New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell, Chairman | Thomas A. Nies, *Executive Director*

MEMORANDUM

DATE: October 14, 2014

TO: Scientific and Statistical Committee (SSC)

FROM: Groundfish Plan Development Team (PDT)

CC: Groundfish Committee (Committee)

SUBJECT: **Pollock, Georges Bank (GB) winter flounder, and Gulf of Maine (GOM) winter flounder ABCs and OFLs**

The Groundfish Plan Development Team (PDT) discussed and completed analyses for **pollock, Georges Bank (GB) winter flounder, and Gulf of Maine (GOM) winter flounder ABCs/OFLs for FY 2015- FY 2017**.

2014 Operational Assessments

Overview

Operational assessments and peer reviews were completed for pollock, GB winter flounder, and GOM winter flounder in July – August 2014. The most recent benchmark assessments for these stocks were at SAW/SARC 50 (pollock) and SAW/SARC 52 (GB and GOM winter flounder). The subject operational assessments included three additional years (2011-2013) of fishery catch data and research survey abundance indices for the two winter flounder stocks and four years (2010-2013) for pollock. For the GOM winter flounder and GB winter flounder operational assessments, no changes were made to the methods used to prepare the input data, or in the assessment model configurations. For the pollock operational assessment, there were several revisions from the SAW50 data including the recreational catch estimates, precision of recreational discards, and commercial discard-at-age estimates for 2001-2008.

Pollock

The Peer Review Panel accepted the stock status determined by updated assessment results (2013 SSB= 126,000 mt and 2013 average F for ages 5-7=0.1), the updated estimate of the average $F_{40\%}$ (0.27), and the SSB_{MSY} proxy (76,900 mt). Therefore, the stock was not overfished and not experiencing overfishing in 2013. However, the Peer Review Panel noted that the overfishing status is sensitive to the assumed survey selectivity.

Short-term projections were based on the control rule applied at 75% F_{MSY} and two sensitivity projections assuming:

1) Domed shaped selectivity and recruitment at 50% for the 2011 year class (i.e., mean recruitment over the time series); and
2) Flat-top shaped selectivity in the surveys with a rho adjustment.

GB Winter Flounder

The Peer Review Panel accepted the stock status determined by updated VPA results (2013 F=0.30, 2013 SSB=6,950 mt) and updated MSY reference points (F_{MSY}=0.44, SSB_{MSY}=8,100 mt). Therefore, the stock was not overfished or experiencing overfishing in 2013. Short-term projections were based on the control rule applied at $F_{rebuild}$.

GOM Winter Flounder

The Peer Review Panel accepted the stock status determined by updated assessment results (2013 exploitable biomass = 2,932 mt and 2013 exploitation rate=0.09) and the SAW52 estimate of $F_{40\%}$ (0.23). Therefore, the stock was not experiencing overfishing in 2013. The overfished status continues to be unknown. The Peer Review Panel expressed concerns that recent biomass estimates substantially decreased despite relatively low catch, noting that the reasons for the apparent decline in biomass are not well understood.

Constant OFLs and ABCs were based on 2013 exploitable biomass from the fall surveys with q=0.6 on the wing spread multiplied by F_{MSY} and 75%F_{MSY}. A sensitivity estimate on exploitable biomass was also done using a q=0.37 on door spread from the recent 2014 Georges Bank empirical benchmark assessment.

PDT Analysis, Results, Discussion, and Recommendations

Analysis: Estimate of 2014 Catches

For GB winter flounder and pollock, the PDT estimated the calendar year catch for 2014 using current catch information for 2014 and previous years' catch. For pollock, the recreational component is included within other and state (i.e., no recreational sub-ACL). The PDT did not estimate 2014 catch for GOM winter flounder because short-term projections are not possible for this stock.

Results: Candidate ABCs/OFLs

Pollock

The PDT used 6,817 mt (imputed catch) for 2014, as the best estimate of removals for calendar year 2014 for ABC and OFL calculations (Appendix 1).

Table 1 summarizes the candidate ABCs for FY 2015- FY 2017 for the pollock stock, based on:

1) The control rule applied at 75% F_{MSY};
2) A constant quota approach in which the first year's ABC is held constant for three years based on the sensitivity projection using recruitment at 50% of the 2011 year class.

Table 2 provides the corresponding OFLs after imputing the candidate ABCs. The flat-top sensitivity projection is not being brought forward because it would reflect a major change in the assumptions for an assessment of this type (i.e., operational versus benchmark). Catch advice from the flat-top sensitivity run is much lower relative to the accepted base run. Recent catches have been near the catch estimates at 75%F_{MSY} from the flat-top sensitivity run.

Table 1- Candidate ABCs for pollock for FY 2015-FY 2017, indicated in black. Gray out catch projections provided for reference.

Year	75%Fmsy	Fmsy	Low Recruitment	Flat rho Adjust	Low Recruitment Constant
2015	16,600	21,538	15,866	5,031	15,866
2016	16,859	20,925	15,070	5,691	15,866
2017	19,029	22,818	15,065	6,867	15,866

Table 2- Candidate OFLs for pollock for FY 2015-FY 2017

Year	OFLs 75%Fmsy	Low Recruitment Constant
2015	21,538	21,538
2016	21,864	22,004
2017	24,541	24,894

GB Winter Flounder

The PDT used 1,522 mt (imputed catch) for 2014, as the best estimate of removals for calendar year 2014 for ABC and OFL calculations (Appendix 2). Table 3 summarizes the ABCs for FY 2015- FY 2017 for the GB winter flounder stock, based on the control rule applied at $F_{rebuild}$ (i.e., F=0.27). Table 4 provides the corresponding OFLs after imputing the candidate ABCs.

Table 3- Candidate ABCs for GB winter flounder for FY 2015-FY 2017, indicated in black. Gray out catch projections provided for reference.

Year	75%Fmsy	Fmsy	Frebuild	rho adjust 75%Fmsy	rho adjust Frebuild
2015	2,537	3,242	2,124	1,941	826
2016	2,546	3,024	2,221	1,994	974
2017	2,559	2,909	2,294	2,114	1,123

Table 4- Candidate OFLs for GB winter flounder for FY 2015-FY 2017.

Year	OFLs Frebuild
2015	3,242
2016	3,383
2017	3,511

GOM Winter Flounder

Table 5 summarizes the ABCs for FY 2015- FY 2017 for the GOM winter flounder stock, based on the control rule applied at 75%F_{MSY} as a constant quota for the next three years. Table 5 also provides the corresponding OFLs. Although a sensitivity run was conducted at the assessment, the Peer Review Panel recommended this analysis requires further examination before being brought forward as a basis for management.

