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New England Fishery Management Council

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MEMORANDUM

DATE: October 10th, 2019
TO: Scientific and Statistical Committee
CC: Groundfish Committee
FROM: Groundfish Plan Development Team
SUBJECT: **Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022**

The Groundfish Plan Development Team (PDT) discussed candidate overfishing limits (OFLs) and acceptable biological catches (ABCs) for 14 of the groundfish stocks.

1. Information reviewed included:

- The Council's Risk Policy Road Map (2016), that includes the Risk Policy Statement and Implementation Plan, see pp. 4-5 and 10-12.
- Operational Stock Assessments of 14 Northeast Groundfish Stocks through 2018, including the peer review reports for each stock, version for PDT and SSC meetings (NEFSC, October 2019)
- Supplemental Information: Stock Assessment Support Information (SASINF) - use this link to access the database which include the assessment reports, peer review presentations, additional information and:
http://www.nefsc.noaa.gov/saw/sasi/sasi_report_options.php
- Background: Affected Environment, excerpt from DRAFT Amendment 23/Groundfish Monitoring, NEFMC, October 2019.
- Background: State of the Ecosystem and Current Conditions. NOAA/NEFSC. Available at: <https://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/> and <https://www.nefsc.noaa.gov/ecosys/current-conditions/>
- Memo SSC to Council re OFL and ABC recommendations for groundfish stocks for fishing years 2018-2020, Nov. 30, 2017.
- Memo PDT to SSC re Candidate OFLs and ABCs for groundfish stocks for FY2018-FY2020, Oct. 13, 2017
- Memo from the Groundfish PDT to SSC re candidate halibut OFLs/ABCs for FY2018-FY2020, Dec. 15, 2019
- Memo SSC to Council re OFL and ABC recommendations for Atlantic halibut for fishing years 2018-2020, Jan. 16, 2018.

2. Overview

This memorandum provides information to support FY2020 – FY2022 OFL and ABC recommendations by the SSC for most of the groundfish stocks.

Fourteen groundfish stocks were recently assessed (as listed below) and ten of these stocks were peer reviewed during the 2019 Groundfish Operational Assessments in September 2019, while the remaining four stocks (marked with “*”) were provided by direct delivery to the PDT and SSC as recommended by the Assessment Oversight Panel (i.e., as Level 1 assessments¹). Stocks to review include:

1. Georges Bank Cod*
2. Gulf of Maine Cod
3. Georges Bank Haddock
4. Gulf of Maine Haddock
5. Southern New England/Mid-Atlantic Yellowtail Flounder
6. Cape Cod/Gulf of Maine Yellowtail Flounder
7. Georges Bank Winter Flounder
8. American Plaice
9. Witch Flounder*
10. Pollock
11. White Hake
12. Atlantic Halibut*
13. Gulf of Maine/Georges Bank Windowpane Flounder
14. Southern New England/Mid-Atlantic Windowpane Flounder*

The assessment and peer review report is provided as a separate document and the data in the assessments are not repeated within this memorandum. Generally, these assessments update the data since the last assessment for each stock without changes to the model formulation. However, there are some exceptions, which are documented in the assessment and peer review report.

The PDT did not make specific recommendations for fishing year 2020 to 2022 OFLs/ABCs for each groundfish stock. Rather, the PDT offers some options for the SSC to consider. However, the PDT notes that in general the SSC recommendations following the 2015 updates, with regards to using the straight 75% F_{MSY} projections or constants which were projected to end overfishing, appear to have resulted in lower fishing mortality and improvements in biomass in the 2019 operational models and subsequent projections (Appendix I). GOM cod continues to have slight increases in SSB with lower Fs. However, overfishing is still occurring for GOM cod in 2018. For GB winter flounder overfishing is not occurring but poor recruitment resulted in declines in recent SSB.

¹ For an overview of the process, see https://s3.amazonaws.com/nefmc.org/11_Stock-assessment-process-FINAL.pdf.

Catch projections for FY2020 - FY 2022:

The PDT applied the same approach to catch projections that it used following the 2015 and 2017 operational assessments (see Groundfish PDT memo to the SSC, October 9, 2015² and Groundfish PDT memo to the SSC, October 13, 2017).³

1. For stocks needing a “bridge” year catch to run catch projections, the PDT estimated the CY2019 catches for those groundfish stocks. This information was used in the projections within the 2019 Groundfish Operational Assessments. Detailed catch estimate information for CY2019 is provided in Appendix IV.
2. Projection assumptions followed those approved at the 2019 peer review meeting. In addition, the 2019 peer review requested for some stocks that specific sensitivity projections or additional information be provided by the PDT to the SSC, and those are included in this memorandum and noted as appropriate.
3. Following the SSC’s default ABC control rule, the PDT ran ABC projections at 75% F_{MSY} and $F_{rebuild}$ if necessary. One stock, GOM cod, is not projected to rebuild by the end date of its rebuilding plan, even at $F=0$ at a 50% probability. The PDT uses 75% F_{MSY} to calculate 2020 -2022 OFLs and ABCs. While the SSC is not required to select a new $F_{rebuild}$ at this time, the SSC may choose to develop ABCs under “Option C” of the default ABC control rule. The PDT provides a summary of recent total discards and non-groundfish fishery landings for GOM cod for the purposes of discussion. However, these values do not necessary represent incidental, non-target catch of each stock under the current prevailing operating conditions of the fishery.

The SSC’s default ABC control rule (see Amendment 16):

The ABC control rules will be used in the absence of better information that may allow a more explicit determination of scientific uncertainty for a stock or stocks. If such information is available – that is, if scientific uncertainty can be characterized in a more accurate fashion -- it can be used by the SSC to determine ABCs. These ABC control rules can be modified in a future Council action (an amendment, framework, or specification package):

- a. *ABC should be determined as the catch associated with 75% of F_{MSY} .*
- b. *If fishing at 75% of F_{MSY} 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 ($F_{rebuild}$).*

² Groundfish PDT memo to the SSC re FY2016-FY2018 Groundfish ABCs, dated October 9, 2015. Available at: http://s3.amazonaws.com/nefmc.org/3.5_151009-GF-PDT-memo-to-SSC-re-FY2016-FY2018-Groundfish-ABCs_FINAL.pdf

³Groundfish PDT memo to the SSC re FY2018-FY2020 Groundfish ABCs, dated October 13, 2017. Available at: https://s3.amazonaws.com/nefmc.org/A11_171013-GF-PDT-memo-to-SSC-re-FY2018-FY2020-Groundfish-OFLs-ABCs.pdf

- c. *For stocks that cannot rebuild to B_{MSY} in the specified rebuilding period, even with no fishing, the ABC should be based on incidental bycatch, including a reduction in bycatch rate (i.e., the proportion of the stock caught as bycatch).*
 - d. *Interim ABCs should be determined for stocks with unknown status according to case- by case recommendations from the SSC*
4. For comparison purposes, the PDT ran ABC projections holding the lowest value of 75% F_{MSY} for FY2020- FY2022 projected catches constant for three years. The lowest value is usually the first year in the projection (i.e., 2020), since projections assume mortality targets are achieved which usually results in stock rebuilding within the projections. Past experience and PDT simulation testing using projections and assessments suggest catch and population rebuilding in the projections in the out years (4+ years) are overly optimistic. However, there are 5 stocks (Georges Bank haddock, Gulf of Maine haddock, Cape Cod/Gulf of Maine yellowtail flounder, American plaice, pollock) in which the projected catch and biomass decreased from 2020-2022. These projected decreases are due to relatively large year classes ageing out of the population and being replaced with subsequent poorer year classes - at the end of the time series within the assessment. For these stocks, the PDT used the lowest projected catch (for 2020, 2021 or 2022) to provide an option that increases the uncertainty buffer. However, when using this approach for stocks with the lowest catch in the third year (i.e., 2022), the uncertainty buffer will be greatest in the first year and decrease in the out years.
 5. The PDT calculated corresponding OFLs under #3 and #4 above. OFLs are calculated assuming the ABC was caught in previous years. Therefore, OFLs in 2021 and 2022 depend on ABC choices that are made for 2020 and/or 2021. OFLs in 2020 (calculated from F_{MSY} in 2020) do not change because the 2019 bridge year catch assumption does not change between projections. OFLs for 2021 and 2022 for potential ABC recommendation using the sensitivity runs are not in the tables below. These estimates can be quickly provided depending on the final SSC's decisions with regards to using a constant ABC, or the projected changes in the ABC's using the sensitivity runs. Resulting ABCs from the sensitivity runs are plotted in the catch performance figures (e.g., Figure 2).

Catch Performance

The PDT also provides information on catch performance for each stock in a series of tables and figures (e.g., Table and Figure 1). Tables were added starting in 2017's report in response to feedback from the SSC in 2015. Catch is the calendar year catches from 2005-2018 for each stock. Historical OFLs and ABCs are provided for each fishing year (May 1 start) since 2010. The catch performance information provides calendar year catches from the stock assessments and fishing year ABC's, and therefore that data sources do not temporally align. As an example, this means calendar year 2013 catch exceeding fishing year 2013 ABC does not necessarily mean an overage occurred. However, this misalignment in catch accounting between the stock assessments and management is a source of error. In addition, stocks with update MRIP catch estimates (GOM cod, GB cod, GOM haddock, Pollock) also do not necessarily align with the past calculated OFLs and ABCs. The catch assumption is the calendar 2019 "bridge year" estimated catch used in the assessments (see Appendix IV). F_{MSY} and 75% F_{MSY} and/or $F_{rebuild}$ projections for FY2020- FY2022 are plotted, as appropriate.

Uncertainties

Of the 9 analytical groundfish stock assessments, 8 had a major retrospective pattern that required a rho-adjustment. These stocks include Georges Bank haddock, Gulf of Maine haddock, Pollock, white hake, Georges Bank winter flounder, American plaice, Cape Cod/Gulf of Maine yellowtail flounder, and Southern New England/Mid-Atlantic yellowtail flounder. The analytical model for Gulf of Maine cod (M=0.2 model)⁴ exhibited a major retrospective pattern, and the peer review panel recommended that the PDT provide retrospective adjusted projections as a sensitivity for the SSC to consider. Most assessments which require a retrospective adjustment tend to overestimate the terminal year biomass and underestimate the fishing mortality. One stock, Gulf of Maine haddock had a retrospective adjustment in the opposite direction. The cause of the retrospective bias remains unknown.

Past experience has shown that the projections used to set future catch limits and plan rebuilding strategies do not perform well (i.e., projected catch does not result in the desired fishing mortality, and stock growth does not occur as expected). In 2011, the NEFSC asked the PDT to examine an alternative to using updated assessments for setting FY2012 – FY2014 ABCs. Simulation analyses showed that projections tend to be biased high – that is, they over-estimated stock growth and future catches (Brooks and Legault 2016 and Wiedenmann and Jensen 2017). This work led to the SSC’s implementation of constant ABCs for several groundfish stocks.

