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Attachment 3
Georges Bank Yellowtail Flounder

1. GB yellowtail flounder was assessed by the TRAC in July, 2010. Two VPA formulations were presented in TRAC 2009 in order to address unusually large tows in the Canadian survey in 2008 and 2009. The two formulations have been replaced by a single formulation that incorporates the large surveys but down weights the survey in those years. There was no similar large tow in 2010. In brief, stock biomass is estimated to be markedly lower than estimated last year and fishing mortality has been below F_{MSY} for the last two years. This revised perception of stock biomass is primarily because the 2005 year class which was thought to be large (60 million age 1 fish) is now estimated to be just above average (23.9 million fish). This assessment has a new source of uncertainty compared to recent assessments due to the re-emergence of a moderate retrospective pattern despite splitting the survey series. The assessment is summarized in the TRAC Status Report (TSR) 2010/03 (attached).

Figure 1 – GB YTF recruitment and SSB (TRAC 2010/03)
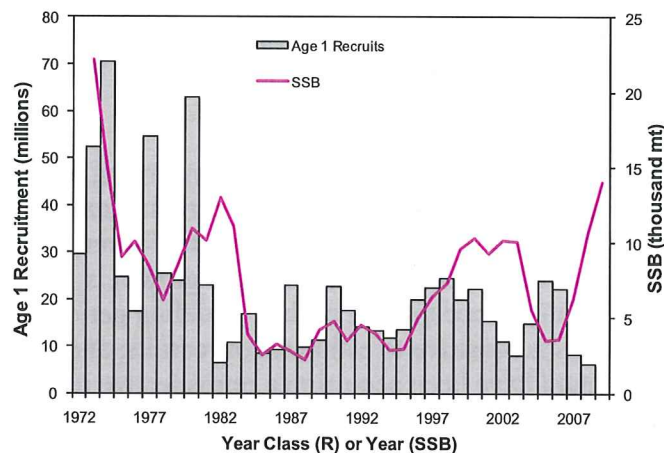
2. The ABC control rule for overfished stocks in rebuilding programs was recommended by the SSC and adopted by the Council in Amendment 16: "If fishing at 75% of FMSY does not achieve the mandated rebuilding requirements for overfished stocks, ABC should be determined as the catch associated with the fishing mortality that meets rebuilding requirements (Frebuild)."

3. The Council is considering four rebuilding strategies for this stock:

- Option 1/No Action: Rebuild using a fishing mortality rate needed to rebuild by 2014 with a 75 percent probability o f success.
- Option 2/Sub-Option A: Rebuild by 2016 with a 50 percent probability of success
- Option 2/Sub-Option B: rebuild by 2016 with a 60 percent probability of success
- Option 2/Sub-Option C: Rebuild by 2016 with a 75 percent probability of success

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4. Based on the TRAC 2010 assessment, projections were run to determine the fishing mortality rates (Frebuild), spawning stock biomass (SSB) trajectories, and catch streams that correspond to the four rebuilding strategies. Assumption used in the assessment for biological parameters were those approved at TRAC and GARM III. Notably, the recruitment assumption samples from all recruitments observed, including higher recruitments from the period 1963 – 1982. Recruitment is sampled in two stages with the break at 5,000 mt of SSB. Catch in 2010 was assumed equal to the quotas established by the U.S. and Canada outside the TMGC process. Results of the projections are summarized in Table 1 through Table 3and Figure 2 and Figure 3.

5. Projection results indicate the stock is unlikely to rebuild by 2014 in the absence of fishing mortality, but can rebuild by 2016 under any of the other three rebuilding strategies. Only Option 2/Sub-Option A (median probability of success) will increase catches from current levels.

6. As noted, these projections use the entire recruitment series, including hindcast recruitments. This is the same series used to set the biomass status determination criteria. Median recruitment for the full time series is 24.7 million fish at Age 1. For the period 1983 through 2009, the median Age 1 recruitment is only 14 million fish. TRAC ran several projections using this lower recruitment series and noted using these values would change rebuilding probabilities and future catches.

7. Last year the PDT noted several reasons for caution concerning the 2009 assessment: first, the TRAC cautioned that the assessment was less certain than in the past due to the recent unusual Canadian surveys; second, while both model formulations indicated rapidly increasing stock size since 2005, continued rapid growth is less certain because of poor recruitment in 2007; third, since the end of the rebuilding period is approaching, projected rebuilding success is sensitive to estimates of recruits; and fourth, the PDT thought the assessment might have been acquiring a retrospective pattern when estimating fishing mortality.

The PDT reiterates similar concerns this year. The 2010 TRAC results indicate that the stock is not as large as previously thought, the 2005 year class is not as large as previously estimated and the 2007 and 2008 year classes are still estimated as among the poorest in the time series. These two small year classes are driving the low fishing mortality needed to rebuild the stock. Even if the Council extends the rebuilding period to 2016, meeting that timeline is contingent on successful recruitment. The PDT is concerned that the assessment has developed a retrospective pattern that under-estimates fishing mortality and now it appears to also over-estimates stock size (

Table 5).

8. While there are concerns for meeting rebuilding requirements, the assessment also contains positive information. Even with the revised perception of stock size, there have been recent increases and stock size is estimated larger than observed since the early 1980's. Fishing mortality (with the caution that the retrospective pattern introduces

uncertainty in the estimates for recent years) has been reduced dramatically from the values seen previously. As a result, the 2005 year class produced more survivors at age 4 in 2009 than have been estimated since 1974 and more age 5 fish at the beginning of 2010 than have been observed in the time series. Assuming mortality remains low, this should lead to expansion of the age structure above age 6 in the near future. The 2006 year class is producing similar numbers at age. These year classes may help sustain the stock as the weak 2007 and 2008 year-classes age and enter the fishery.