Table 5- Candidate OFLs and ABCs for GOM winter flounder for FY 2015-FY 2017.

Year	ABCs	OFLs
2015	510	688
2016	510	688
2017	510	688

Discussion: Assessment Findings and Comparison of ABCs

Pollock

There are several sources of uncertainty in the 2014 pollock assessment. One source of uncertainty is why the ACL has not been caught as the stock is estimated to be above SSB_{MSY} (Figure 1).

The PDT notes that based on the pollock assessment, there is no change in stock status and catches are well-below the recent quotas. The strong 2011 year class is the second highest in the recruitment series (Figure 2).

The SSB is estimated to be substantially higher than the exploitable biomass due to the dome shape selectivity assumptions in both the surveys and the catch. The dome shape selectivity pattern results in a large amount of cryptic biomass over the time series (Figure 3). The assessment findings indicate that total recreational catches (landings and discards) are becoming an increasing portion of the overall (i.e., commercial and recreational) catch.

The 2013 rho-adjusted point estimate of F and SSB is barely within the 90% confidence interval of the unadjusted point estimate. In addition, two sensitivities projections were conducted within

the assessment: (1) assuming dome shaped selectivity in the surveys and 50% of 2011 recruitment and (2) assuming flat-top shaped selectivity in the surveys with a rho adjustment (Tables 6-8 and Figure 4). The flat-top by definition changes the perception of biomass, and therefore removes cryptic biomass.

The PDT is concerned about the consistent pattern of the retrospective in the assessment (Figure 5). When examining the sensitivity projections, this pattern is worse for the flattop sensitivity run than the domed sensitivity run. The comparison of the two sensitivities is difficult because the retrospective adjustment was only applied to the flattop. This may complicate the comparison between the two runs.

GB Winter Flounder

Based on the 2014 assessment update, there are no changes in stock status for GB winter flounder. The stock is scheduled to rebuild by 2017 with a 75% probability of achieving the SSB target. In order to do so, a fishing mortality rate set at $F_{rebuild}$ would be necessary for the next three years, FY 2015-FY2017 (Tables 9-11 and Figure 6).

The PDT remains concerned about the continued retrospective patterns in F and SSB (Figure 7). As with pollock, the 2013 rho-adjusted point estimate of F and SSB is barely within the 90% confidence interval of the unadjusted point estimate. If the retrospective bias continues at the next assessment, then the projections will be overly optimistic.

Also, the peer review report suggests that the PDT account for the GB winter flounder discards in the Canadian sea scallop and groundfish fisheries. The PDT will consider accounting for these catches within the "other" sub-component during its annual review of catches for the current framework adjustment (i.e., Framework Adjustment 53).

GOM Winter Flounder

Based on the 2014 update, there are no changes in stock status. The stock is not overfished, and overfished status remains unknown. The fall surveys (NMFS and MA DMF) show large declines in the past two years; while the spring surveys have been relatively constant. The fall survey is used within the assessment to determine catches. Most catches are from statistical area 514.

The PDT is concerned that biomass has declined despite catches well-below the recent ABCs (Figure 8). The catchability assumption q (survey catch efficiency), in the updated assessment remains the same, but the recent benchmark for GB yellowtail flounder used a different assumption on q. A sensitivity projection was done to examine this assumption. It was noted that a flatfish catchability study underway by NMFS may further inform future assessments with a better estimate of survey efficiency.

The PDT notes that potential sources of uncertainty include the use of survey information to set catches, scaling up of biomass to determine exploitable biomass, and the status of the stock. The three surveys are being combined, such that the estimates from one survey may result in measurement error not fully being captured. The assessment assumes no difference in

"trawlable" versus "untrawlable" bottom, and notes this for the SSC because the biomass estimate is being scaled up to total area.

PDT Recommendations

Pollock

The PDT recommends a constant quota approach of 15,866 mt, based on the sensitivity projection assuming 50% of the 2011 YC for FY 2015- FY 2017 ABCs. This would hold the catch in FY 2015 constant for FY 2016 and FY 2017. The PDT recognizes that the retrospective pattern is in the direction that if all catches are taken then the stock could be subject to overfishing. However, the PDT acknowledges that recent catches have been under the quotas. Furthermore, the very large recruitment event in 2011 is only evidenced in the surveys and not in the fishery catches. This constant ABC approach provides a slightly larger uncertainty buffer relative to the straight $75\%F_{MSY}$ projection in recognition of some of the uncertainty associated with 2011 year class and the general retrospective issues with the assessment. However this additional buffer does not cover the uncertainty with regards to the selectivity assumption. The constant quota approach is similar to status quo quotas for the next three years (i.e, FY 2014 ABC is 16,000 mt)

GB Winter Flounder

The PDT recognizes that the GB winter flounder stock is in a $F_{rebuild}$ situation. The PDT recommends this approach be applied for the FY 2015- FY 2017 ABCs. The stock is scheduled to rebuild in 2017 with a 75% probability of achieving the SSB target. The SSB trends were revised lower in comparison to the SARC 52 assessment due to the respective pattern within the assessment. This control rule is more conservative since ABCs are estimated from Frebuild to rebuild by 2017 with 75% probability of success. However with the observed historical retrospective pattern a larger buffer may be warranted. The PDT notes that the SSC may want to consider a constant quota for the next three years to add additional precaution. The PDT also notes that the ABCs from $F_{rebuild}$ are still higher than the most recent two years of catches (Figure 9).

GOM Winter Flounder

The PDT recommends that $75\%F_{MSY}$ be held constant at 510 mt for FY 2015 – FY 2017 ABCs. The PDT also notes that for stocks with index-based assessments, such as GOM winter flounder, a mechanism may need to be put in place to examine these stocks each year.

Tables

Table 6- F-Mult (i.e., fully selected F) from the pollock 2014 operational assessment update for the base final model at 75%F_{MSY} and F_{MSY}, a sensitivity projection at 75%F_{MSY} using a flat survey selectivity was a rho adjustment, a sensitivity with a 50% reduction in the 2011 year class and a sensitivity with the 50% 2011 year class reduction keeping catch constant at the 2015 estimate.

Fishing Mortality	pollock				
	75%Fmsy	Fmsy	low recruitment	flat adjust	low recruitment constant
2014	0.13	0.13	0.13	0.43	0.13
2015	0.32	0.42	0.32	0.31	0.32
2016	0.32	0.42	0.32	0.31	0.33
2017	0.32	0.42	0.32	0.31	0.34
2018	0.32	0.42	0.32	0.31	0.32
2019	0.32	0.42	0.32	0.31	0.32
2020	0.32	0.42	0.32	0.31	0.32
2021	0.32	0.42	0.32	0.31	0.32
2022	0.32	0.42	0.32	0.31	0.32
2023	0.32	0.42	0.32	0.31	0.32
2024	0.32	0.42	0.32	0.31	0.32
2025	0.32	0.42	0.32	0.31	0.32

Table 7- Catch (thousandths mt) from the pollock 2014 operational assessment update for the base final model at 75%FMSY and FMSY, a sensitivity projection at 75%FMSY using a flat survey selectivity was a rho adjustment, a sensitivity with a 50% reduction in the 2011 year class and a sensitivity with the 50% 2011 year class reduction keeping catch constant at the 2015 estimate.

