2015-Revised

SUBJECT: New Jersey Black Sea Bass Recreational Fishery Management Proposal for 2015

Attached are the New Jersey options to manage its 2015 recreational black sea bass fishery. Each option contains, at a minimum, modifications to either daily possession limit, and/or an open season that satisfies the required reduction of 33 % as established by the Atlantic States Marine Fisheries Commission (ASMFC). New Jersey has also developed options increasing the minimum size from 12.5 inches to 13 inches as well as options retaining the current minimum size limit of 12.5 inches. A spreadsheet that includes the data and formulas used to calculate the percent reductions for the options has been provided to the ASMFC's Summer Flounder, Scup and Black Sea Bass Technical Committee.

Background:

At their February 2014 meeting, the ASMFC's Summer Flounder, Scup, and Black Sea Bass Management Board approved ad hoc regional management measures for the 2014 and 2015 recreational black sea bass fishery for 2015. These measures require states in the northern region, MA, RI, CT, NY, and NJ, to take an estimated 33% reduction based on the preliminary 2014 recreational black sea bass harvest estimates. The current 2014 New Jersey recreational black sea bass regulations are minimum size of 12.5 inches with possession limits of 15 fish from May 19-June 30, 3 fish from July 1 – August 31, 15 fish from September 1 – September 6 and October 18 – December 31. The current 2015 Federal Waters Measures are a 15 fish possession limit, with a size limit of 12.5 inches and open seasons from May 15 - September 21 and October 22 - December 31.

Method:

New Jersey landed a MRIP estimated 395,930 fish in 2014 with a required reduction of 33% in 2015, the recreational New Jersey target is 265,273 fish. New Jersey explored several methods to estimate 2015 recreational black sea bass options. Those considered included estimates of harvest by wave based on the National Marine Fisheries Service (NMFS), Marine Recreational Information Program (MRIP) and New Jersey Volunteer Angler Survey (VAS). Ultimately, a combination of both data sources was utilized to allow New Jersey the flexibility to either increase the size limit, reduce the possession limit, and reduce the season length in either combination or individually. The MRIP data provided landings estimates for season reductions and size increases while the New Jersey VAS data provided the data for daily possession reductions. Since MRIP 2014 wave 6 data is not currently available, New Jersey used 2013 wave 6 estimates for the purpose of this exercise.

Proposed Management Strategies for 2014:

Options that are being considered for New Jersey's 2015 black sea bass recreational fishery are listed in Table 2. All options were developed using the New Jersey MRIP harvest data from 2014 for waves 1-5 and 2013 wave 6 data. In the past, it is typical to use the average from multiple years of data to gap fill when specific wave data is absent. However, in the case of 2014 MRIP wave 6, New Jersey felt the higher estimate in 2013 was a conservative approach compared to the lower average estimate from 2011-2013, hence the reason for utilizing only 2013 wave 6. To create a daily possession bag reduction table, the New Jersey VAS data was used by taking the average harvest from 2011-2013. New Jersey is considering a split bag approach, as was applied in 2014, which would implement for example, a size limit of 12.5 inches and a possession limit of 15 fish during waves 3, 5, and 6 and a reduced possession limit during wave 4.

Please keep in mind that the options listed in Table 1 reflect potential options. New Jersey's Marine Fisheries Council's Black Sea Bass Committee and its advisors will convene to recommend their preferred options to the New Jersey Marine Fisheries Council for 2015. The Council will then meet to select an option. The option they select may or may not be one of the examples provided, but it will have been developed using the same methodology as the options listed in Table 1. The Technical Committee has been provided the spreadsheet with the calculations for the percent reductions.

Table 1. Management options for NJ's 2015 black sea bass recreational fishery based on average daily harvest rates from MRIP and NJVAS data achieving a 33 percent reduction in harvest.

NJ Recreational 2014 Black Sea Bass Measures

		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx
	2014 Season	May19-June30 (47 days)	July 1-August 31 (62 days)	Sept 1-Sept 6 and Oct 18-Oct 31 (31 days)	Nov 1 - Dec 31 (61 days)	
						0.00%
2014	bag	15	3	15	15	
	size	12.5	12.5	12.5	12.5	
	days	43	62	20	61	

NJ 2015 Black Sea Bass Example Option 1

		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx	
2015 Example Season		June 8-June30	July 1-August 31	Oct 23-Oct 31	Nov 1 - Dec 31	33.11%	Fish Harvested Under Example Measures
							264,836
2015	bag	15	3	15	15		
	size	12.5	12.5	12.5	12.5		
	days	23	62	9	61		

NJ 2015 Black Sea Bass Example Option 2

		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx	
2015 Example Season		June 6-June30	July 1-August 31	Oct 23-Oct 31	Nov 1 - Dec 31	33.21%	Fish Harvested Under Example Measures
							264,434
2015	bag	10	3	10	15		
	size	12.5	12.5	12.5	12.5		
	days	25	62	9	61		

NJ 2015 Black Sea Bass Example Option 3

		Wave 3	Wave 4	Wave 5	Wave 6		
2015 Example Season		June 4-June30	July 1-August 31	Oct 23-Oct 31	Nov 1 - Dec 31	33.51%	Fish Harvested Under Example Measures
							263,240
2015	bag	8	3	8	15		
	size	12.5	12.5	12.5	12.5		
	days	27	62	9	61		

NJ 2015 Black Sea Bass Example Option 4

		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx		
2015 Example Season		May 26-June30	July 1-August 31	Sept 1-Sept 2 and Oct 22-Oct 31	Nov 1 - Dec 31	33.80%	Fish Harvested Under Example Measures	Additional Dead Discards do to Size Increase (.15)
							262,109	9,156
2015	bag	15	3	15	15			
	size	13	13	13	13			
	days	35	62	9	61			

NJ 2015 Black Sea Bass Example Option 5

		Wave 3	Wave 4	Wave 5	Wave 6	Perc Redx		
2015 Example Season		May 18-June30	July 1-August 31	Oct 22-Oct 31	Nov 1 - Dec 31	33.17%	Fish Harvested Under Example Measures	Additional Dead Discards do to Size Increase (.15)
							264,594	8,626
2015	bag	10	3	10	10			
	size	13	13	13	13			
	days	38	62	10	61			