9. U.S. and Canadian catches of this stock are coordinated through the Transboundary Resource Management Guidance Committee (TMGC). The TMGC will meet before the SSC and the SSC will be informed of the results of that meeting. TMGC recommendations do not currently exempt the Council from M-S Act rebuilding requirements.

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Table 1 – Frebuild for four GB YTF rebuilding options

| | F=0 | 50% | 60% | 75% |
Year	2014	2016	2016	2016
2010	0.142	0.142	0.142	0.142
2011	0	0.138	0.101	0.039
2012	0	0.138	0.101	0.039
2013	0	0.138	0.101	0.039
2014	0	0.138	0.101	0.039
2015	0.191	0.138	0.101	0.039
2016	0.191	0.138	0.101	0.039
2017	0.191	0.191	0.191	0.191
2018	0.191	0.191	0.191	0.191
2019	0.191	0.191	0.191	0.191
2020	0.191	0.191	0.191	0.191

Table 2 – Projected SSB for four GB YTF rebuilding strategies

| | F=0 | 50% | 60% | 75% |
year	2014	2016	2016	2016
2010	15.031	15.031	15.031	15.031
2011	16.817	15.985	16.203	16.575
2012	22.079	19.114	19.865	21.194
2013	29.043	23.925	25.169	27.46
2014	38.008	30.461	32.25	35.592
2015	45.368	37.399	40.005	44.943
2016	47.658	43.189	46.746	53.655
2017	48.269	46.211	49.827	56.944
2018	48.44	47.334	49.93	55.235
2019	48.495	47.744	49.612	53.375
2020	48.455	48.069	49.382	51.916

Table 3 – Median catch/ABC for four GB YTF rebuilding strategies ('000 mt)

| | F=0 | 50% | 60% | 75% |
year	2014	2016	2016	2016
2010	1.956	1.956	1.956	1.956
2011	0	1.998	1.486	0.59
2012	0	2.222	1.699	0.706
2013	0	2.658	2.065	0.884
2014	0	3.431	2.683	1.163
2015	7.447	4.355	3.433	1.512
2016	7.973	5.167	4.135	1.857
2017	8.096	7.72	8.38	9.705
2018	8.124	7.911	8.401	9.378
2019	8.119	7.991	8.338	9.038
2020	8.13	8.052	8.295	8.768

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Table 4 – OFL for four GB YTF rebuilding strategies ('000 mt)

| | F=0 | 50% | 60% | 75% |
| | 2014 | 2016 | 2016 | 2016 |
year				
2010	1.956	1.956	1.956	1.956
2011	3.495	3.495	3.495	3.495
2012	4.335	3.901	4.011	4.208
2013	5.541	4.674	4.885	5.274
2014	7.367	6.027	6.347	6.941

Table 5 – Comparison of recent TRAC estimates of fishing mortality and biomass for GB yellowtail flounder

	Year									
	Fishing Mortality (age 4+)					SSB_{MSY} (K mt)				
Assessment Year	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
2006	1.37	-	-	-	-	5.4	-	-	-	-
2007	1.22	0.89	-	-	-	4.4	5.0	-	-	-
2008	1.16	0.89	0.29	-	-	4.2	4.4	9.5	-	-
2009 – Excl.	1.25	1.06	0.41	0.09	-	3.7	4.4	10.0	17.8	-
2009 – Incl.	1.23	1.01	0.38	0.08		3.8	4.7	11.7	22.9	
2010	1.30	1.18	0.53	0.15	0.15	3.5	3.5	6.2	10.6	14.0

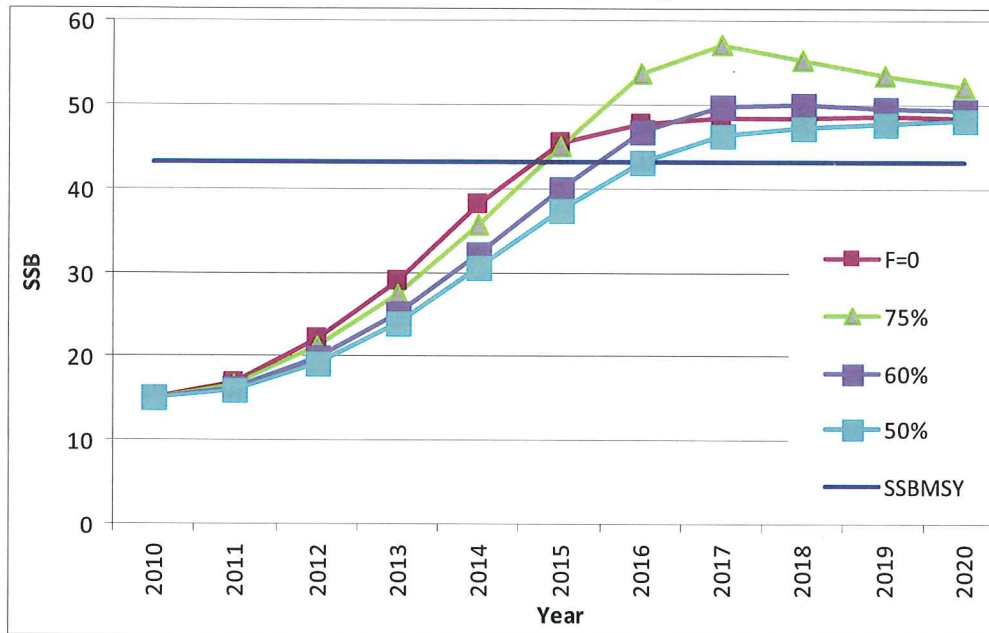**Figure 2 – Projected SSB for four GB YTF rebuilding strategies**

Figure 3 – Projected median catch for four GB YTF rebuilding strategies