Total Catch pollock

year	75%Fmsy	Fmsy	low recruitment	flat adjust	low recruitment constant
2014	6.817	6.817	6.817	6.817	6.817
2015	16.6	21.538	15.866	4.959	15.866
2016	16.859	20.925	15.070	5.622	15.866
2017	19.029	22.818	15.065	6.794	15.866
2018	18.475	21.244	13.722	7.494	13.484
2019	15.199	17.082	12.332	6.943	12.195
2020	12.969	14.768	12.258	6.944	12.193
2021	13.662	15.429	13.122	8.057	13.07
2022	13.736	15.441	13.332	8.736	13.287
2023	13.624	15.276	13.316	9.005	13.289
2024	13.545	15.156	13.311	9.193	13.293
2025	13.474	15.056	13.299	9.313	13.288

Table 8- SSB from the pollock 2014 operational assessment update for the base final model at 75%FMSY and FMSY, a sensitivity projection at 75%FMSY using a flat survey selectivity was a rho adjustment, a sensitivity with a 50% reduction in the 2011 year class and a sensitivity with the 50% 2011 year class reduction keeping catch constant at the 2015 estimate.

SSB pollock

year	75%Fmsy	Fmsy	low recruitment	flat adjust	low recruitment constant
2014	123.407	123.407	120.91	32.02	120.91
2015	131.633	131.633	122.58	34.102	122.581
2016	131.291	126.522	114.92	38.141	114.933
2017	125.784	117.176	106.43	40.488	105.533
2018	117.200	105.212	99.712	42.306	98.245
2019	108.085	94.196	95.69	44.040	94.649
2020	104.995	89.92	94.778	47.932	94.107
2021	101.506	86.489	93.771	51.013	93.28
2022	99.126	83.923	93.297	53.584	92.905
2023	97.438	82.032	93.034	55.591	92.729
2024	96.165	80.647	92.848	56.945	92.615
2025	95.209	79.638	92.694	57.942	92.516

Table 9- Average F (ages 4-6) from the Georges Bank winter flounder 2014 operational assessment update for the base final model at 75%FMSY, FMSY, and Frebuild and a sensitivity projection at 75%FMSY and Frebuild using a rho adjustment for retrospective bias.

Fishing Mortality	GB winter flounder				
	75%Fmsy	Fmsy	Frebuild	rho adjust 75%Fmsy	rho adjust Frebuild
2014	0.22	0.22	0.22	0.29	0.29
2015	0.33	0.44	0.27	0.33	0.13
2016	0.33	0.44	0.27	0.33	0.13
2017	0.33	0.44	0.27	0.33	0.13
2018	0.33	0.44	0.27	0.33	0.13
2019	0.33	0.44	0.27	0.33	0.13
2020	0.33	0.44	0.27	0.33	0.13
2021	0.33	0.44	0.27	0.33	0.13
2022	0.33	0.44	0.27	0.33	0.13
2023	0.33	0.44	0.27	0.33	0.13
2024	0.33	0.44	0.27	0.33	0.13
2025	0.33	0.44	0.27	0.33	0.13

Table 10- Catch (thousandth mt) from the Georges Bank winter flounder 2014 operational assessment update for the base final model at 75%FMSY, FMSY, and Frebuild and a sensitivity projection at 75%FMSY and Frebuild using a rho adjustment for retrospective bias.

Total Catch	GB winter flounder				
year	75%Fmsy	Fmsy	Frebuild	rho adjust 75%Fmsy	rho adjust Frebuild
2014	1.522	1.522	1.522	1.522	1.522
2015	2.537	3.242	2.124	1.941	0.826
2016	2.546	3.024	2.221	1.994	0.974
2017	2.559	2.909	2.294	2.114	1.123
2018	2.692	2.991	2.449	2.351	1.323
2019	2.811	3.065	2.589	2.541	1.503
2020	2.884	3.100	2.681	2.673	1.644
2021	2.95	3.132	2.764	2.79	1.773
2022	2.997	3.151	2.826	2.876	1.877
2023	3.029	3.164	2.868	2.937	1.961
2024	3.051	3.172	2.899	2.982	2.028
2025	3.066	3.178	2.920	3.015	2.070

Table 11- SSB (thousandths mt) from the Georges Bank winter flounder 2014 operational assessment update for the base final model at 75%FMSY, FMSY, and Frebuild and a sensitivity projection at 75%FMSY and Frebuild using a rho adjustment for retrospective bias.

SSB year	GB winter flounder 75%Fmsy	Fmsy	Frebuild	rho adjust 75%Fmsy	rho adjust Frebuild
2014	7.261	7.261	7.261	5.697	5.697
2015	8.561	8.363	8.671	6.551	6.836
2016	8.394	7.610	8.861	6.542	7.84
2017	8.496	7.356	9.219	7.007	9.152
2018	8.929	7.562	9.840	7.782	10.757
2019	9.339	7.753	10.423	8.424	12.276
2020	9.575	7.832	10.787	8.862	13.418
2021	9.802	7.919	11.131	9.259	14.493
2022	9.962	7.971	11.385	9.547	15.386
2023	10.070	7.999	11.558	9.759	16.076
2024	10.147	8.023	11.688	9.915	16.613
2025	10.198	8.038	11.776	10.027	16.987

Figures

Figure 1- Comparison of catch, 2014 projection catch assumption, historical ABCs, and projected F_{MSY}, 75%F_{MSY}, recruitment sensitivity constant catch, and MSY catch at B_{MSY} for pollock.

