New England Fishery Management Council
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John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

MEMORANDUM

DATE: September 26, 2008

TO: Groundfish Oversight Committee

FROM: Groundfish Plan Development Team (PDT)

SUBJECT: **Amendment 16 Projections; Conference Call**

1. The Groundfish PDT held a conference call on September 11, 2008 to review Groundfish Assessment Review Meeting (GARM III) results and estimate mortality reductions needed in Amendment 16 to achieve rebuilding targets. Members participating in the call were Tom Nies and Anne Hawkins (NEFMC staff), Thomas Warren and Doug Christel (NMFS NERO), Eric Thunberg, John Walden, and Paul Nitschke (NMFS NEFSC), Steve Correia (Mass. DMF), Dan Holland (GMRI), Kohl Kanwit (Maine DMR), and Paul Parker (Groundfish Advisory Panel chair).

2. The PDT was unable to begin work on effort control development and did not complete projections for newly overfished stocks. Key PDT members are busy working on the interim action for NMFS and are not available for PDT work until that is completed. The PDT hopes to return to these efforts by mid-October.

Review of Framework 42 Analyses

3. Prior to estimating mortality reductions for Amendment 16, the PDT examined how well work supporting FW 42 predicted mortality changes that would result from that action. For this exercise, the following comparisons were made:

a. FW 42 estimated fishing mortality in 2005 based on partial year preliminary landings estimates, and measures were designed based on the mortality changes needed to achieve the rebuilding targets in 2006. The FW 42 catch estimates for 2005 were compared to the actual 2005 catches used in GARM III (Table 1). The catch estimates used in FW 42 were generally within 15 percent of the actual values. In two instances the estimates exceeded the actual values by more than 20 percent, and in two other instances the catch estimates under-estimated the actual values by more than 20 percent (GB cod and pollock). For GB cod, GARM III included discards in the catch, whereas GARM II and FW 42 did not - this explains differences. In the case of pollock, FW 42 estimates did not include any Canadian catch.

Table 1 – Comparison of FW 42 catch estimates for 2005 to GARM III catch for 2005

Stock	Catch (mt) FW 42 Estimate	GARM III Actual	FW 42 compared to GARM III	Comments
GB Cod	3,498	4,404	-21%	GARM II/FW 42 did not include US discards (1,040 mt)
GB Haddock	23,533	21,814	8%	
GB Yellowtail(1)	3,543	3,922	-10%	
SNE/MA Yellowtail	318	367	-13%	
CC/GOM Yellowtail	865	997	-13%	
GOM Cod	6,430	5,218	23%	
Witch Flounder	3,212	2,804	15%	
Plaice	1,989	1,556	28%	
GOM Winter Flounder	330	387	-15%	
SNE/MA Winter Flounder	1,636	1,563	5%	
GB Winter Flounder	2,510	2,202	14%	
White Hake	2,912	3,136	-7%	
Pollock	6,032	8,358	-28%	FW 42 did not include Canadian catch (~1,800 mt)
Redfish	693	665	4%	
GOM Haddock	934	962	-3%	

b. Since GARM II did not adjust terminal year mortality estimates for a retrospective pattern, differences between the FW 42 estimate of 2005 fishing mortality that is based on estimated catch and the GARM III 2005 value may be due to errors in the GARM II mortality estimate for the terminal year of 2004. GARM III also adopted several new assessment models that are not directly comparable to those used in GARM II. For this reason, the change in mortality from 2004 to 2005 based on FW 42 estimates and GARM III were compared, rather than the point estimates of fishing mortality.

In all but one instance the FW 42 estimates of the change in fishing mortality from 2004 to 2005 estimated a larger reduction than was determined by GARM III. Since this consistent bias was not seen in the catch estimates, it may be due to errors in the terminal year of the assessment results and their effect on the short-term projections. It may also be due in part to differences between assessment models used in the two GARM reports.

