New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
C.M. "Rip Cunningham, *Chairman* | Paul J. Howard, *Executive Director*

MEMORANDUM

DATE: October 23, 2012

TO: Scallop and Groundfish Committees

FROM: Scallop Plan Development Team (PDT)

SUBJECT: **Preliminary estimates of YT catch for the Framework 24 scallop specification alternatives under consideration (version 2)**

The Scallop PDT reviewed preliminary estimates of YT catch for 2013-2015 at a PDT meeting on October 9, 2012. Framework 24 is setting specifications for FY2013-FY2014, with default measures for 2015. The Council may decide to make this an annual specification package (FY2013 only with default measures for FY2014), but the action is considering both.

Yellowtail Bycatch Estimate Method

The estimate of YT catch uses the same method used in the past, which has three basic steps. First a discard to kept ratio (D:K) is estimated from the most recent observer data available. This estimate includes a D:K ratio for all GB access areas (CA1, CA2, and NL) using all 2012 observed trips to date (March-August only). For open areas and scallop access areas in the Mid-Atlantic the overall D:K ratio was calculated using all observed trips in 2011 (March 2011-Feb 2012). Second, a projection of YT biomass for 2013-2015 is needed. That information comes from the most recent stock assessments for both SNE/MA and GB YT flounder. Finally, projections of area specific scallop biomass are used for 2013-2015 from the SAMS model. These three elements are combined into the formula below:

$$\text{Pred. YT D:K} = \text{Obs. D:K} * \frac{ScallopEBms_{baseyear}}{ScallopEBms_{projyear}} \frac{YTBms_{projyear}}{YTBms_{baseyear}}$$

Scallop Access Area Alternatives

There are a range of possible scallop fishery specifications under consideration, No Action as well as four other alternatives. All of the alternatives include a closure of Elephant Trunk in 2013 and 2014, Delmarva closure in 2013 and access in 2014, closure of Hudson Canyon in 2014 and 2015, and 33 open area DAS in 2013 and 31 in 2014. The only variation among the alternatives is the level of effort in GB access areas in terms of the number of trips and which areas are open. Table 1 below summarizes the various alternatives. Alternative 4 was specifically developed to reduce YT bycatch after the Scallop PDT reviewed preliminary estimates of YT catch for the scallop fishery. Alternative 4 reduces the level of access in CA2 by more than 50% compared to Alternative 2.

Table 1 – Summary of FW24 fishery specification alternatives

	Description of Alternative	Total AA catch per FT vessel
Alt 1	2013: Two 13,000 pound trips in CA1, CA2, and HC 2014: Two 15,000 pound trips in CA2, NL and DMV	26,000 30,000
Alt 2 (spread AA effort out)	2013: Two 13,000 pound trips in CA1, CA2, NL, and HC 2014: Two 15,000 pound trips in CA2, NL and DMV	26,000 30,000
Alt 3 (No CA1 effort)	2013: One 18,000 pound trip in CA2 and HC 2014: Two 15,000 pound trips in CA2, NL and DMV	18,000 30,000
Alt 4 (Low YT catch)	2013: One 18,000 pound trip in CA1, CA2, NL, and HC 2014: Two 13,500 pound trips in in CA2, NL and DMV	18,000 27,000
No Action	2013: Four 18,000 trips in CA2, NL, HC and DMV 2014: Four 18,000 trips in CA2, NL, HC and DMV	72,000 72,000

Estimates of YT catch

All of these specification alternatives have a different estimate of YT catch as a function of the various alternatives that differentially partition effort in the GB access areas. For all of the estimates the same assumption was used for open area catch, which is a function of the exploitable biomass in open areas. In general, the estimate of YT bycatch is positively correlated to amount of effort in CA2 (i.e. the more access to CA2, the greater the estimate of GB YT catch). Table 2 is a summary of the YT catch estimates.