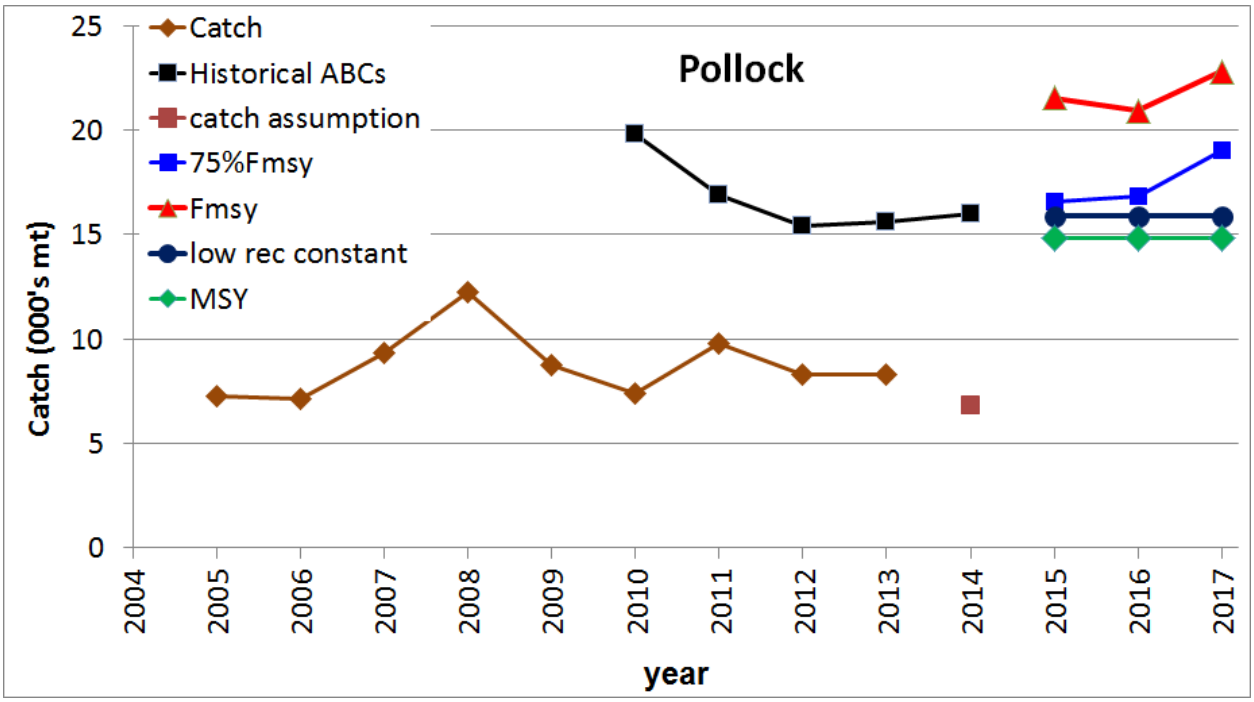


Figure 2- Estimated age-1 recruitment from the base Pollock and flat-top sensitivity runs. ***Plot is from 2014 operational update pollock presentation, dated August 2014.***

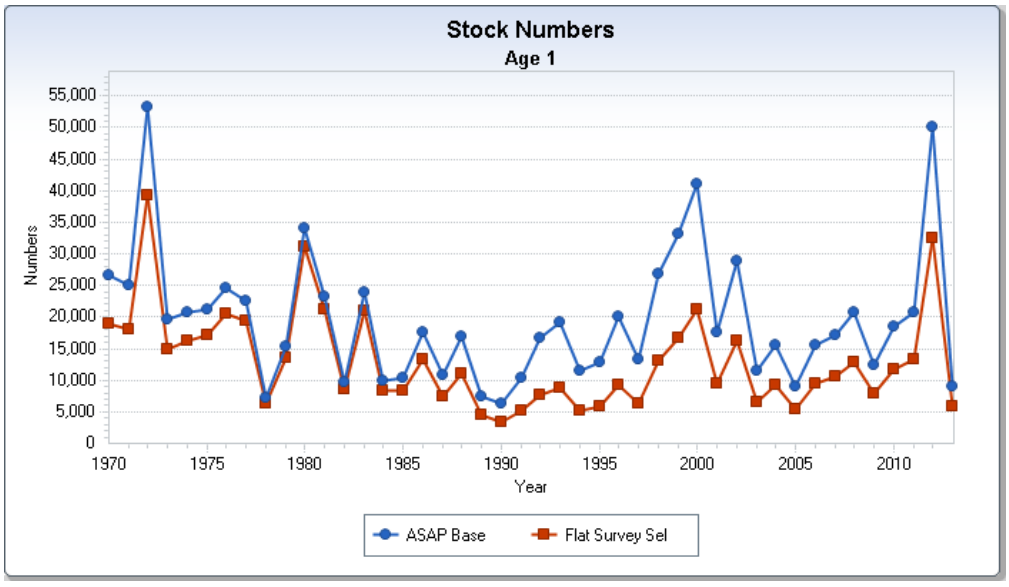


Figure 3- Comparison of total, SSB and exploitable biomass form the base Pollock ASAP run from the 2014 operational update. ***Figure C7, pp. 51 from the draft 2014 assessment document, dated October 2014.***

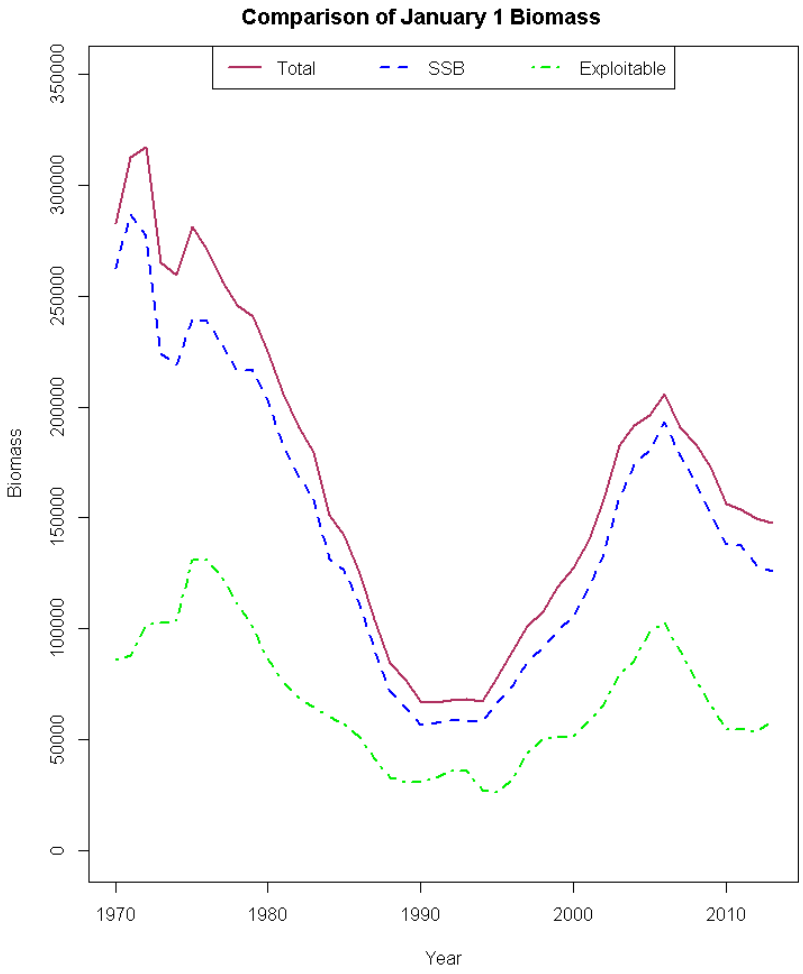


Figure 4- F-Mult (top), catch (middle), and SSB (bottom) from the Pollock 2014 operational assessment update for the base final model at 75%F_{MSY} and F_{MSY}, a sensitivity projection at 75%F_{MSY} using a flat survey selectivity was a rho adjustment, a sensitivity with a 50% reduction in the 2011 year class and a sensitivity with the 50% 2011 year class reduction keeping catch constant at the 2015 estimate.