c. Based on estimates of fishing mortality in 2005 and the differences between those values and the rebuilding targets, FW 42 measures were designed to achieve changes in fishing mortality for seven stocks. These targeted chances were compared to the changes in mortality documented by the GARM III results. Since FW 42 was not implemented until late in 2006, the comparisons are made between 2005 and 2007(Table 3). These comparisons show that the realized reductions in mortality were similar to the targeted reductions for five of the stocks, but exceeded the targeted reductions for GB cod and white hake. The PDT cautions that the terminal year estimates of mortality – in this case, for 2007 – may be in error even though adjusted for retrospective patterns by GARM III.

d. FW 42 also estimated changes in mortality expected to result from the FW 42 measures for a larger group of stocks (essentially all stocks included in the closed area model used to design effort control measures). These were compared to the changes that actually occurred (based on GARM III results). In general, FW 42 under-estimated the mortality reductions for GB cod, haddock, winter flounder, and yellowtail flounder but did reasonably well for estimating reductions for other stocks. One exception is GOM haddock, where the framework predicted a reduction but mortality increased from 2005 to 2007. A partial explanation for the under-estimate of the impacts of the measures on the four GB stocks may be that the FW 42 analyses (the closed area model) cannot model the in –season regulation adjustments for the US/CA area. Another may be changes in operating costs that occurred over time, that might have moved effort onto inshore stocks.

e. Based on this review, the PDT concluded that the procedures used to estimate catches in 2005 provided reasonable estimates and these procedures could be used for Amendment 16 development. The measures designed in FW 42 did achieve the targeted mortality reductions, though the framework analyses under-estimated mortality reductions for several stocks. A possible explanation for these under-estimates may be limitation in the closed area model, particularly its ability to incorporate in-season adjustments in the US/CA area.

Table 2 – Comparison of changes in fishing mortality as determined by GARM III and as estimated by FW 42 based on catch estimates

	GARM III Actual Change, 04-05	FW 42 Expected Change 04-05 Based on Catch Estimate
GB Cod	-22%	-33%
GB Haddock	3%	-25%
GB Yellowtail(1)	-36%	-89%
SNE/MA Yellowtail	4%	-41%
CC/GOM Yellowtail	-10%	-36%
GOM Cod	18%	-41%
Witch Flounder	-22%	-35%
Plaice	-50%	-7%
SNE/MA Winter Flounder	0%	-29%

Table 3 – Comparison of mortality reduction targeted in FW 42 and actual reduction as determined by GARM III. FW 42 targeted reductions from Table 45, FW 42.

Stock	FW 42 Targeted Reduction from 2005	Realized Reduction, 2005-2007
GB Cod	0%	-58%
SNE/MA Yellowtail	-55%	-51%
CC/GOM Yellowtail	-46%	-46%
GOM Cod	-32%	-28%
SNE/MA Winter Flounder	-9%	-11%
GB Winter Flounder	-46%	-60%
White Hake	-13%	-45%

Table 4 – Comparison of mortality change from 2005 to 2007 predicted by FW 42 and as measured by GARM III.

	FW 42 Predicted Mortality Change	Realized Mortality Change, 05-07
GB Cod	-9%	-58%
GB Haddock	1%	-26%
GB Yellowtail	-40%	-75%
SNE/MA Yellowtail	-63%	-51%
CC/GOM Yellowtail	-49%	-46%
GOM Cod	-44%	-28%
Witch Flounder	-25%	-53%
Plaice	-11%	-63%
GOM Winter Flounder	-52%	NA
SNE/MA Winter Flounder	-19%	-11%
GB Winter Flounder	-41%	-60%
White Hake	-18%	-45%
Pollock	-17%	
Redfish	-5%	
GOM Haddock	-22%	35%

Amendment 16 Mortality Reductions

4. The PDT's approach to determine the rebuilding mortality targets and needed mortality reductions for Amendment 16 is similar to that used for FW 42. Catch in 2008 was estimated using six months of preliminary landings statistics provided by NERO, the ratio of discards to landings in 2007 from the GARM, Canadian quotas for GB cod, haddock, and yellowtail flounder, 2007 Canadian catch for pollock, and 2007 recreational catches for GB cod, GOM cod, GOM haddock, pollock, SNE/MA winter flounder, and GB winter flounder. Estimates were not made for the four stocks with very low landings. *While the method used to estimate 2008 catch has performed adequately in the past, it is not without uncertainty. Changes in discard rates, recreational catch, and commercial fishing patterns could result in actual catches that differ from these estimates*. Table 6 summarizes the derivation and the results for 2008. In several instances, the 2008 catch differs from that assumed for projections included in GARM III. PDT analyses suggest that rebuilding mortality targets are not very sensitive to the 2008 catch assumption, but it does have larger implications when estimating the necessary mortality reductions to get from the current mortality (that is, 2008 as estimated using a catch estimate and GARM III results) to the target fishing mortality.