Table 2 –Summary of GB YT catch estimates for the various scallop specification alternatives (2013-2014)

	No Action		**Alt1**		**Alt2**		**Alt3**		**Alt4**	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
GBOp	27	33	34	41	34	41	34	41	34	41
CL1	0	0	2	0	2	0	0	0	2	0
CL2	194	285	139	161	98	169	111	132	37	57
Total	222	318	175	202	134	210	145	173	73	97
% US TAC*	103%		82%		62%		40%		34%	

* Assuming US ACL equivalent to 215 mt

The projections of SNE/MA YT catch do not seem to be an issue for 2013 and 2014 in terms of what is available to the fishery. The range of 2013 catch estimated from the specification alternatives under consideration is 28-39 mt. FW48 does not specify how the allocation will be determined, so the GF

Committee will need to specify a value for FW48, but not based on a particular method. In 2011 the scallop fishery was allocated 82 mt of SNE/MA YT, and 127 mt in 2012.

Table 3 –Summary of SNE/MA YT catch estimates for the various scallop specification alternatives (2013-2014)

SNE/MA YT		2013	2014	2015
Alt 1	SNEMAOp	28	27	27
	NLS	0	11	8
	HCS	0	0	0
	ET	0	0	1
	SNEMATOT	**28**	**38**	**35**
		2013	**2014**	**2015**
Alt 2	SNEMAOp	28	27	27
	NLS	4	12	9
	HCS	0	0	0
	ET	0	0	1
	SNEMATOT	**33**	**38**	**36**
		2013	**2014**	**2015**
Alt 3	SNEMAOp	28	27	27
	NLS	0	11	10
	HCS	0	0	0
	ET	0	0	1
	SNEMATOT	**28**	**38**	**37**
		2013	**2014**	**2015**
Alt4	SNEMAOp	28	27	27
	NLS	4	12	8
	HCS	0	0	0
	ET	0	0	1
	SNEMATOT	**32**	**39**	**36**
		2013	**2014**	**2015**
NoAction	SNEMAOp	23	21	22
	NLS	15	16	21
	HCS	0	1	1
	ET	1	1	1
	SNEMATOT	**39**	**39**	**45**

Scallop PDT Discussion

The Scallop PDT discussed possible preferred alternatives for FW24 specifications. Overall, all the scenarios have similar impacts on scallop biomass and revenue. Alternative 2 minimizes losses in the short term (2013-2015) compared to the other alternatives (Table 3). Alternative 2 and Alternative 4 have essentially the same long-term revenues, both slightly higher than the other alternatives under

consideration (Table 3). Alternative 2 provides more catch in 2013, (about 8,000 more pounds per full-time vessel, or 2.5 million pounds overall), and that makes that alternative attractive since the fishery is facing substantial reductions in 2013 compared to recent catch levels. Total revenue for Alternative 2 in 2013 is $393 million dollars, compared to $374 million dollars for Alternative 4.

However, due to the very low GB YT available in 2013 (500 mt total and 215 mt for the US share), the PDT supports that Alternative 4 may be the most realistic alternative when other issues are taken into consideration like YT bycatch. Alternative 4 projects 73 mt of GB YT catch, 40% less YT than Alternative 2 (134 mt). Seventy-three metric tons of GB YT is about 34% of the total US TAC of 215 mt. It is possible that GF FW48 will recommend the total GB YT TAC be above 500 mt, i.e. 1,150 mt, but these analyses assume the total US TAC is 215 mt. Alternative 4 has higher possession limits (18,000 pounds), which may not be ideal with lower scallop biomass levels in access areas, but Alternative 4 has the lowest YT catch and is preferable to Alternative 3 because it spreads effort into more access areas. Finally, Alternative 4 does have the highest long term net economic benefits to the nation when other factors are considered like trip costs and consumer benefits, 81 million dollars more than No Action (Table 4).