Rebuilding Status

GB winter flounder, SNE/MA yellowtail flounder, witch flounder, northern windowpane flounder, and ocean pout have new or revised rebuilding plans since the 2017 assessments. The new rebuilding plans for GB winter flounder, SNE/MA yellowtail flounder, northern windowpane flounder, and ocean pout specified F_{rebuild} at $70\%F_{\text{MSY}}$ until the stock is rebuilt to B_{MSY} . An overview of rebuilding plans for all groundfish stocks resulting from the 2019 assessments is provided in Appendix II while results from 2017 assessments are in Appendix III.

Appendices

This memorandum includes four appendices. An overview of the basis for the most recent SSC ABC recommendations compared to the results of the 2019 assessments is provided in Appendix I. A summary of rebuilding plans as a result of the 2019 groundfish assessments is provided in Appendix II. A summary of the rebuilding plans from the 2017 groundfish assessment is in Appendix III. The PDT’s CY2019 catch estimates for all groundfish stocks are in Appendix IV.

3. OFLs and ABCs by Stock

1. Georges Bank Cod

Georges Bank cod was a level 1 assessment (direct delivery), and as such did not receive an independent peer review in 2019 (outside SSC and PDT review). The time series of recreational catches were updated to account for the change in MRIP methodology. Based on the recommendation of the 2017 peer review, GB cod is overfished, but overfishing is unknown, and

⁴ The M=0.4 M_{ramp} model did not exhibit major retrospective bias so no sensitivity analysis was performed by the PDT.

the 2019 assessment did not recommend a change in the stock status. The stock is in a rebuilding plan with an end date of 2026, but projections are not possible with the current empirical model formulation (PlanBsmooth approach). Stock status was not quantified with the empirical model formulation.

The overfishing limit recommendation in FY2020 from the 2019 peer review is 1,762 mt. The catch advice was derived by multiplying the rate of change in the recent three years of survey biomass (0.936) by the average catch in the three most recent years (1,882mt). The 2017 peer review cautioned that experience suggests that previous recruitment events were not always realized in the fishery. The 2017 peer review further recommended that the SSC’s approach to buffering catch advice in determining an ABC should consider this source of uncertainty.

Without a model to project forward and calculate F_{MSY} or $75\%F_{MSY}$, the PDT provided possible OFLs and ABCs for FY 2020- FY 2022 using a constant approach. As a starting point for SSC discussion of three-year catch advice, 75% of this value (1,762 mt) is 1,322 mt (Table 1). This approach was used by the SSC in 2017.

Table 2 and Figure 1 summarize catch performance and changes in overfishing status for GB cod.

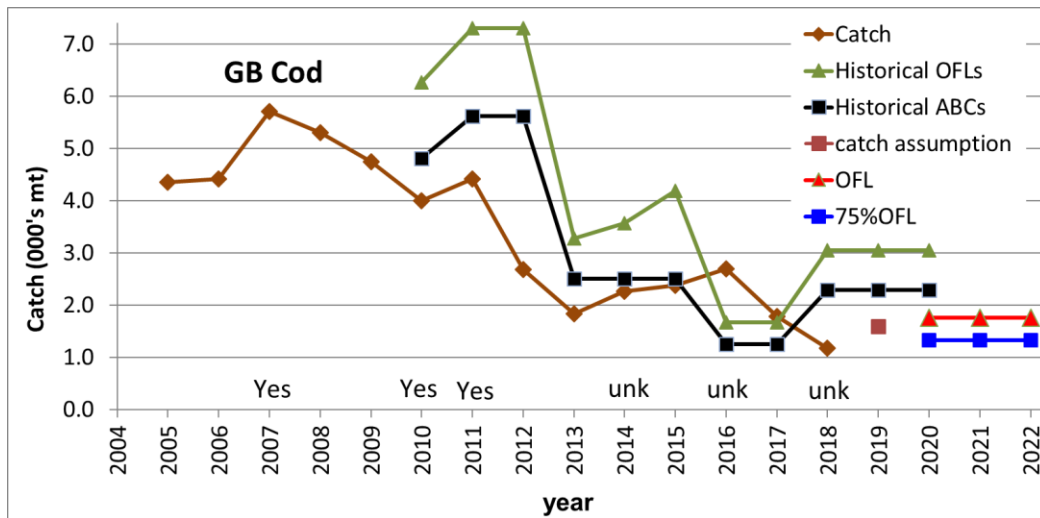
Table 1- Possible OFLs and ABCs (mt) for FY2020- FY2022 for Georges Bank cod, using a constant approach for three years.

year	OFL	ABC
2020	1,762	1,322
2021	1,762	1,322
2022	1,762	1,322

Table 2- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and constant approach for F_{MSY} and $75\%F_{MSY}$ (FY2020-FY2022) for Georges Bank Cod.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	$75\%F_{MSY}$
2010	4,005	6,272	4,812			
2011	4,421	7,311	5,616			
2012	2,681	7,311	5,616			
2013	1,828	3,279	2,506			
2014	2,267	3,570	2,506			
2015	2,380	4,191	2,506			
2016	2,690	1,665	1,249			
2017	1,782	1,665	1,249			
2018	1,176	3,047	2,285			
2019		3,047	2,285	1,599		
2020		3,047	2,285		1,762	1,322
2021					1,762	1,322
2022					1,762	1,322

Figure 1- Catch performance for Georges Bank cod including: catches from CY2005- CY2018, historical OFLs and ABCs since FY 2010, CY 2019 “bridge year” catch assumption, and constant approach FY2020-FY2022 OFL and 75%OFL. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “unk” = unknown overfishing status).



2. Gulf of Maine Cod

Based on the recommendation of the 2019 peer review, GOM cod is overfished and overfishing is occurring. GOM cod is in a rebuilding plan with a rebuild by date of 2024. GOM cod is projected to rebuild with a 1% probability with $F=0$ under the $M=0.2$ model and cannot rebuild under the M_{ramp} model in the projections. Recruitment remains at low levels at the end of the time series and the 2019 peer review states that recent low recruitment compromises the rebuilding potential of the stock. The time series of recreational catches were updated to account for the change in MRIP methodology. A retrospective adjustment was not applied to the terminal year of the assessment, but the $M=0.2$ does have a retrospective pattern and the $M=0.2$ model with the rho adjustment is provided by the PDT to the SSC as a sensitivity at the request of the 2019 peer review. Catch projections are provided for FY2020- FY2022 under F_{MSY} and $75\%F_{MSY}$ for the $M=0.2$ model (Table 4) and M_{ramp} model (Table) under all scenarios ($M=0.2$ model rho adjustment and unadjusted; M_{ramp} model $M=0.2$ and 0.4) as recommended by the 2019 peer review. The peer review stated that “there is no basis to support the M_{ramp} model with $M=0.2$ projection because there is no reason to believe the natural mortality rate would immediately return to 0.2 and doing so artificially increases the rebuilding rate of the population.”

Table 6 and Figure 2 summarize catch performance and changes in overfishing status for GOM cod.

The M_{ramp} projection assuming $M=0.2$ are in grayed out italic since the peer review has concerns with using this natural mortality assumption in the projections. For clarity, the estimated candidate $75\%F_{MSY}$ constant ABC values from three projections for the two assessment models are boxed out in table 6. The peer review did not recommend averaging across projections to derive an ABC.

The GOM cod rebuilding plan, as revised in 2014 by Framework Adjustment 51, initially $F_{rebuild}$ to $75\%F_{MSY}$. The rebuilding plan also stated that if rebuilding progress is not made, $F_{rebuild}$ could be set lower than $75\%F_{MSY}$, and associated catch limits would be set based on that $F_{rebuild}$.

For stocks that cannot rebuild to B_{MSY} in the specified rebuilding period, even with no fishing ($F=0$), the SSC’s default ABC control rule states that the ABC should be based on incidental bycatch, including a reduction in bycatch rate (i.e., the proportion of the stock caught as bycatch).

In 2014 at the request of the SSC, the PDT discussed, completed analyses, and reviewed work regarding incidental, non-target catch of GOM cod under the current prevailing/operating conditions of the fishery. The PDT concluded⁵ that the SSC’s question regarding incidental non-target catch of GOM cod is difficult to answer, because it is conditional on multiple factors, including:

- The groundfish ACLs in a given fishing year;
- The availability of cod and exploitable stock biomass;
- The variation in definitions of a targeted cod trip (e.g., on a tow-by-tow basis rather than trip-by-trip; across gear types and vessel sizes; by the portfolio of groundfish Annual Catch Entitlement available to sectors over the course of a fishing year);
- The willingness/ability of the fishery to change fishing practices to avoid cod;
- The multispecies nature of the fishery; and
- The ability to define which components of the fishery are actively targeting cod.

Given that this stock is not projected to rebuild under $F=0$, the SSC could decide to develop ABCs under “Option C” of the default ABC control rule, Table 3 summarizes total discards (in all fisheries) and non-groundfish landings for GOM cod. Recreational discards are based on post-calibration MRIP data consistent with the updated stock assessment. It is important to note that these values do not necessary represent incidental, non-target catch of each stock under the current prevailing operating conditions of the fishery. The three-year average of discards and non-groundfish landings for GOM cod is 450 mt. Projected catch for FY2020, under all calculated scenarios for $75\%F_{MSY}$, ranges from 526 mt to 843 mt, and is higher than the bycatch estimate (450 mt).

Table 3- Summary of total discards (in all fisheries) and non-groundfish landings for GOM cod. Source: 2019 Gulf of Maine cod stock assessment and FY2016 – FY2018 year-end catch reports.

	FY2016 (mt)			FY2017 (mt)			FY2018 (mt)			Average of totals
	Total Discards	Other landings	2016 Total	Total Discards	Other landings	2017 Total	Total Discards	Other landings	2018 Total	
Total	347.8	5.7	353.5	635.6	22.7	658.3	335.8	3.7	339.5	450.4
<i>Commercial</i>	13.8	-	-	25.6	-	-	9.8	-	-	-
<i>Recreational</i> ⁶	334	-	-	610	-	-	326	-	-	-

Sources:

⁵ From the PDT to the SSC memo re Gulf of Maine cod incidental catch, dated October 16, 2014.

⁶ Recreational discards are for calendar years.

Recreational discards from 2019 Assessment for Gulf of Maine cod, and based on updated MRIP data.
 Commercial discards and Other landings from the following Year-End Reports:

FY2016 Year End Report:

https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sector_Monitoring/FY16_Mults_Catch_Estimates.pdf

FY2017 Year End Report:

https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sector_Monitoring/FY17_Mults_Catch_Estimates.pdf

FY2018 Year End Report: (*personal communication*, GARFO, October 7, 2019)

Table 4 -Projection results from the M=0.2 model for Gulf of Maine cod.