5. Projections were run to determine rebuilding mortality targets. The following assumptions were used:

- Beginning projection stock size, age structure, partial recruitment, weights-at-age, and future recruitment assumptions were as approved by the GARM III for each stock.
- The PDT's estimate of catch was used for 2008.

- Fishing mortality in 2009 was assumed to be the rebuilding fishing mortality for stocks currently in rebuilding plans, and F_{MSY} for stocks that will begin a formal rebuilding program at the implementation of Amendment 16 (May 1, 2010). These assumptions may need to be revisited once NMFS plans for the interim action become clear.

- For stocks that are currently in rebuilding programs, the probability of achieving stock size at the end of the period is as specified in the plan: 75 percent for GB yellowtail flounder, and 50 percent for all other stocks.

- For newly overfished stocks, illustrative projections were run with a rebuilding date of 2018 and a median probability of success. These are not recommendations; they are examples only until the PDT can complete the projections requested by the Council for these stocks.

6. Results of the preliminary rebuilding projections are summarized in Table 7. Note that in this table example projection results are shown for the stocks that were determined to be newly overfished by GARM III. The Council has not selected the time periods or probabilities for those stocks, and the PDT is still developing alternatives for Council consideration. The values shown are provided only to give the Council a sense of the reductions that may be needed. The PDT also cautions that the GOM winter flounder value is based on an assessment and projection that the GARM III panel specifically recommended not using for management advice.

The table includes an estimate of catch in 2009. This estimate is based on the Freb or F_{MSY} that was used for the projection. It includes all elements of the catch: discards, landings, recreational harvest when appropriate, and Canadian catches for shared stocks.

Recreational/Commercial Allocations

7. Table 7 shows the mortality reductions needed to achieve rebuilding targets, based on 2008 estimated fishing mortality. The Council is considering an allocation of certain stocks to commercial and recreational fishermen. The following table (Table 7) illustrates how the selection of the allocation period affects the mortality reduction needed from each component of the fishery. These are approximate values, as the allocation percentages need to be recalculated after removing catches from state waters taken outside the management plan. The pollock rebuilding plan selected by the Council will also affect these values. In this example, the current recreational share of the stock was based on the average of the last three years of catch as used in the assessment. It is important to note that mortality reduction for each component differs under different allocation alternatives.

Table 5 – Impacts of recreational/commercial allocation options on mortality reductions needed for the recreational and commercial components of the groundfish fishery.

Stock	Overall Needed Reduction	Allocation Years 1996-2006		Allocation Years 2001-2006	
		Rec.	Comm.	Rec.	Comm.
GOM cod	-21%	.-27%	-19%	-2%	-28%
Pollock	-48%	-34%	-49%	-29%	-49%
GOM haddock	NA	-18%	Increase	Increase	Increase

Table 6 – Derivation of 2008 estimated catch for rebuilding projections.