Table 4. Scallop Revenue by Fishyear (Million $, in 2011 constant prices)

subperiod	Fishing year	No Action	Status quo	ALT1	ALT2	ALT3	ALT4
2013-2015	2013	448.4	505.0	393.5	393.4	368.9	373.7
	2014	434.9	488.1	395.0	396.3	398.1	388.2
	2015	470.9	508.0	440.5	445.5	452.6	458.2
2013-2015 Total		**1,354.2**	**1,501.2**	**1,228.9**	**1,235.3**	**1,219.6**	**1,220.2**
2016-2018	2016	502.2	452.1	488.0	492.2	489.8	500.1
	2017	499.5	460.1	507.3	506.2	510.3	516.2
	2018	523.9	475.0	504.2	509.5	504.4	514.5
2016-2018 Total		**1,525.7**	**1,387.2**	**1,499.5**	**1,507.9**	**1,504.5**	**1,530.8**
2019-2026	2019	485.9	486.0	534.9	548.7	532.7	553.0
	2020	486.8	493.9	533.8	541.6	528.8	545.1
	2021	490.8	497.6	525.0	531.5	520.9	530.2
	2022	495.5	500.6	520.2	522.8	515.9	518.7
	2023	498.2	505.0	516.6	514.6	511.3	510.9
	2024	498.2	506.2	514.4	508.3	508.1	507.9
	2025	500.3	506.1	513.3	506.8	506.5	505.5
	2026	501.2	504.2	510.6	506.3	506.2	502.1
2019-2026 Total		**3,957.1**	**3,999.5**	**4,168.7**	**4,180.6**	**4,130.4**	**4,173.3**
Grand Total		**6,837.0**	**6,887.9**	**6,897.2**	**6,923.8**	**6,854.5**	**6,924.3**

Table 5. Cost and Benefits for Alternative Scenarios Net of No Action Values ($ Million, Cumulative present values discounted at 3%)

subperiod	Values	ALT1	ALT2	ALT3	ALT4	Status quo
2013-2015	Total revenue	-112.0	-106.5	-121.2	-120.7	131.1
	Total trip Costs	-26.7	-27.6	-28.8	-31.0	16.6
	Total producer Surplus	-85.3	-78.9	-92.4	-89.8	114.5
	Total Consumer Surplus	-10.8	-10.4	-11.2	-11.6	18.5
	Total benefits	-96.1	-89.2	-103.6	-101.4	133.0
2016-2018	Total revenue	-21.2	-14.4	-17.1	4.4	-112.7
	Total trip Costs	-3.9	-3.8	-3.7	-2.6	-7.3
	Total producer Surplus	-17.3	-10.6	-13.4	6.9	-105.4
	Total Consumer Surplus	-2.7	-1.7	-2.2	1.4	-19.1
	Total benefits	-20.0	-12.3	-15.5	8.3	-124.5
2019-2026	Total revenue	151.8	162.5	125.6	158.3	29.2
	Total trip Costs	9.3	9.7	7.7	9.7	2.0
	Total producer Surplus	142.5	152.9	117.9	148.6	27.2
	Total Consumer Surplus	24.3	25.1	19.4	25.3	4.1
	Total benefits	166.9	178.0	137.3	173.9	31.3
Total revenue		**18.7**	**41.7**	**-12.7**	**41.9**	**47.6**
Total trip Costs		**-21.3**	**-21.7**	**-24.8**	**-23.8**	**11.3**
Total producer Surplus		**40.0**	**63.5**	**12.1**	**65.8**	**36.4**
Total Consumer Surplus		**10.7**	**13.0**	**6.0**	**15.0**	**3.5**
Total benefits		**50.7**	**76.5**	**18.2**	**80.8**	**39.9**

Groundfish Framework 48 is considering two alternatives for allocating the GB YT sub-ACL. The first alternative is a range of 8-16% of the total ACL. For 2013 that is equivalent to 16.7 mt to 33.4 mt. The second alternative is 90% of the projected catch estimate. For Alternative 2 that would be 116.9 mt (97% of 90% of 134 mt), and for Alternative 4 that is equivalent to 63.7 mt (97% of 90% of 73 mt). Both of these alternatives are a high percentage of the total available GB YT catch; an allocation of 120.6 mt for Alternative 2 is equivalent to 54% of the US TAC, and 65.7 mt for Alternative 4 is equivalent to 30% of the US TAC (Table 2). The FW24 scallop specification alternatives are already 30% lower than recent catch levels; therefore, if further reductions are needed to reduce YT catch (i.e. Alternative 4 compared to Alternative 2), there will be additional short-term losses to the scallop fishery.