			M=0.2 model					
			No retro adjustment			Retrospective adjustment		
			Catch (mt)	Spawning stock biomass (mt)	F _{full}	Catch (mt)	Spawning stock biomass (mt)	F _{full}
Harvest strategy	Year	Input						
F_{MSY}	2018	Model result	753	3,752	0.188	753	3,752	0.188
	2019	Assumed catch	710	4,732	0.144	710	3,074	0.225
	2020	Projection	1,102	6,276	0.173	689	3,947	0.173
	2021	Projection	1,440	8,064	0.173	912	5,127	0.173
	2022	Projection	1,813	10,673	0.173	1,160	6,828	0.173
75% F_{MSY}	2018	Model result	753	3,752	0.188	753	3,752	0.188
	2019	Assumed catch	710	4,732	0.144	710	3,074	0.225
	2020	Projection	843	6,327	0.13	526	3,979	0.13
	2021	Projection	1,134	8,355	0.13	718	5,309	0.13
	2022	Projection	1,461	11,298	0.13	935	7,288	0.13

Table 5- Projection results from the M-ramp model for Gulf of Maine cod.

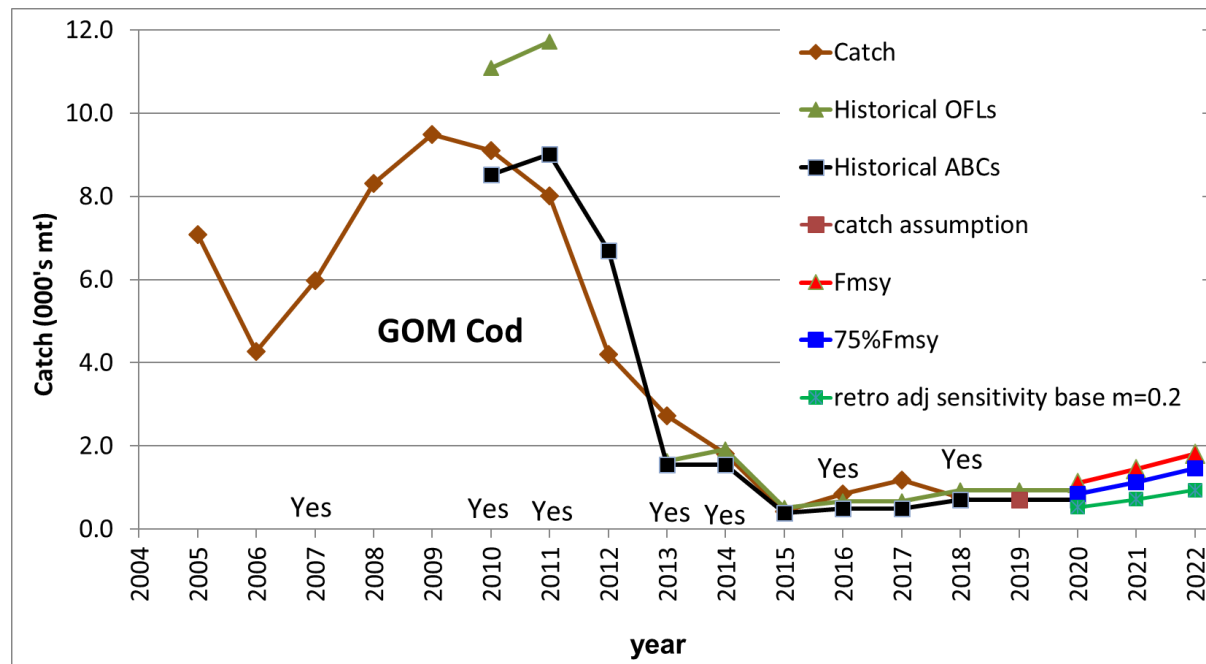
Harvest strategy	Year	Input	M-ramp model					
			M=0.2 (M decreases to 0.2)			M=0.4 (M remains at 0.4)		
			Catch (mt)	Spawning stock biomass (mt)	F _{full}	Catch (mt)	Spawning stock biomass (mt)	F _{full}
F _{MSY}	2018	Model result	753	3,838	0.198	753	3,838	0.198
	2019	Assumed catch	710	4,326	0.171	710	4,103	0.189
	2020	Projection	1,027	6,112	0.175	758	4,719	0.175
	2021	Projection	1,469	8,547	0.175	893	5,461	0.175
	2022	Projection	1,995	11,927	0.175	1,010	6,415	0.175
F _{MSY} 75%	2018	Model result	753	3,838	0.198	753	3,838	0.198
	2019	Assumed catch	710	4,326	0.166	710	4,103	0.183
	2020	Projection	782	6,159	0.131	577	4,756	0.131
	2021	Projection	1,150	8,822	0.131	698	5,637	0.131
	2022	Projection	1,596	12,548	0.131	807	6,738	0.131

Table 6- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 75%F_{MSY} (FY2020-FY2022) for Gulf of Maine Cod. Peer review suggested not to use the Mramp projects at m=0.2 for catch advice in grayed out italics. Numbers in the boxes are candidate constant ABC for the peer review suggested projections.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	<i>M=0.2</i>			<i>Mramp</i> M=0.2	<i>Mramp</i> M=0.2	<i>Mramp</i> M=0.4	<i>Mramp</i> M=0.4
					F _{MSY}	75%F _{MSY}	<i>Rho adj</i> 75%F _{MSY}				
2010	9,100	11,089	8,530								
2011	8,007	11,715	9,012								
2012	4,204		6,700								
2013	2,723	1,635	1,550								
2014	1,806	1,917	1,550								
2015	420	514	386								
2016	850	667	500								
2017	1,171	667	500								
2018	753	938	703								
2019		938	703	710							
2020		938	703		1,102	843	526	1,027	782	758	577
2021					1,440	1,134	718	1,469	1,150	893	698
2022					1,813	1,461	935	1,995	1,596	1,010	807

Figure 2- Catch performance for Gulf of Maine cod including: catches from CY2005- CY2018, historical OFLs and ABCs since FY 2010, CY 2019 “bridge year” catch assumption, and projections for FY2020- FY2022 (using the M=0.2 model) F_{MSY}, 75%F_{MSY}, and a sensitivity for 75%F_{MSY} with a retrospective adjustment. Overfishing status in the terminal year of

the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “unk” = unknown overfishing status).



3. Georges Bank Haddock

Based on the recommendation of the 2019 peer review, GB haddock is not overfished and overfishing is not occurring. GB haddock was rebuilt in 2010. A retrospective adjustment was applied to the terminal year of the assessment. Catch projections are provided for FY2020-FY2022 under 75% F_{MSY} (Table 7) and for comparison by holding the lowest value of 75% F_{MSY} for FY2020-FY2022 projected catches constant for three years (Table 8). In either scenario, projected SSB is well above the SSB_{MSY} target in any year (138,924 mt). The projections follow the guidance provided by the 2019 peer review. The projections use the 5 most recent years of data to estimate the maturity ogive. The fishery selectivity in the projections follows the recent 5-year average, with the exception of the 2013 year class, which was assigned the same selectivity as the 2010 year class. Mean weights at age were projected as a recent 2-year average, with the exception of the 2010 and 2013 year classes, where recent growth trends were expected to continue. An additional adjustment of the size of the record high 2013 year class was not made in the 2019 projections.

Table 8, Figure 3, and Table 9 summarize catch performance and changes in overfishing status for GB haddock.

Table 7- Possible OFLs and ABCs (mt) for FY2020- FY2022 for Georges Bank haddock, under 75% F_{MSY} projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	184,822	145,367	0.36	594,412
2021	116,883	90,337	0.36	549,918
2022	114,925	88,856	0.36	470,979

Table 8- Comparison OFLs and ABCs (mt) for FY2020- FY2022 for Georges Bank haddock, holding the lowest value of 75% F_{MSY} for FY 2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

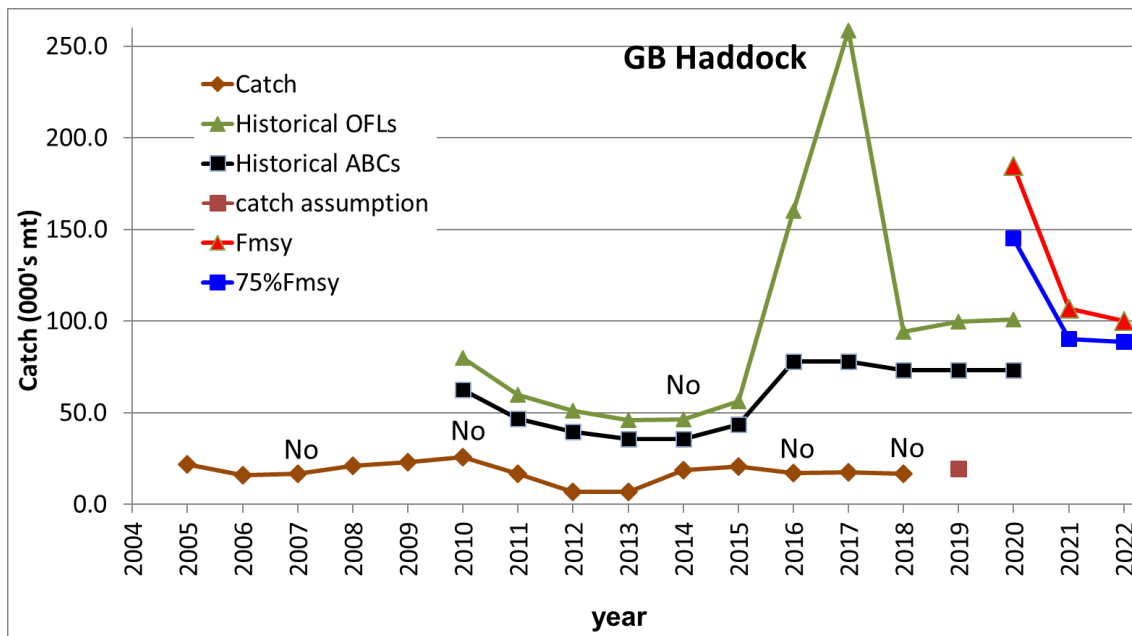
year	OFL	ABC	F	SSB
2020	184,822	88,856	0.21	611,549
2021	130,773	88,856	0.31	611,849
2022	129,580	88,856	0.31	532,886

Table 9- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 75% F_{MSY} (FY2020-FY2022) for Georges Bank haddock.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	75% F_{MSY}
2010	25,903	80,007	62,515			
2011	16,670	59,948	46,784			
2012	6,935	51,150	39,846			
2013	6,828	46,185	35,783			
2014	18,601	46,268	35,699			
2015	20,687	56,293	43,606			
2016	17,274	160,385	77,898			
2017	17,387	258,691	77,898			
2018	16,647	94,274	73,114			
2019		99,757	73,114	19,455		
2020		100,825	73,114		184,822	145,367
2021					106,805	90,337
2022					100,009	88,856

Figure 3- Catch performance for Georges Bank haddock including: catches from CY2005-CY2018, historical OFLs and ABCs since FY2010, CY 2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY} and 75% F_{MSY}

75%F_{MSY}. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “unk” = unknown overfishing status).



4. Gulf of Maine Haddock

Based on the recommendation of the 2019 peer review, GOM haddock is not overfished and overfishing is not occurring. GOM haddock was rebuilt in 2011. Catch projections are provided for FY2020- FY2022 under 75%F_{MSY} (Table 10) and for comparison by holding the lowest value of 75% F_{MSY} for FY2020- FY2022 projected catches constant for three years (Table 11).