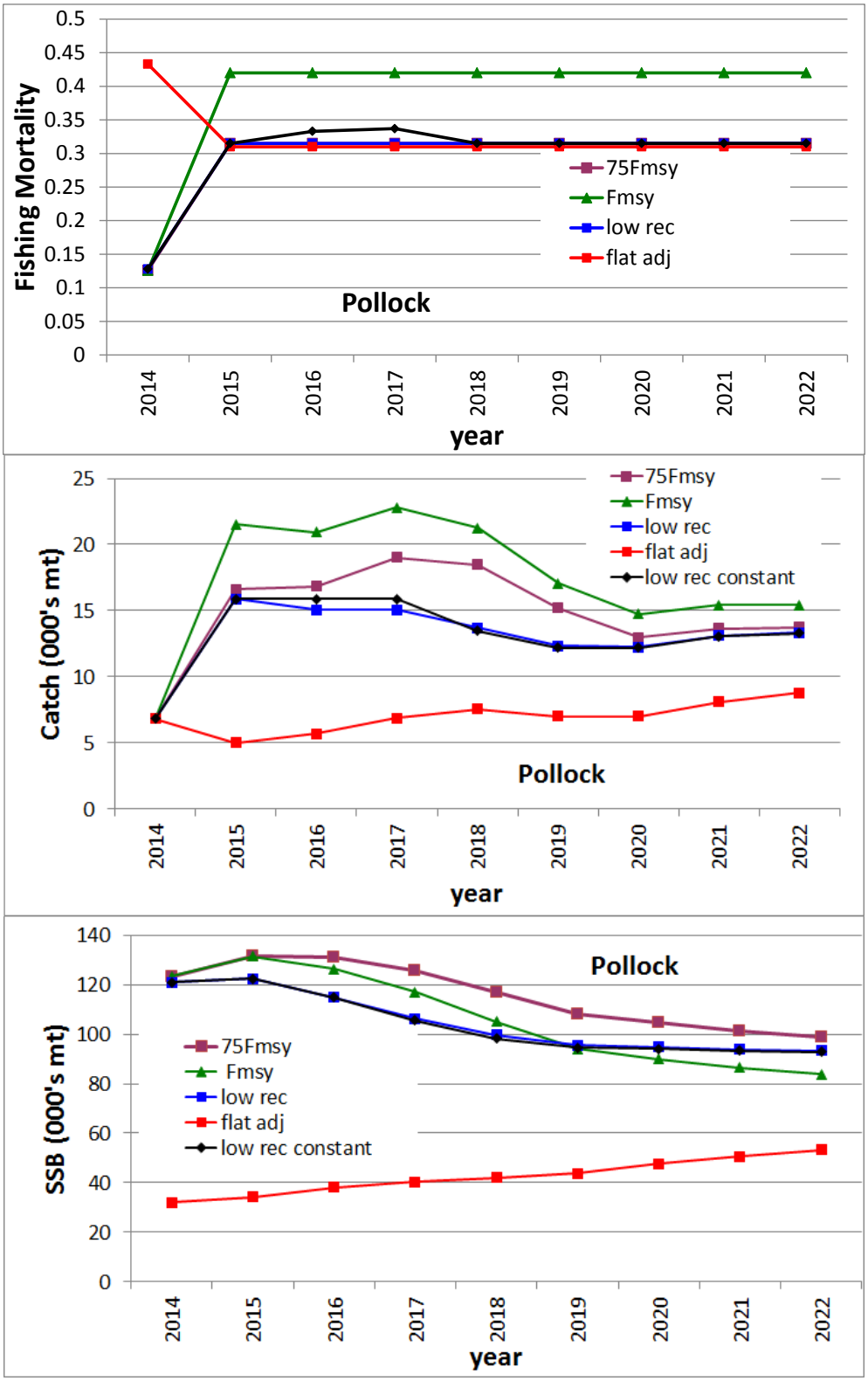


Figure 5- Historical retrospective between the 2014 update and SARC 50 for pollock for SSB and fishing mortality.