The Scallop PDT does caution that these are point estimates and are more likely underestimates for several important reasons. First, the bycatch rate for GB access areas uses 2012 observed trips from June 15 –August only. This rate will likely increase once observed trips from the fall are included because bycatch rates are typically higher in CA2 during the fall compared to the spring and summer. Many of the access areas are getting fished out, and as scallop biomass declines, YT bycatch rates may increase due to increases in towing time. Therefore, bycatch rates from 2011 and 2012 used in these analyses could be lower than the realized rates will be in 2013 and 2014. On the other hand, these could be overestimates if vessels fish less open area DAS on GB. The model assumes that 20% of open area effort will occur on GB. In addition, the YT biomass estimates could be higher than realized, thus bycatch rates could be lower.

In order to capture some of this uncertainty the Scallop PDT prepared some sensitivity analyses for the YT catch estimates provided above. A similar analysis was prepared earlier this year when the Council

and NMFS considered shifting some 2012 GB YT sub-ACL to the GF fishery from the scallop fishery. This sensitivity analysis only accounts for the uncertainty related to projected scallop and YT biomass in 2013-2015. The "Medium" estimate uses the median biomass estimate for both scallops and YT for 2013-2015. The "Low" estimate uses the 10^{th} percentile for YT biomass combined with the 90^{th} percentile for scallop biomass. The "High" estimate uses the 90^{th} percentile for YT combined with the 10^{th} percentile for scallop biomass. For example, for Alternative 4 the medium estimate of GB YT catch is 73 mt; the low is 35 mt and the high is 129 mt (Table 5). This range still does not take into account variation in scallop fishing behavior in terms of when and where vessels will fish open area DAS or whether the D:K ratio used from 2011/2012 observer data will be reflective of D:K ratios in 2013-2015. Those additional sources of uncertainty would impact realized YT catch as well.

In summary, these estimates are very uncertain. On top of that, one alternative in Framework 48 will allocate 90% of the estimated catch as an incentive to further reduce YT bycatch. The Scallop PDT is concerned that while this allocation method may provide incentive to reduce YT bycatch, there are many variables that change from year to year, so allocating less than the estimated catch level could lead to increased risks of exceeding the sub-ACL. However, there is also a provision that AMs in the scallop fishery do not trigger unless the total US ACL has been exceeded, or the scallop fishery exceeds their ACL by 50%. Those provisions reduce the chance that AMs will trigger, but managers should be aware that setting the initial allocation at 90% of the estimated catch level potentially increases the likelihood that the scallop fishery will exceed their sub-ACL every year.

The PDT also prepared some sensitivity analyses for the SNE/MA YT estimates. In this case the PDT did not run separate projections using different estimates of biomass. Instead a more simple approach as used to highlight the uncertainty related to the estimate of open area effort that will occur in the SNE/MA YT stock area, compared to other areas. Specifically, the projections estimate that 50% of all open area catch will occur in the SNE/MA YT stock area, but the fleet dynamic methods used in the estimates are relatively crude. The model could be underestimating the level of MA effort because some vessels are not able to fish in certain hard bottom areas like the Channel, some will not travel as far to fish open area DAS, and fishing in the MA in the winter is more favorable than on GB. On the other hand, 50% of open area effort could be an overestimate, so the PDT has added a 10% bound to the estimate of YT catch from open areas in SNE/MA (Table 7).