In either scenario, projected SSB is far beyond the 2019 SSB_{MSY} target of 7,993 mt or even the 95th percentile of SSB_{MSY} at 34,191 mt, since the lowest projected SSB in 2022 is 60,503 mt.

The time series of recreational catches were updated to account for the change in MRIP methodology. Biomass is expected to decline in the future as the record high 2013 year class ages in the projections. The peer review panel noted that the magnitude of the 2014-2017 year classes are estimated be close to the long term average. A 75%F_{MSY} sensitivity projection that did not adjust for the retrospective pattern is provided in Table 12 as recommended by the 2019 peer review.

Table 12 and Figure 4 summarize catch performance and changes in overfishing status for GOM haddock.

Table 10- Possible OFLs and ABCs (mt) for FY2020- FY2022 for Gulf of Maine haddock, under 75%F_{MSY} projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	25,334	19,696	0.28	94,793
2021	21,521	16,794	0.28	73,776
2022	14,834	11,526	0.28	60,503

Table 11- Comparison OFLs and ABCs (mt) for FY2020- FY2022 for Gulf of Maine haddock, holding the lowest value of 75% F_{MSY} for FY 2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

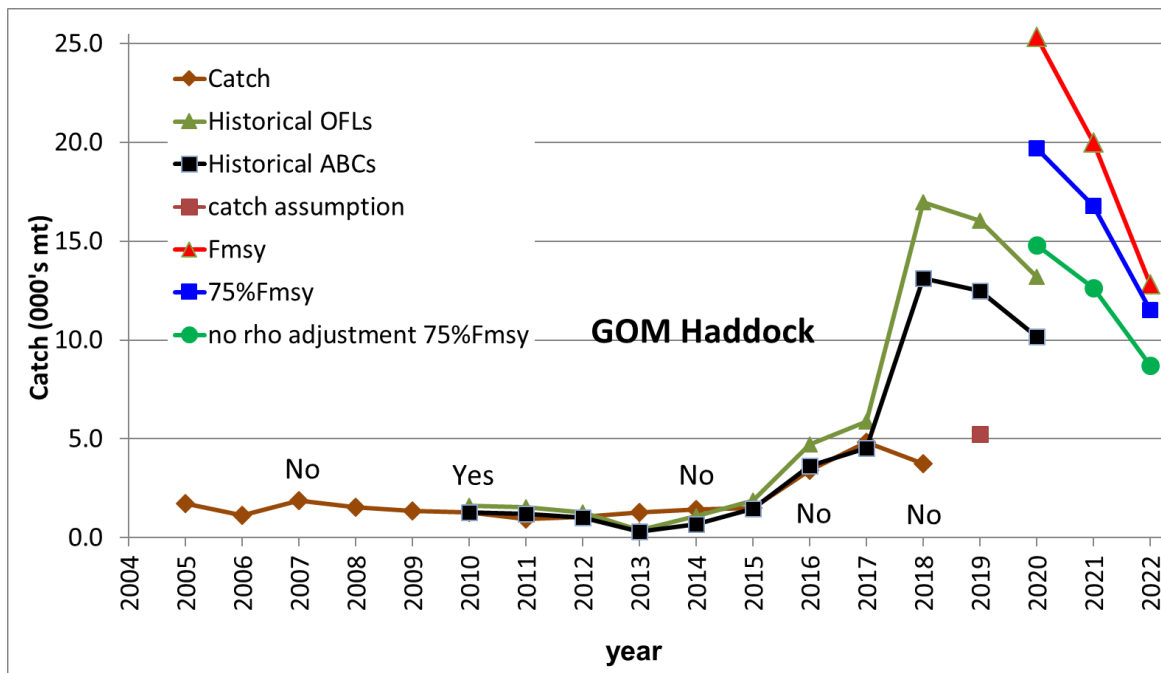
year	OFL	ABC	F	SSB
2020	25,334	11,526	0.16	97,150
2021	23,709	11,526	0.17	83,044
2022	17,945	11,526	0.23	73,542

Table 12- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 75% F_{MSY} (FY2020-FY2022) for Gulf of Maine haddock.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	75% F_{MSY}	no rho adj 75% F_{MSY}
2010	1,295	1,617	1,265				
2011	926	1,536	1,206				
2012	1,060	1,296	1,013				
2013	1,277	371	290				
2014	1,412	1,085	677				
2015	1,513	1,871	1,454				
2016	3,406	4,717	3,630				
2017	4,843	5,873	4,534				
2018	3,731	16,954	13,131				
2019		16,038	12,490	5,239			
2020		13,200	10,186		25,334	19,696	14,800
2021					19,996	16,794	12,634
2022					12,811	11,526	8,700

Figure 4- Catch performance for Gulf of Maine haddock including: catches from CY2006- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY} and

75%F_{MSY}. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “unk” = unknown overfishing status).



5. Southern New England/Mid-Atlantic Yellowtail Flounder

Based on the recommendation of the 2019 peer review, SNE/MA yellowtail flounder is overfished and overfishing is not occurring, which is a change in status from the 2017 assessment that concluded that overfishing was occurring. A retrospective adjustment was applied to the terminal year of the assessment. The stock is in a rebuilding plan, with a rebuilding end date of 2029. According to the 2019 assessment, rho-adjusted SSB in 2018 (90mt) is only 5% of the biomass target (SSB_{msy} proxy = 1,779mt). Under 70%F_{MSY} the stock is projected to rebuild by 2029 with a 72% probability. The review panel stated that “Recruitment continues to be at record lows and estimates of the current stock are 20% of what they were the mid-1990s when it was considered to be collapsed. Trying to conduct a survey or an analytical assessment for a stock in this depleted state is challenging.” Catch projections are provided for FY2020- FY2022 at 70%F_{MSY} (Table 13) and for comparison by holding the lowest value of 70% F_{MSY} for FY2020- FY2022 projected catches constant for three years (Table 14).

Table 15 and Figure 5 summarize catch performance and changes in overfishing status for SNE/MA yellowtail flounder.

Table 13- Possible OFLs and ABCs (mt) for FY2020- FY2022 for Southern New England/Mid-Atlantic yellowtail flounder, under 70%F_{MSY} projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	31	22	0.25	114
2021	71	51	0.25	418
2022	178	128	0.25	914

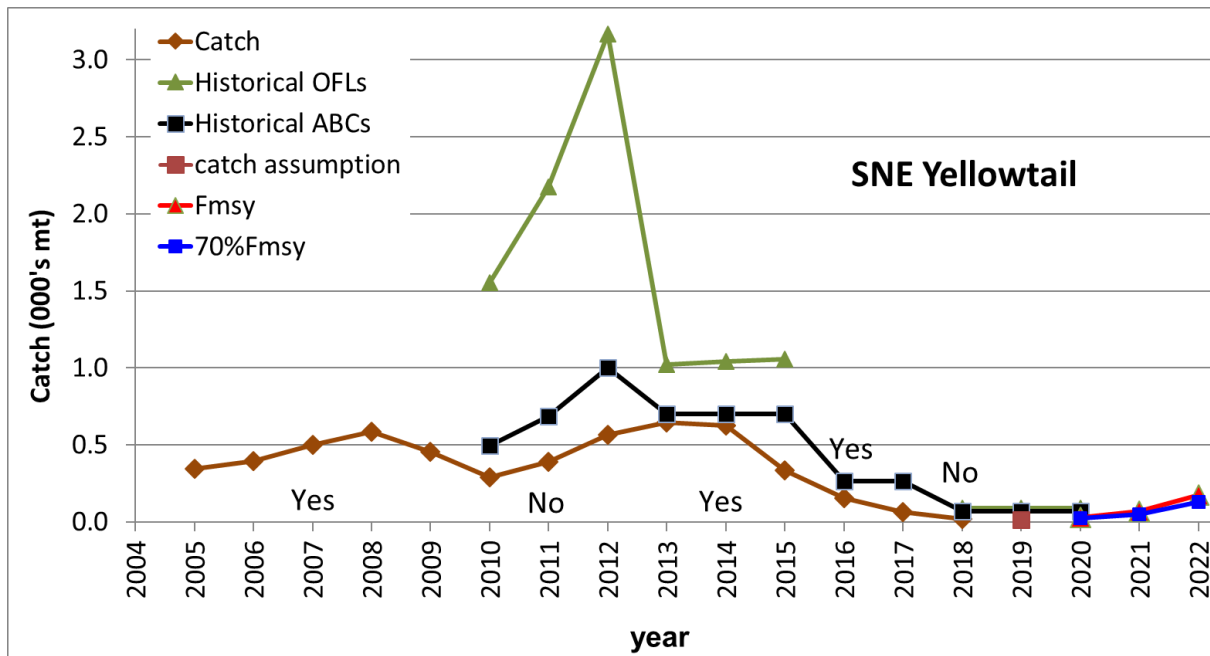
Table 14- Comparison OFLs and ABCs (mt) for FY 2020- FY2022 for Southern New England/Mid-Atlantic yellowtail flounder, holding the lowest value of 70% F_{MSY} for FY 2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	31	22	0.25	114
2021	71	22	0.10	428
2022	184	22	0.04	982

Table 15- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 70%F_{MSY} (FY2020-FY2022) for Southern New England/Mid-Atlantic yellowtail flounder.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F _{MSY}	70%F _{MSY}
2010	291	1,553	493			
2011	388	2,174	687			
2012	563	3,166	1,003			
2013	646	1,021	700			
2014	625	1,042	700			
2015	337	1,056	700			
2016	152	undefined	267			
2017	64	undefined	267			
2018	19	undefined	68			
2019		undefined	68	16		
2020		undefined	68		31	22
2021					69	51
2022					173	128

Figure 5- Catch performance for Southern New England/Mid-Atlantic yellowtail flounder including: catches from CY2005- CY2018, historical OFLs and ABCs since FY 2010, CY 2019 “bridge year” catch assumption, and projections for FY2020 FY 2022 at F_{MSY} and $70\%F_{MSY}$. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No”= not overfishing, and “unk” = unknown overfishing status).



6. Cape Cod/Gulf of Maine Yellowtail Flounder

Based on the 2019 peer review, CC/GOM yellowtail flounder is not overfished and overfishing is not occurring. This is a change in status from the 2017 assessments, which concluded that that stock was overfished, and overfishing was occurring. CC/GOM yellowtail flounder is in a rebuilding plan with a rebuild by date of 2023, and in 2018 SSB was at 62% of the SSB_{MSY} target and is on schedule to rebuild. A retrospective adjustment was applied to the terminal year of the assessment. The 2019 peer review stated “there are major diagnostic problems with the assessment (e.g., major retrospective pattern, apparent problems with estimates of scale, residual patterns), the updated assessment has some improvements from the 2017 update assessment. The assessment shows that the VPA is getting closer to the Bigelow swept-area biomass time series in the most recent 2 years. The retrospective pattern is also improving.” Catch projections are provided for FY2020- FY2022 at $75\%F_{MSY}$ (Table 16) and for comparison by holding the lowest value of $75\% F_{MSY}$ for FY2020- FY2022 projected catches constant for three years (Table 17).