Stock	Prelim. Landings, Jan – Jun			Jan-Jun Prelim. Landings, Percent of Total		Estimated Commercial Catch		Maximum Estimated Comm. Catch				
	2007	2008	GARM III Discards as % of Landings	CY 2007	Average, CY 2005-CY 2007	Based on 2007	Based on 05-07	2008	2007 Rec Harvest	Canada	Total Est. 2008 Catch	GARM III Assumed 2008 Catch
GB Cod	1,829	1,878	0.282	0.48	0.55	5,016	4,378	5,016	8	1,633	6,657	5,957
GOM Cod	1,468	2,356	0.129	0.38	0.39	7,002	6,822	7,002	1,026		8,028	5,268
GB Haddock	1,373	2,986	0.660	0.46	0.59	10,776	8,401	10,776		14,950	25,726	21,929
GOM Haddock		217	0.066	0.74	0.70	313	330	330	630		960	1,368
GB Yellowtail	804	483	0.474	0.70	0.60	1,017	1,187	1,187		550	1,737	2,500
SNE/MA Yellowtail	61	122	0.895	0.44	0.49	525	472	525			525	396
CC/GOM Yellowtail	215	300	0.298	0.48	0.52	811	749	811			811	627
Plaice	419	426	0.241	0.42	0.47	1,258	1,124	1,258			1,258	1,126
Witch Flounder	599	581	0.090	0.56	0.58	1,131	1,092	1,131			1,131	1,172
GB Winter Flounder	384	261	0.245	0.45	0.46	722	707	722			722	980
GOM Winter Flounder	109	132	0.065	0.46	0.48	306	293	306	28		334	305
SNE/MA Winter Flounder	546	312	0.070	0.36	0.32	928	1,044	1,044	121		1,165	1,857
Redfish	438	617	0.474	0.56	0.56	1,624	1,624	1,624			1,624	1,160
White Hake	673	469	0.371	0.44	0.50	1,461	1,286	1,461			1,461	2,200
Pollock	3,539	3,765		0.42	0.42	8,964	8,964	8,964	383	650	9,997	7,756

Table 7 – Summary of rebuilding mortality targets. When F rebuild is in grey font, it exceeds F_{MSY} and FMSY is used for all projections. Stocks in italics are examples only and actual values will be based on Council decisions for rebuilding period and probability of success.

Species	Stock	2007 Fishing Mortality	Frebuild	Fmsy	Rebuild Date	2007 Catch (mt)	PDT 2008 catch	2009 estimat-ed catch	2008 F from 2008 PDT Catch	% Change in F necessary to achieve Frebuild using catch and F 2008
Cod	**GB**	0.300	0.185	0.2466	2026	5,957	6,657	3,592	0.410	-55%
Cod	**GOM**	0.456	0.282	0.237	2014	5,268	8,028	10,327	0.300	-21%
Haddock	**GB**	0.230	n/a	0.350	2014	*16,815*	25,726	86,520	0.083	322%
Haddock	**GOM**	0.350	n/a	0.430	2014	1,368	960	1,564	0.214	72%
Yellowtail Flounder	**GB**	0.289	0.109	0.254	2014	2,500	1,735	2,234	0.130	-16%
Yellowtail Flounder	**SNE/MA**	0.413	0.075	0.254	2014	396	525	389	0.120	-38%
Yellowtail Flounder	**CC/GOM**	0.414	0.238	0.239	2023	627	811	860	0.289	-18%
American Plaice	**GB/GOM**	0.090	0.210	0.190	2014	1,126	1,258	3,214	0.099	92%
Witch Flounder		*0.290*	*0.196*	*0.200*	*(2018)*	*1,172*	*1,131*	*928*	*0.296*	*-32%*
Winter Flounder	***GB***	*0.280*	*0.254*	*0.260*	*(2018)*	*980*	*722*	*2,004*	*0.131*	*98%*
Winter Flounder	***GOM***	*0.417*	*0.274*	*0.283*	*(2018)*	*305*	*334*	*379*	*0.333*	*-15%*
Winter Flounder	**SNE/MA**	0.649	0.000	0.248	2014	1,857	1,165	0	0.265	-100%
Redfish		0.005	n/a	0.038	2051	1,160	1,624	8,614	0.008	375%
White Hake	**GB/GOM**	0.150	0.084	0.125	2014	2,200	1,461	2,376	0.065	29%
Pollock	***GB/GOM***	*10.975*	*5.310*	*5.66*	*(2018)*	*7,756*	*9,997*	*8,015*	*n/a*	*-48%*
Windowpane	***GOM/GB***	*1.960*	*n/a*	*0.50*		*299*	*n/a*	*299*	*n/a*	*-74%*
Windowpane	**SNE/MA**	1.850	n/a	1.47	2014	338	n/a	338	n/a	-21%
Ocean Pout		0.380	n/a	0.760	2014	n/a	n/a	n/a	n/a	n/a
Atlantic Halibut		*0.065*	*0.044*	*0.073*	*(2056)*	*84*	*n/a*	*68*	*0.060*	*-27%*