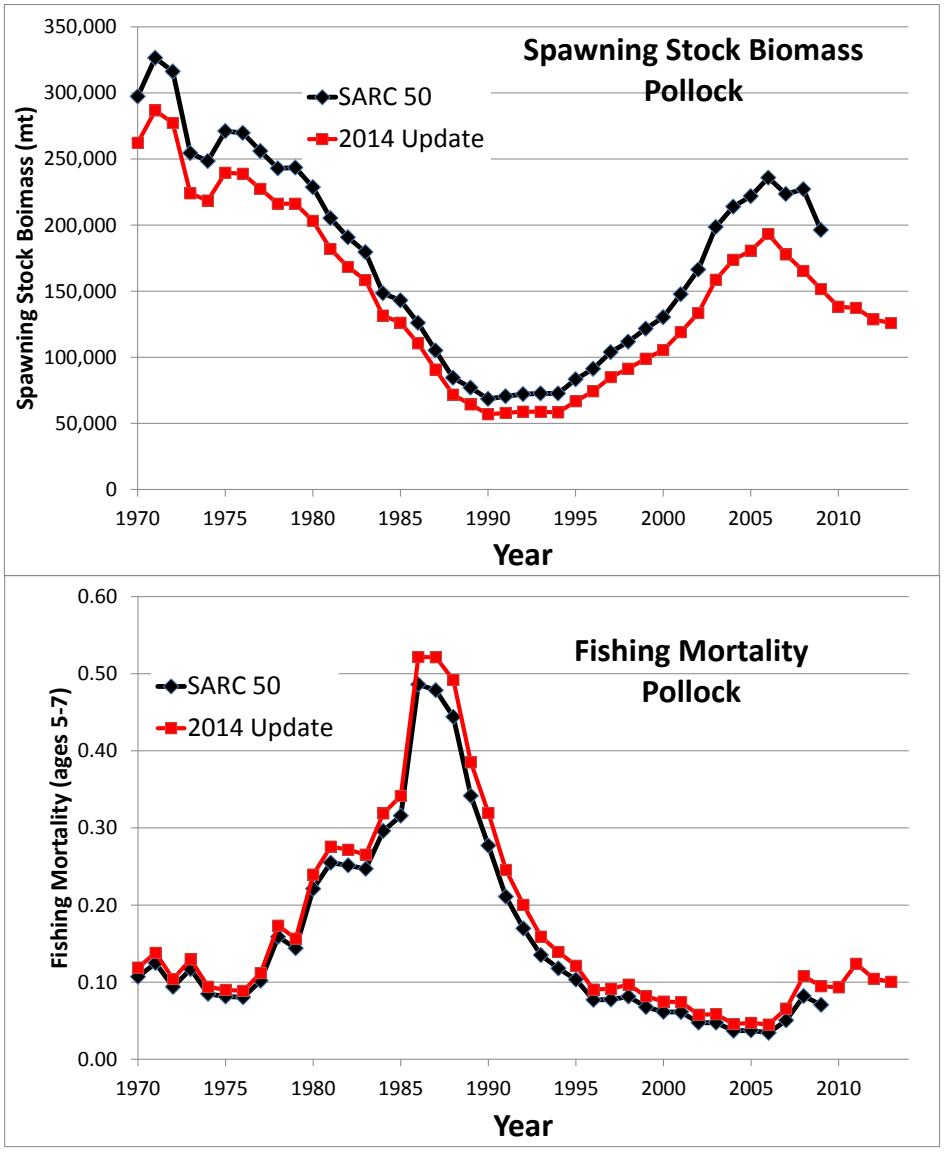
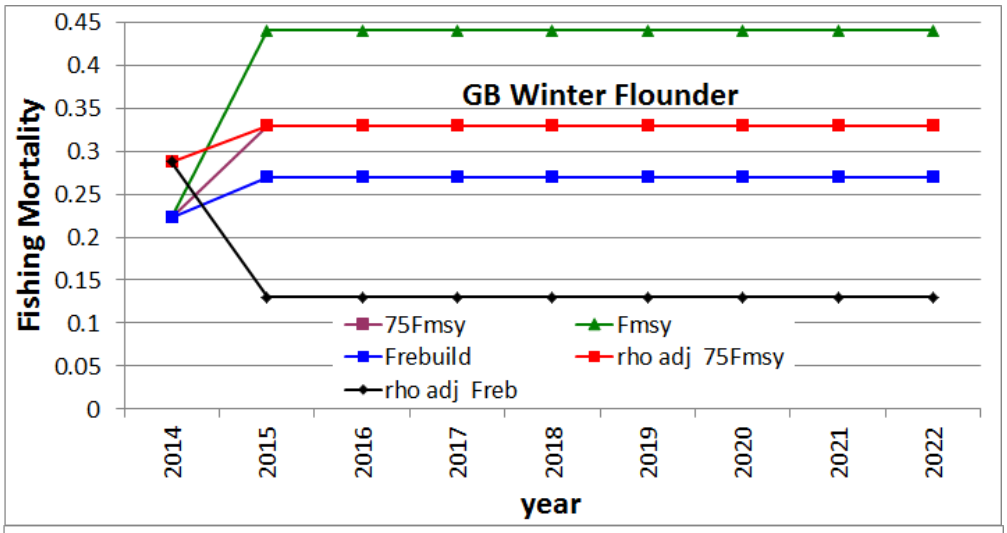
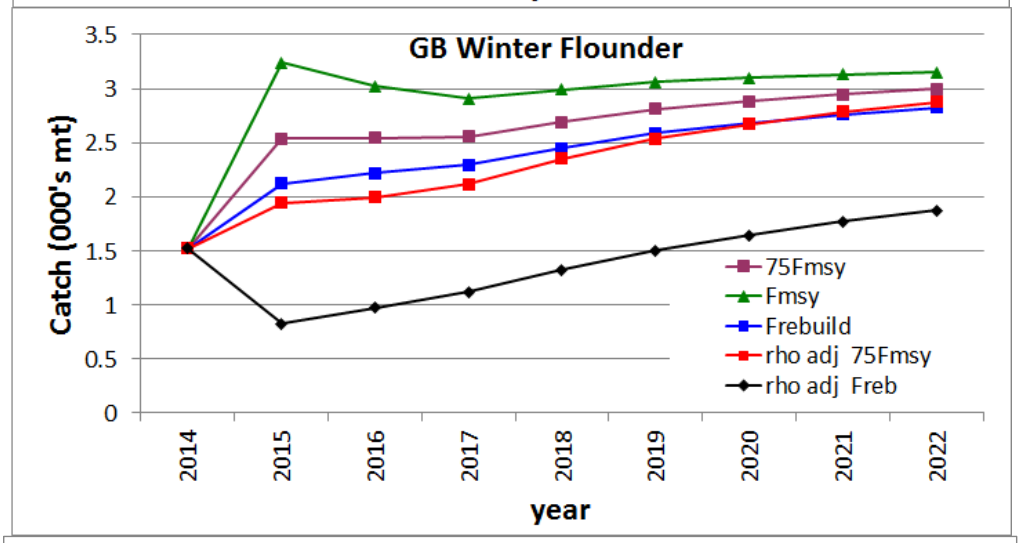


Figure 6- Medians of average F(ages4-6) (top), catch (middle), and SSB (bottom) from the Georges Bank winter flounder 2014 operational assessment update for the base final model at 75%FMSY, FMSY, and Frebuild and a sensitivity projection at 75%FMSY and Frebuild using a rho adjustment.