Table 18 and Figure 6 summarize catch performance and changes in overfishing status for CC/GOM yellowtail flounder

Table 16- Possible OFLs and ABCs (mt) for FY2020- FY2022 for Cape Cod/Gulf of Maine yellowtail flounder, under 75%F_{MSY} projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	1136	881	0.24	3577
2021	1061	823	0.24	3318
2022	1103	852	0.24	3461

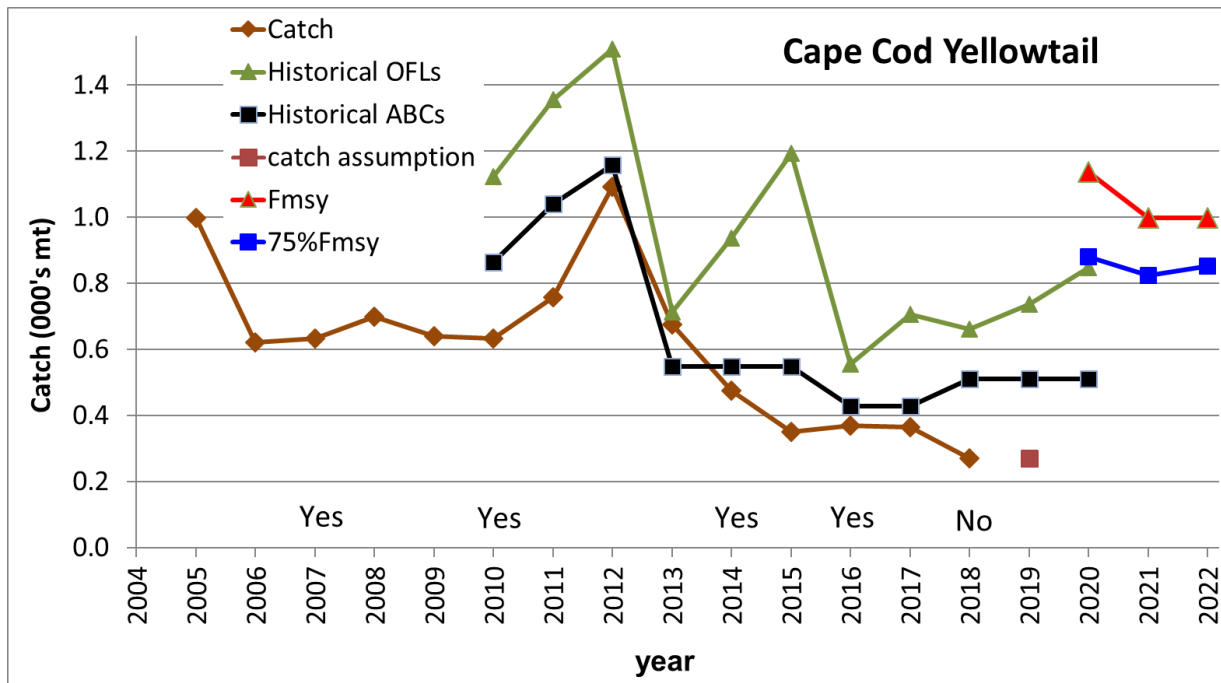
Table 17- Comparison OFLs and ABCs (mt) for FY2020- FY2022 for Cape Cod/Gulf of Maine yellowtail flounder, holding the lowest value of 75% F_{MSY} for FY2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	1136	823	0.22	3602
2021	1076	823	0.24	3373
2022	1116	823	0.23	3529

Table 18- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 75%F_{MSY} (FY2020-FY2022) for Cape Cod/Gulf of Maine yellowtail flounder.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F _{MSY}	75%F _{MSY}
2010	633	1,124	863			
2011	758	1,355	1,041			
2012	1,092	1,508	1,159			
2013	676	713	548			
2014	475	936	548			
2015	351	1,194	548			
2016	368	555	427			
2017	365	707	427			
2018	271	662	511			
2019		736	511	271		
2020		848	511		1,136	881
2021					997	823
2022					999	852

Figure 6- Catch performance for Cape Cod/Gulf of Maine yellowtail flounder including: catches from CY2005- CY2018, historical OFLs/ABCs since FY2010, CY2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY} and $75\%F_{MSY}$. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “unk” = unknown overfishing status).



7. American Plaice

Based on the 2019 peer review, American plaice is not overfished and overfishing is not occurring. A retrospective adjustment was applied to the terminal year of the assessment. The rho adjusted SSB in 2018 (17,748mt) is greater than SSB_{MSY} (15,293mt). American plaice was previously in a rebuilding plan with a rebuild by date of 2024, but the stock is now rebuilt in the 2019 assessment. Projections are provided for FY2020- FY2022 under $75\%F_{MSY}$ (Table 19), and by holding the lowest value of $75\% F_{MSY}$ for FY2020- FY2022 projected catches constant for three years (Table 20). Biomass (and catch) is projected to decrease as the large 2013 year class ages out of the population and is replaced with recent year classes that are estimated to be below average.

Table 21 and Figure 7 summarize catch performance and changes in overfishing status for American plaice.

Table 19- Possible OFLs and ABCs (mt) for FY2020- FY2022 for American plaice, under $75\%F_{MSY}$ projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	4,084	3,155	0.19	18,020
2021	3,740	2,881	0.19	16,875
2022	3,687	2,825	0.19	16,911

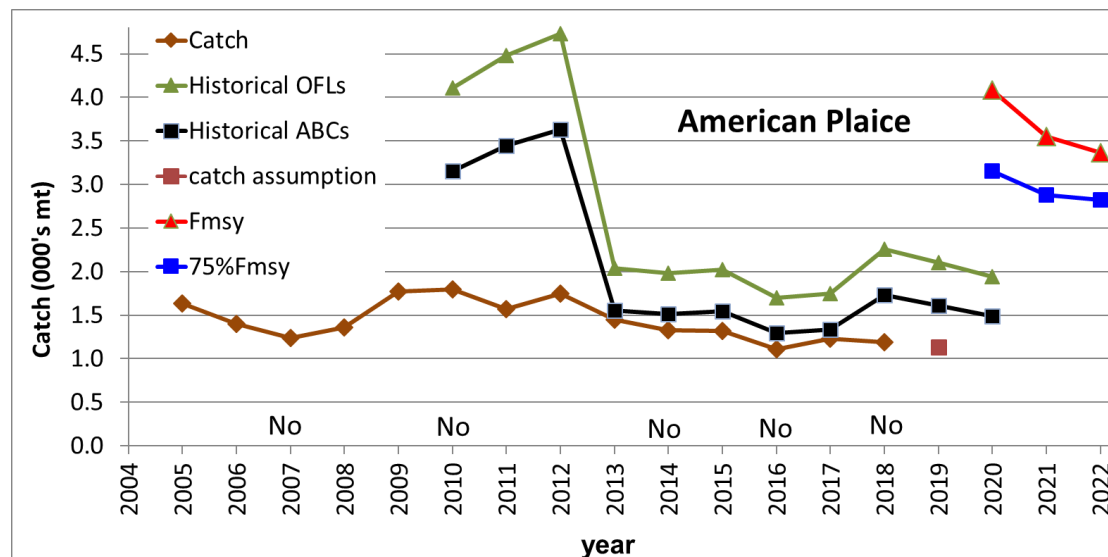
Table 20- Comparison OFLs and ABCs (mt) for FY2020- FY2022 for American plaice, holding the lowest value of 75% F_{MSY} for FY2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	4,084	2825	0.17	18,101
2021	3,806	2825	0.19	17,202
2022	3,753	2825	0.19	17,267

Table 21 - Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY}, and 75%F_{MSY}(FY2020-FY2022) for American plaice.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F _{MSY}	75%F _{MSY}
2010	1,795	4,110	3,156			
2011	1,569	4,483	3,444			
2012	1,747	4,727	3,632			
2013	1,449	2,035	1,557			
2014	1,328	1,981	1,515			
2015	1,316	2,021	1,544			
2016	1,108	1,695	1,297			
2017	1,226	1,748	1,336			
2018	1,192	2,260	1,732			
2019		2,099	1,609	1,131		
2020		1,945	1,492		4,084	3,155
2021					3,547	2,881
2022					3,367	2,825

Figure 7- Catch performance for American plaice including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY}, and 75%F_{MSY}. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “unk” = unknown overfishing status).



8. Witch Flounder

Witch flounder was a tier 1 assessment (direct delivery), and as such did not receive a peer review in 2019. Based on the 2017 peer review, witch flounder was overfished and overfishing was unknown. The 2019 assessment did not recommend a change to the stock status. Witch flounder is in a rebuilding plan with a rebuild by date of 2043, but projections are not possible with the current empirical model formulation nor do quantitative estimates of biological reference points exist.

Catchability values for the NEFSC survey were updated for this assessment to incorporate new information. Using the January 2017 PDT/SSC approach for catch advice, application of the mean exploitation rate of 4.9% (based on nine years, 2007-2015) to the 3-year (2017- 2019) moving average of exploitable biomass (30,259 mt) results in an estimated ABC for 2020 of 1,483 mt.

Table 23 and Figure 8 summarize catch performance and changes in overfishing status for witch flounder.

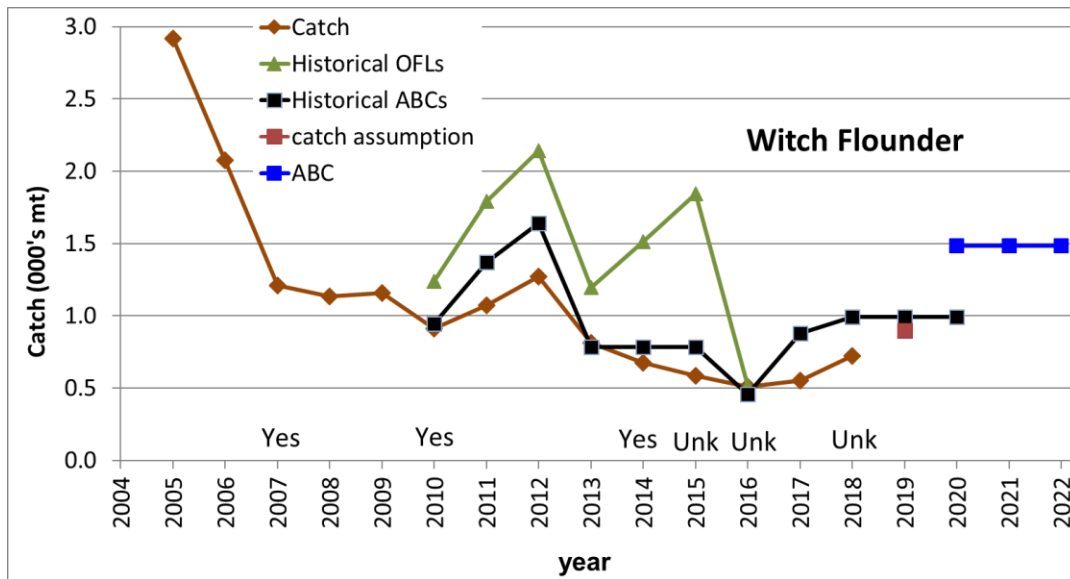
Table 22- Possible OFLs and ABCs (mt) for FY2020- FY2022 for witch flounder, using a constant approach for three years.

year	OFL	ABC
2020	unknown	1,483
2021	unknown	1,483
2022	unknown	1,483

Table 23- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections (FY2020-FY2022) for witch flounder.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F _{MSY}	ABCs
2010	913	1,239	944			
2011	1,072	1,792	1,369			
2012	1,270	2,141	1,639			
2013	811	1,196	783			
2014	676	1,512	783			
2015	586	1,846	783			
2016	512	521	460			
2017	552	Undefined	878			
2018	722	Undefined	993			
2019		Undefined	993	896		
2020		Undefined	993		-	1,483
2021					-	1,483
2022					-	1,483

Figure 8- Catch performance for witch flounder including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and FY2020- FY2022 ABCs. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).