Table 6 – Summary of GB YT catch estimates (Low, medium and high)

	No Action		Alt1		Alt2		Alt3		Alt4	
LOW										
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
GBOp	14	18	17	23	17	23	17	23	17	23
CL1	0	0	1	0	1	0	0	0	1	0
CL2	92	146	59	47	46	87	52	68	18	29
Total	105	165	77	70	64	109	70	90	35	52
MEDIUM										
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
GBOp	27	33	34	41	34	41	34	41	34	41
CL1	0	0	2	0	2	0	0	0	2	0
CL2	194	285	139	161	98	169	111	132	37	57
Total	222	318	175	202	134	210	145	173	73	97
HIGH										
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
GBOp	47	55	59	67	59	67	59	67	59	67
CL1	0	0	4	0	3	0	0	0	3	0
CL2	353	501	257	318	178	297	202	231	67	99
Total	400	556	319	385	240	364	260	299	129	166

Table 7 – Summary of SNE/MA YT catch estimates (Low, Medium, High)

LOW		2013	2014	2015	MEDIUM		2013	2014	2015	HIGH		2013	2014	2015
Alt 1	SNEMAOp	22	21	21	Alt 1	SNEMAOp	28	27	27	Alt 1	SNEMAOp	34	32	32
	NLS	0	11	8		NLS	0	11	8		NLS	0	11	8
	HCS	0	0	0		HCS	0	0	0		HCS	0	0	0
	ET	0	0	1		ET	0	0	1		ET	0	0	1
	SNEMATOT	**23**	**33**	**30**		**SNEMATOT**	**28**	**38**	**35**		**SNEMATOT**	**34**	**43**	**41**
		2013	**2014**	**2015**			**2013**	**2014**	**2015**			**2013**	**2014**	**2015**
Alt 2	SNEMAOp	22	21	21	Alt 2	SNEMAOp	28	27	27	Alt 2	SNEMAOp	34	32	32
	NLS	4	12	9		NLS	4	12	9		NLS	4	12	9
	HCS	0	0	0		HCS	0	0	0		HCS	0	0	0
	ET	0	0	1		ET	0	0	1		ET	0	0	1
	SNEMATOT	**27**	**33**	**31**		**SNEMATOT**	**33**	**38**	**36**		**SNEMATOT**	**38**	**43**	**41**
		2013	**2014**	**2015**			**2013**	**2014**	**2015**			**2013**	**2014**	**2015**
Alt 3	SNEMAOp	22	21	21	Alt 3	SNEMAOp	28	27	27	Alt 3	SNEMAOp	34	32	32
	NLS	0	11	10		NLS	0	11	10		NLS	0	11	10
	HCS	0	0	0		HCS	0	0	0		HCS	0	0	0
	ET	0	0	1		ET	0	0	1		ET	0	0	1
	SNEMATOT	**23**	**33**	**32**		**SNEMATOT**	**28**	**38**	**37**		**SNEMATOT**	**34**	**43**	**42**
		2013	**2014**	**2015**			**2013**	**2014**	**2015**			**2013**	**2014**	**2015**
Alt4	SNEMAOp	22	21	21	Alt4	SNEMAOp	28	27	27	Alt4	SNEMAOp	34	32	32
	NLS	4	12	8		NLS	4	12	8		NLS	4	12	8
	HCS	0	0	0		HCS	0	0	0		HCS	0	0	0
	ET	0	0	1		ET	0	0	1		ET	0	0	1
	SNEMATOT	**27**	**33**	**30**		**SNEMATOT**	**32**	**39**	**36**		**SNEMATOT**	**38**	**44**	**41**
		2013	**2014**	**2015**			**2013**	**2014**	**2015**			**2013**	**2014**	**2015**
NoAction	SNEMAOp	18	17	17	NoAction	SNEMAOp	23	21	22	NoAction	SNEMAOp	27	26	26
	NLS	15	16	21		NLS	15	16	21		NLS	15	16	21
	HCS	0	1	1		HCS	0	1	1		HCS	0	1	1
	ET	1	1	1		ET	1	1	1		ET	1	1	1
	SNEMATOT	**34**	**35**	**40**		**SNEMATOT**	**39**	**39**	**45**		**SNEMATOT**	**43**	**43**	**49**