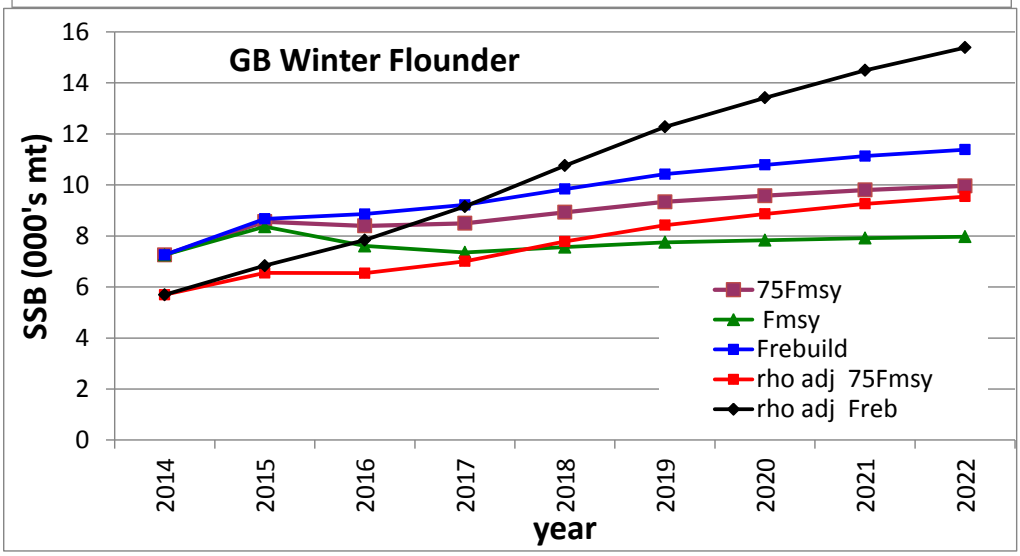


Figure 7- Historical retrospective between the 2014 update and SARC 52 for GB winter flounder for SSB and fishing mortality.

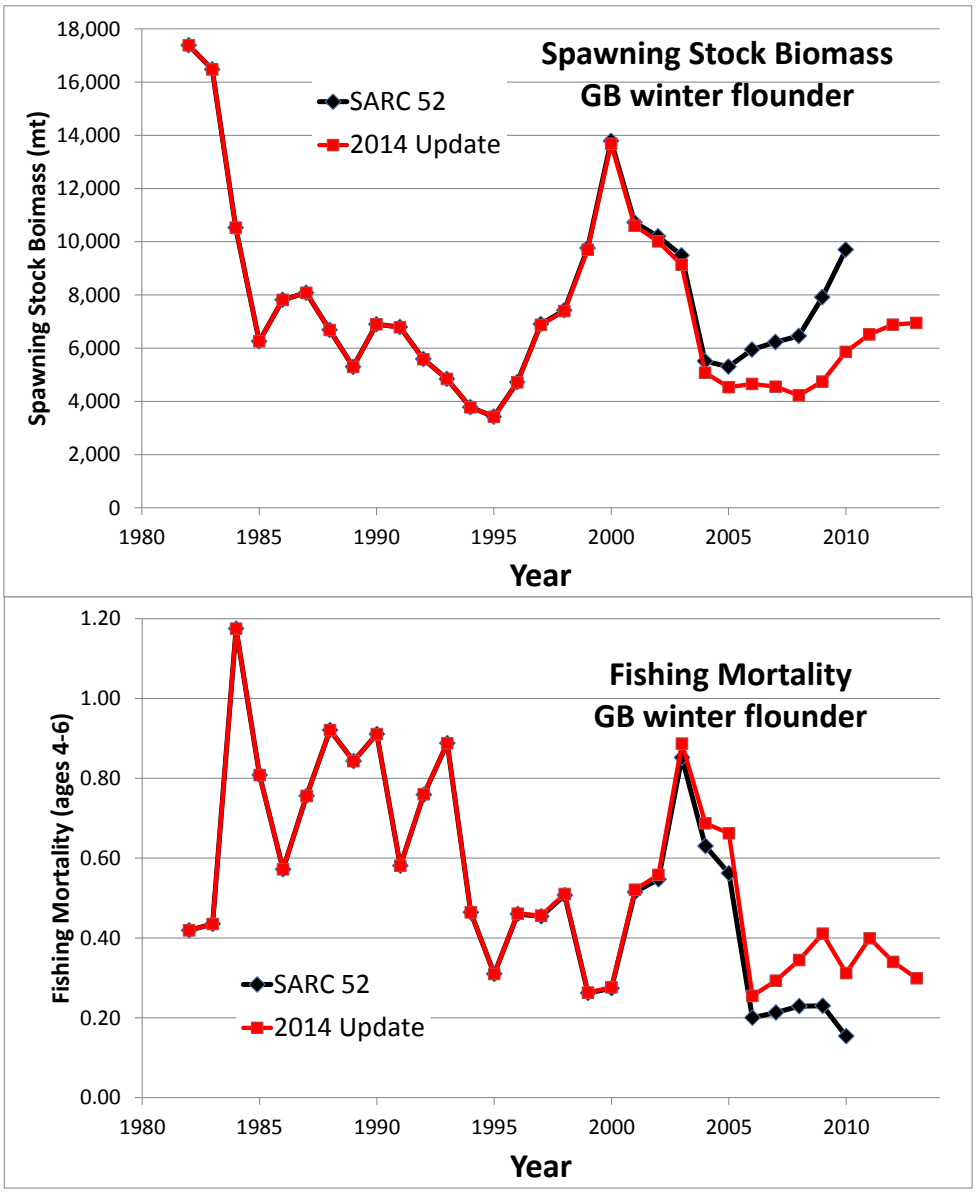


Figure 8- Comparison of catch, historical ABCs, F_{MSY} catch, $75\%F_{MSY}$ catch, and the sensitivity $75\%F_{MSY}$ catch based on Georges Bank yellowtail q=0.27 assumption for Gulf of Maine winter flounder.