9. Georges Bank Winter Flounder

Based on the 2019 peer review, GB winter flounder is overfished and overfishing is not occurring. Based on the 2017 assessment the stock was approaching an overfished condition but was considered “not overfished”. A retrospective adjustment was applied to the terminal year of the assessment. Biomass in 2018 was estimated to be 2,175 mt, which is 24% of biomass target. Georges Bank winter flounder is in a rebuilding plan with $F_{Rebuild}$ rate defined as $70\%F_{MSY}$ with an end date of 2029. The 2019 peer review panel has concerns regarding the estimated F_{MSY} from a stock recruitment relationship with fixed steepness. The residual pattern in the stock-recruitment relationship indicates that recent recruitment has been weaker than expected. The Panel notes “that the current F_{MSY} is much greater than $F_{40\%MSP}$, the standard F_{MSY} proxy for groundfish...” Catch projections are provided for FY2020- FY2022 at $70\%F_{MSY}$ (Table 24) and for comparison by holding the lowest value of $70\%F_{MSY}$ for FY2020- FY2022 projected catches constant for three years (Table 25). $F_{40\%}$ was estimated to be 0.367 from the 2019 assessment which is very similar to the estimate of $70\%F_{MSY}$. Therefore, a $70\%F_{40}$ (0.26) projection was also done as an alternate sensitivity projection (Table 27).

Table 26 and Figure 9 summarize catch performance and changes in overfishing status for GB winter flounder.

Table 24- Possible OFLs and ABCs (mt) for FY2020- FY2022 for Georges Bank winter flounder, under $70\%F_{MSY}$ projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	790	587	0.37	1675
2021	944	687	0.37	1798
2022	1556	1138	0.37	3273

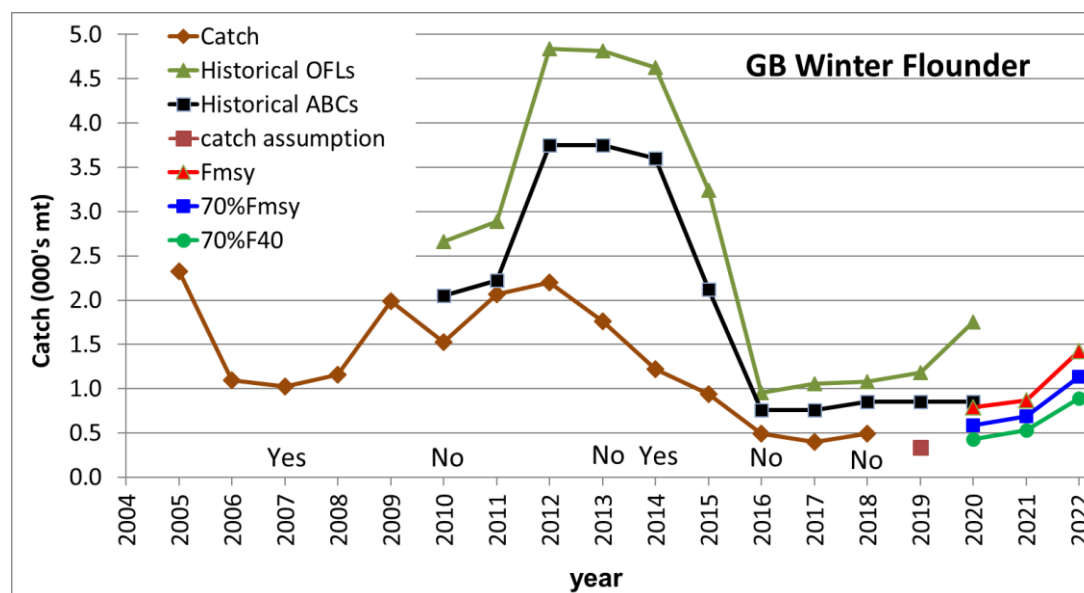
Table 25- Comparison OFLs and ABCs (mt) for FY2020- FY 2022 for Georges Bank winter flounder, holding the lowest value of 70% FMSY for FY 2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	790	587	0.37	1674
2021	944	587	0.302	1828
2022	1590	587	0.172	3482

Table 26- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 70%F_{MSY} (FY2020-FY2022) for Georges Bank winter flounder.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F _{MSY}	70%F _{MSY}	70%F ₄₀
2010	1,523	2,660	2,052				
2011	2,069	2,886	2,224				
2012	2,199	4,839	3,753				
2013	1,761	4,819	3,750				
2014	1,219	4,626	3,598				
2015	940	3,242	2,124				
2016	492	957	755				
2017	402	1,056	755				
2018	490	1,083	855				
2019		1,182	855	334			
2020		1,756	855		790	587	433
2021					868	687	532
2022					1,422	1,138	890

Figure 9- Catch performance for Georges Bank winter flounder including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY} and 70%F_{MSY}. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).



10. White Hake

Based on the 2019 peer review, white hake is overfished and overfishing is not occurring. This is a change in status, the 2017 assessment concluded that the stock was not overfished. Retrospective adjustments were made to the model results in the terminal year and the retrospective pattern appears to be worsening. White hake is under a rebuilding plan, but the stock did not rebuild by 2014 as planned. As advised by the Regional Office, the SSC and the Council has continued to set catch limits based on $75\%F_{msy}$. The rho adjusted SSB in 2018 (15,891 mt) was at 50% of the rebuilding target SSB (SSB_{MSY} proxy = 31,828 mt). Catch projections are provided for FY2020- FY2022 under $75\%F_{MSY}$ (Table 27) and for comparison by holding the lowest value of $75\% F_{MSY}$ for FY2020- FY2022 projected catches constant for three years (Table 28). Short term projections for ABC and OFL determination are based on recruitment from 1995-2016.

Table 29 and Figure 10 summarize catch performance and changes in overfishing status for white hake.

Table 27- Possible OFLs and ABCs (mt) for FY2020- FY2022 for white hake, under $75\%F_{MSY}$ projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	2,857	2,186	0.13	19,759
2021	2,906	2,223	0.13	20,305
2022	2,980	2,279	0.13	20,746

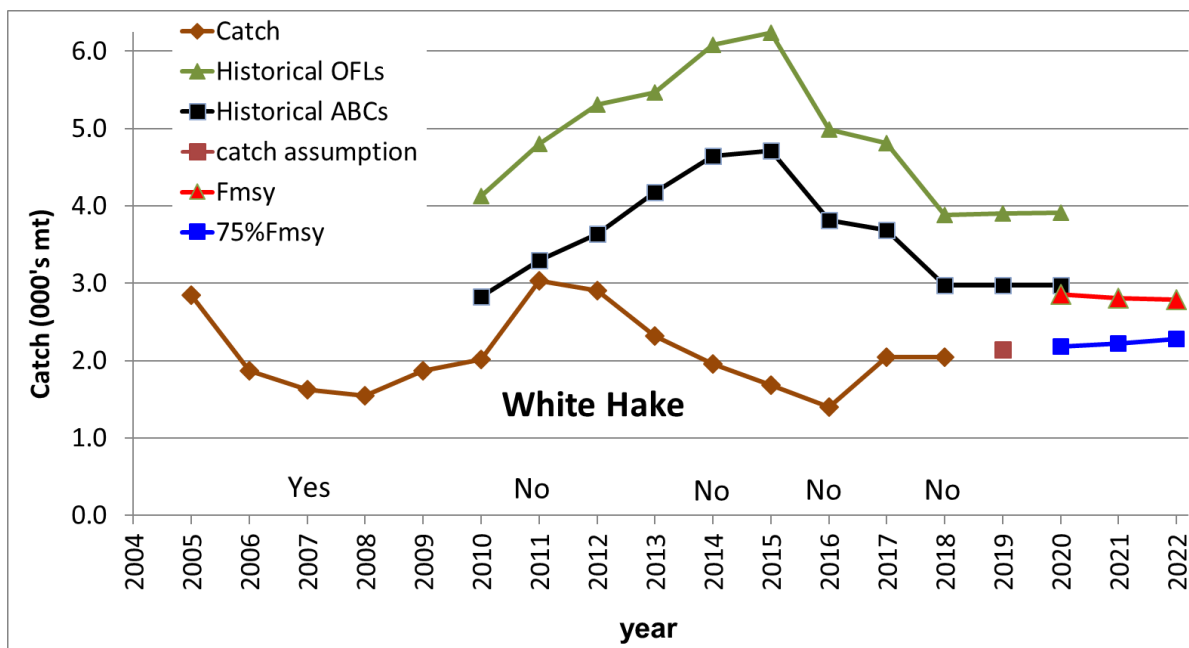
Table 28- Comparison OFLs and ABCs (mt) for FY2020- FY2022 for white hake, holding the lowest value of $75\% F_{MSY}$ for FY2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	2,857	2,186	0.13	19,758
2021	2,906	2,186	0.12	20,308
2022	2,986	2,186	0.12	20,826

Table 29- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and 75%F_{MSY} (FY2020-FY2022) for white hake.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F _{MSY}	75%F _{MSY}
2010	2,012	4,130	2,832			
2011	3,034	4,805	3,295			
2012	2,903	5,306	3,638			
2013	2,316	5,462	4,177			
2014	1,955	6,082	4,642			
2015	1,680	6,237	4,713			
2016	1,396	4,985	3,816			
2017	2,043	4,816	3,686			
2018	2,044	3,885	2,971			
2019		3,898	2,971	2,140		
2020		3,916	2,971		2,857	2,186
2021					2,809	2,223
2022					2,791	2,279

Figure 10- Catch performance for white hake including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY} and 75%F_{MSY}. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).



11. Pollock

Based on the 2019 peer review, pollock is not overfished and overfishing is not occurring. Pollock was rebuilt in 2009. A retrospective adjustment was applied to the terminal year of the

assessment. The time series of recreational catches were updated to account for the change in MRIP methodology. Catch projections are provided for FY2020- FY2022 under 75%F_{MSY} (Table 30) and for comparison by holding the lowest value of 75% F_{MSY} for FY2020- FY2022 projected catches constant for three years (Table 31).

Table 32 and Figure 11 summarize catch performance and changes in overfishing status for pollock and includes a sensitivity projection assuming flat-topped selectivity in the surveys. The 2019 peer review noted that selectivity is one of the greatest sources of uncertainty in the assessment. Following a request from the 2017 peer review, potential consequences of basing catch advice on the dome-shaped based model and the flat-topped sensitivity model if the wrong model is selected are also provided (Table 33). This analysis shows that SSB from 2020-2022 would approach the 0.5 SSB_{MSY} threshold and overfishing would occur if the dome-shaped model is selected to set advice, but the true selectivity is represented by the flat-topped model. The converse is not true, overfishing would not occur if the flat-topped model is selected as the basis for catch advice but the true selectivity is best described by the dome-shaped model. However, this analysis assumes that projected catch will be caught and recent catch rates have been much lower than the dome-shaped model’s projected catch. The 5-year recent average (including the bridge year) is 5,577 mt, far below the projected catch amounts of 16,812 to 27,447 mt. Unless effort dramatically increases it is unlikely that these catch projections will be realized.

Table 30- Possible OFLs and ABCs (mt) for FY2020- FY2022 for pollock, under 75%F_{MSY} projections. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	35,358	27,447	0.30	201,031
2021	28,475	22,062	0.30	184,358
2022	21,744	16,812	0.30	173,494

Table 31- Comparison OFLs and ABCs (mt) for FY2020- FY2022 for pollock, holding the lowest value of 75% F_{MSY} for FY2020- FY2022 projected catches constant for three years. Projected F and SSB provided.

year	OFL	ABC	F	SSB
2020	35,358	16,812	0.18	201,031
2021	30,795	16,812	0.20	195,203
2022	24,087	16,812	0.27	190,204

Table 32- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and catch projections for F_{MSY} and $75\%F_{MSY}$ (FY2020-FY2022) for pollock.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	$75\%F_{MSY}$	Flat F_{MSY}	Flat $75\%F_{MSY}$
2010	10,897	25,200	19,800					
2011	13,792	21,853	16,900					
2012	10,370	19,887	15,400					
2013	13,428	20,060	15,600					
2014	8,632	20,554	16,000					
2015	6,139	21,538	16,600					
2016	5,231	27,668	21,312					
2017	6,597	32,004	21,312					
2018	4,779	51,680	40,172					
2019		53,940	40,172	5,140				
2020		57,240	40,172		35,358	27,447	14,522	11,295
2021					26,765	22,062	11,924	9,867
2022					19,889	16,812	9,388	7,998

Figure 11- Catch performance for pollock including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY 2019 “bridge year” catch assumption, and projections for FY2020- FY2022 at F_{MSY} , $75\%F_{MSY}$, and a sensitivity of assuming flat-topped selectivity in the surveys. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).

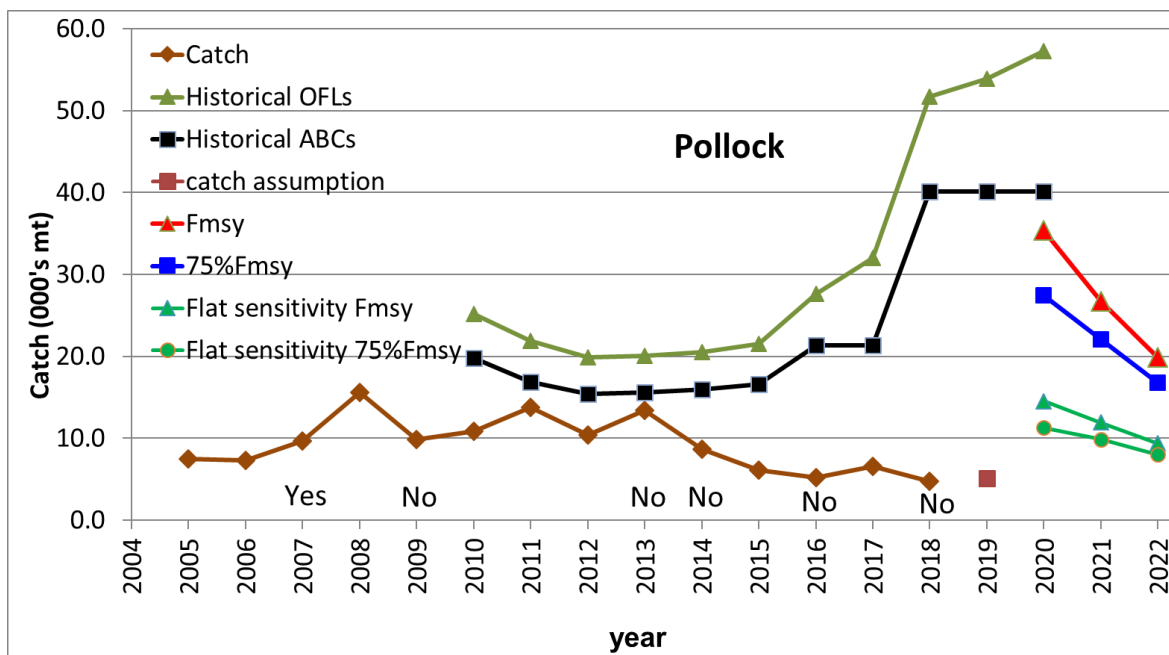


Table 33- Consequence table comparing basing catch advice and outcomes depending on whether the dome-shaped based model (final model) and the flat-topped sensitivity model are chosen and consequences if the selected model does not model the true selectivity . Fs are shown as average F from ages 5-7. Grayed out consequences on the diagonal show catch and outcomes if the “correct” selectivity is modeled meaning management catch is based on the true state of nature. Numbers highlighted in red indicate overfishing. The 2022 SSB of 36,160 mt is approaching the 0.5 SSB_{MSY} threshold if the final model (dome) catch is caught and the sensitivity (flattop) model represents true selectivity.

Biological status risk over the three years		state of nature							
		<i>final</i>				<i>sensitivity</i>			
management catch	<i>final</i>	75%Fmsy final model catch in final model				75%Fmsy final model catch in sensitivity model			
			F	catch	SSB		F	catch	SSB
		2019	0.036	5,140	190,927	2019	0.092	5,140	65,237
		2020	0.204	27,447	200,992	2020	0.583	27,447	69,808
	2021	0.204	22,062	184,293	2021	0.841	22,062	50,041	
	2022	0.204	16,812	173,453	2022	1.133	16,812	36,160	
	<i>sensitivity</i>	75%Fmsy sensitivity catch in final model				75%Fmsy sensitivity catch in sensitivity model			
			F	catch	SSB		F	catch	SSB
2019		0.036	5,140	190,927	2019	0.092	5,140	65,237	
2020		0.079	11,295	200,992	2020	0.195	11,295	69,808	
2021	0.076	9,867	200,898	2021	0.195	9,867	66,606		
2022	0.077	7,998	203,429	2022	0.195	7,998	65,482		

12. Northern Windowpane Flounder

Based on the 2019 peer review, northern windowpane flounder is overfished but overfishing is not occurring (status has not changed from the 2017 assessment). Northern windowpane flounder is in a rebuilding plan with an end date of 2029, and in 2018 biomass is at 7.1% of the B_{MSY} target. The rebuilding plan specifies a fishing mortality rate of 70%F_{msy}. Despite low catches in recent years, the NEFSC Fall survey index has continued to demonstrate a declining trend in stock biomass. The peer review panel noted that the relationship between the catch and the survey index appears to be worsening in the 2019 operational model. Therefore, the panel agreed not to accept the update the fishing mortality reference point, and instead chose to retain the reference point from the 2017 operational assessment (0.34 kt per kg/tow). Catch projections are not acceptable for this stock; therefore, Table 34 provides possible OFLs and ABCs for FY2020- FY2022 using a constant approach for three years. Table 35 and Figure 12 summarize catch performance and changes in overfishing status for northern windowpane flounder.

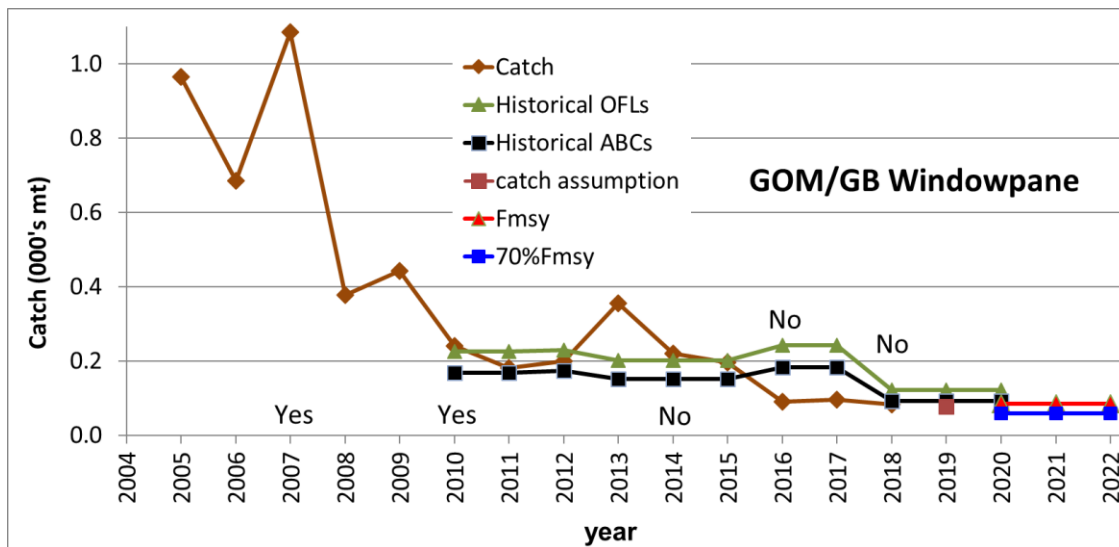
Table 34- Possible OFLs and ABCs (mt) for FY2020- FY2022 for northern windowpane flounder, using a constant approach for three years.

year	OFL	ABC
2020	84	59
2021	84	59
2022	84	59

Table 35- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and constant approach for F_{MSY} and $75\%F_{MSY}$ (FY2020-FY2022) for northern windowpane flounder.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	$70\%F_{MSY}$
2010	241	225	169			
2011	181	225	169			
2012	199	230	173			
2013	356	202	151			
2014	220	202	151			
2015	195	202	151			
2016	90	243	182			
2017	96	243	182			
2018	83	122	92			
2019		122	92	77		
2020		122	92		84	59
2021					84	59
2022					84	59

Figure 12- Catch performance for northern windowpane flounder including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and constant approach for FY2020- FY2022 at F_{MSY} and $70\%F_{MSY}$. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).



13. Southern Windowpane Flounder

Southern windowpane flounder was a tier 1 assessment (direct delivery), and as such did not receive a peer review in 2019. Southern windowpane flounder is not overfished and overfishing is not occurring (status has not changed from the 2017 assessment). Southern windowpane flounder is rebuilt as of 2012. Catch projections are not acceptable for this stock; therefore, Table 36 provides possible OFLs and ABCs for FY2020- FY2022 using a constant approach for three

years. Table 37 and Figure 13 summarize catch performance and changes in overfishing status for southern windowpane flounder.