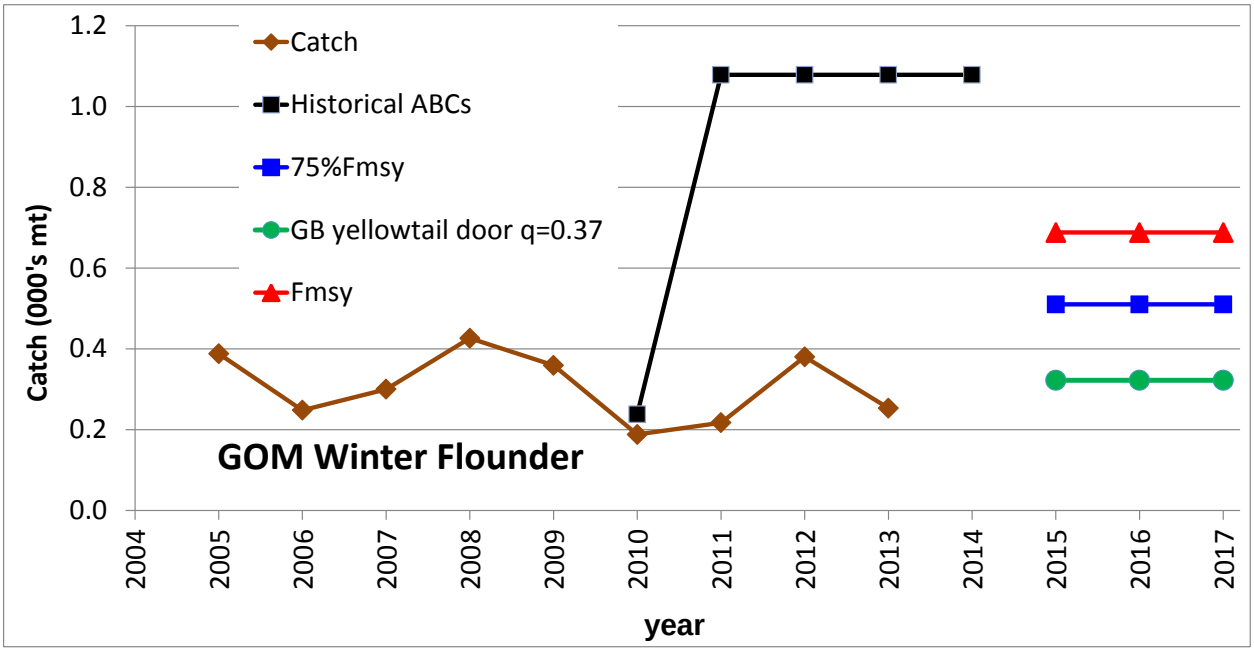
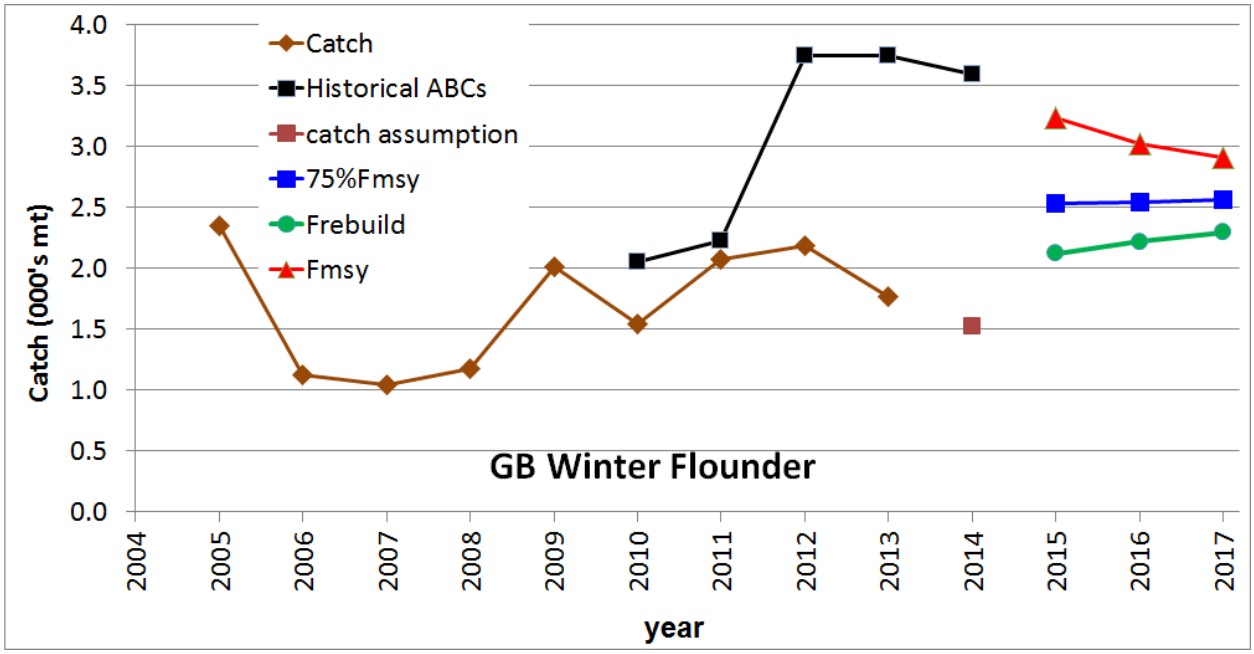


Figure 9- Comparison of catch, 2014 projection catch assumption, historical ABCs, and projected F_{MSY}, $75\%F_{MSY}$, and $F_{Rebuild}$ for Georges Bank winter flounder.



Appendix 1- Estimated calendar year (CY) catches (mt) of pollock for 2014.

Estimated CY 2014 NE Multispecies Pollock Catch (mt)

	ACLs and sub-ACLs; (with accountability measures (AMs))							sub-components: No AMs	
Stock	**Total Groundfish**	Groundfish*	Landings	Discard	Recreational	Herring Fishery	Scallop Fishery	State Water	Other
	A to G	A+B+C	A	B	C	D	E	F	G
Pollock									
2014	6,816.8	4,824.4	4,709.8	114.6				919.6	1,072.8
Jan - Jun 2014	3,540.4	2,764.1	2,717.7	46.4				358.3	418.0
Jul - Dec 2014 (est)	3,276.4	2,060.3	1,992.1	68.2				561.3	654.8

Values in live weight
*Includes estimate of missing dealer reports
Source: Greater Atlantic Regional Fisheries Office
July 30, 2014: Data Dates: July, 2014

Sector/Common Pool:
Jan 2014 - Jun 2014 commercial data from Data Matching and Imputation System
Jul 2014 - Dec 2014 est. = (Jul-Dec CY13 catch)*(May-Jun CY14 catch / May-Jun CY13 catch)

State Water and Other Subcomponent - MRIP a, b1, and b2 weights through April 2014; monthly values of FY14 catch limit for May through Dec.

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting. Differences with previous reports are due to corrections made to the database.

Appendix 2- Estimated calendar year (CY) catches (mt) of GB winter flounder for 2014.

Estimated CY 2014 NE Multispecies GB Winter Flounder Catch (mt)

	ACLs and sub-ACLs; (with accountability measures (AMs))							sub-components: No AMs	
Stock	**Total Groundfish**	Groundfish*	Landings	Discard	Recreational	Herring Fishery	Scallop Fishery	State Water	Other
	A to G	A+B+C	A	B	C	D	E	F	G
GB Winter Flounder									
2014	1,522.1	1,445.9	1,440.9	4.9				0.0	76.2
Jan - Jun 2014	582.2	543.7	541.3	2.4				0.0	38.5
Jul - Dec 2014 (est)	939.9	902.2	899.7	2.5				0.0	37.7

Values in live weight
*Includes estimate of missing dealer reports
Source: NMFS Northeast Regional Office
July 29, 2014: Data Date: July, 2014

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting. Differences with previous reports are due to corrections made to the database.

Sector/Common Pool:
Jan 2013 -Jun 2014 commercial data from Data Matching and Imputation System
Jul-Dec CY14 value = (Jul-Dec CY13 value)*(May-Jun CY14 value / May-Jun CY13 value)

Other Subcomponent - average of FY12 catch (125.9 mt) and CY13 preliminary catch (26.6 mt)