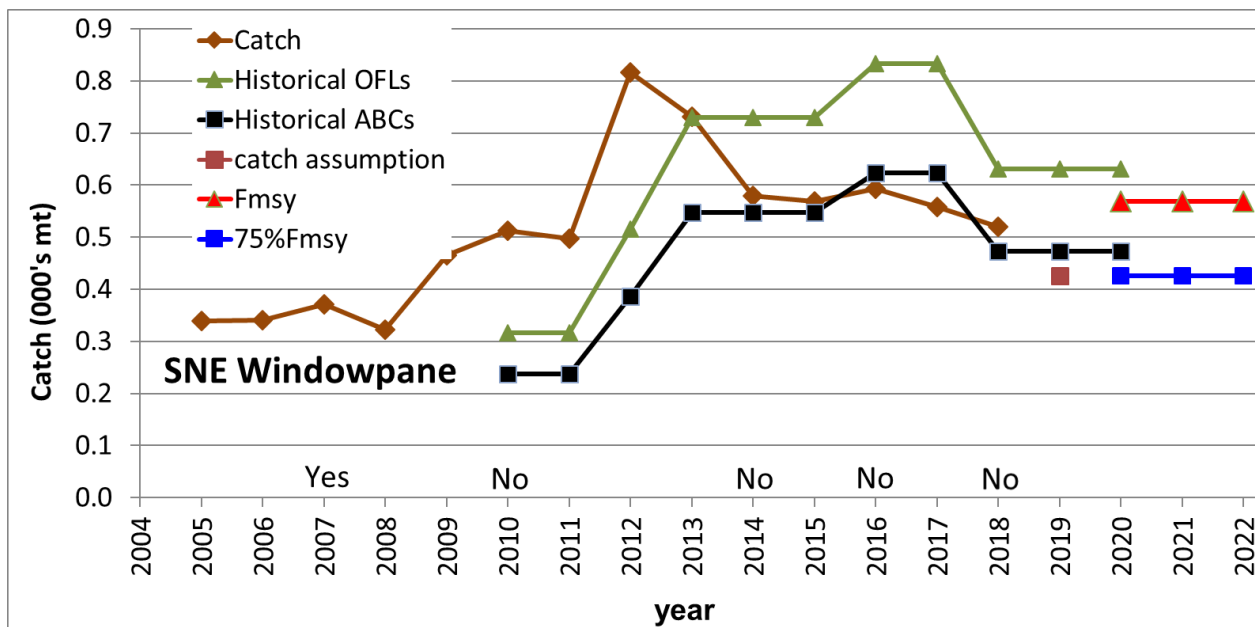
Table 36- Possible OFLs and ABCs (mt) for FY2020- FY2022 for southern windowpane flounder, using a constant approach for three years.

year	OFL	ABC
2020	568	426
2021	568	426
2022	568	426

Table 37- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and constant approach for F_{MSY} and $75\%F_{MSY}$ (FY2020-FY2022) for southern windowpane flounder.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	$75\%F_{MSY}$
2010	513	317	237			
2011	498	317	237			
2012	817	515	386			
2013	731	730	548			
2014	580	730	548			
2015	569	730	548			
2016	593	833	623			
2017	558	833	623			
2018	520	631	473			
2019		631	473	426		
2020		631	473		568	426
2021					568	426
2022					568	426

Figure 13- Catch performance for southern windowpane flounder including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and constant approach for FY2020- FY2022 at F_{MSY} and $75\%F_{MSY}$. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).



14. Atlantic Halibut

Atlantic halibut was a tier 1 assessment (direct delivery), and as such did not receive a peer review in 2019. Halibut is assessed using a data-poor method (First Second Derivative model), and projections are not possible using this method (https://www.nefsc.noaa.gov/saw/sasi/uploads/2019_HAL_UNIT_FSDmodelResults.pdf). Biological reference points are unknown for halibut but the stock is considered overfished. Halibut is currently in a rebuilding plan with an end date of 2056. Catch advice for halibut is derived by multiplying the recent catch by the rate of change in 3 indices (NEFSC fall survey, trawl D:K, gillnet D:K).

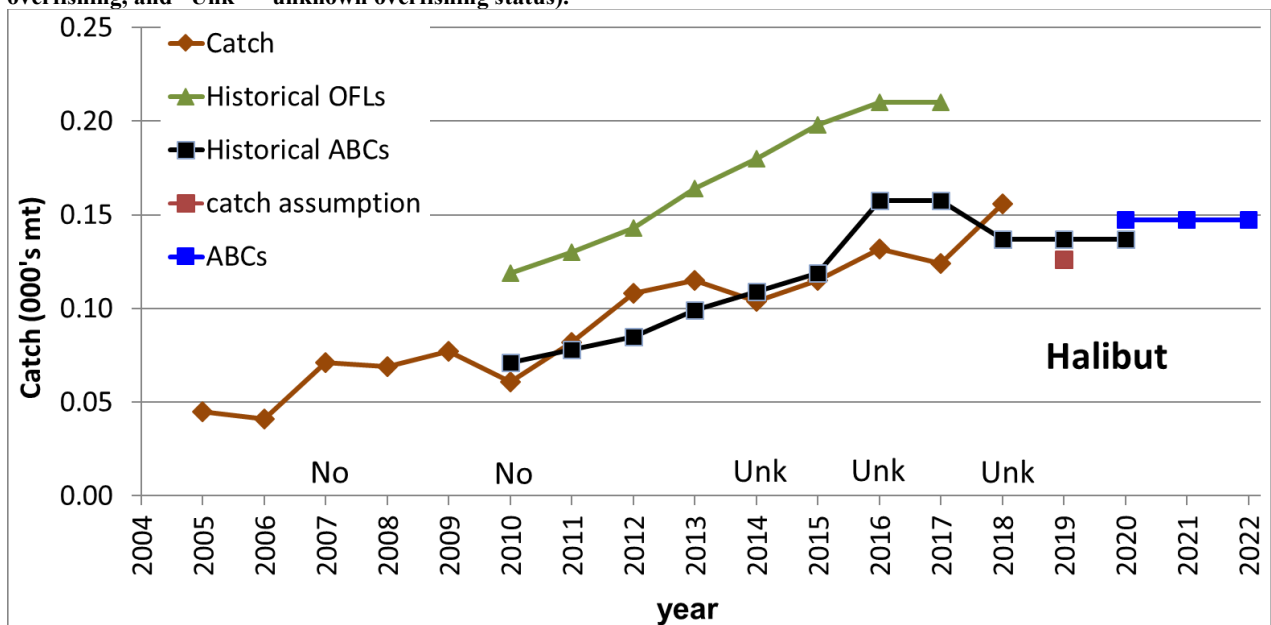
Table 38- Possible ABCs (mt) for FY2020- FY2022 for halibut, using a constant approach for three years, using a constant approach for three years. o

year	OFL	ABC
2020	unknown	147
2021	unknown	147
2022	unknown	147

Table 39- Catch performance (CY2010-CY2018), historical OFLs and ABCs (FY2010-FY2020), and constant approach for F_{MSY} and $75\%F_{MSY}$ (FY2020-FY2022) for halibut.

Year	Catch	Historical OFLs	Historical ABCs	Catch Assumption	F_{MSY}	ABC
2010	61	119	71			
2011	82	130	78			
2012	108	143	85			
2013	115	164	99			
2014	104	180	109			
2015	115	198	119			
2016	132	210	158			
2017	124	210	158			
2018	156	undefined	137			
2019		undefined	137	126		
2020		undefined	137		-	147
2021					-	147
2022					-	147

Figure 14- Catch performance for halibut including: catches from CY2005- CY2018, historical OFLs and ABCs since FY2010, CY2019 “bridge year” catch assumption, and constant approach for FY2020- FY2022 at F_{MSY} and $75\%F_{MSY}$. Overfishing status in the terminal year of the assessment indicated on the x-axis (“Yes” = overfishing, “No” = not overfishing, and “Unk” = unknown overfishing status).



Appendix 1: Overview of most recent SSC recommendations for ABCs for groundfish stocks.

Groundfish Stock	Control Rule Prior to 2015	Contol Rule 2015	Contol Rule 2017	Overfishing in 2018	Comments	Projected catch higher than 2018 ABCs?	Projected catch higher than recent catch?	Biomass and Rebuilding Comments
GB cod	75%Fmsy constant	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	unk	Plan-B smooth	no	stable	Relatively low biomass
GOM cod	average 75%Fmsy constant (3 projections)	average 75%Fmsy constant (3 projections)	average 75%Fmsy constant (2 projections)	yes	F has declined	stabe	stable	Low recent recruitment, cannot rebuild
GB Haddock	75%Fmsy	sensitivity projection 75%Fmsy constant	75%Fmsy constant (short term projection)	no	not constraining	yes	yes	Rebuilt
GOM Haddock	75%Fmsy	75%Fmsy	75%Fmsy	no	not constraining	yes	yes	Rebuilt
GB Yellowtail Flounder	75%Fmsy constant (no projection)	constant catch (no projection, TRAC 2017)	exploitation * area-swept (2 surveys)	unk	empirical	NA	NA	Near record lows
SNE Yellowtail Flounder	long term 75%Fmsy constant	averaging	average Plan-B & projection	no	low recruitment	no	stable	5% SSB _{MSSY} , 70% F _{MSSY} F _{REB} at
CC/GOM Yellowtail Flounder	75%Fmsy constant	75%Fmsy constant	75%Fmsy constant	no	constant seemed to work	yes	yes	on schedule to rebuild
Plaice	75%Fmsy	75%Fmsy	75%Fmsy	no	higher biomass	yes	yes	Rebuilt
Witch Flounder	Rebuild constant	constant ABC (no projection, SARC 62)	exploitation * Area-swept	unk	empirical	yes	yes	no BRPs
GB Winter Flounder	Rebuild	75%Fmsy constant	75%Fmsy constant	no	low recruitment	no	yes	70%F _{MSSY}
GOM Winter Flounder	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	NA	empirical	NA	NA	Little response to low catch and F
SNE/MA Winter Flounder	long term 75%Fmsy constant, different recruitment	75%Fmsy constant	3 year average catch	NA	NA	NA	NA	Biomass is declining, cannot rebuild
Redfish	75%Fmsy	75%Fmsy	75%Fmsy	NA	not constraining	NA	NA	Rebuilt
White Hake	75%Fmsy	75%Fmsy	75%Fmsy (short term projection)	no		no	yes	did not rebuild in 2014
Pollock	75%Fmsy constant	75%Fmsy constant	75%Fmsy constant	no	not constraining	no	yes	Rebuilt
Northern Windowpane Flounder	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	no	index assessment	no	no	70%F _{MSSY}
Southern Windowpane Flounder	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	no	index assessment	no	no	Rebuilt
Ocean Pout	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	NA	index assessment	NA	NA	Little response to low catch and F
Halibut	Rebuild	averaging	FSD rate * catch	unk	FSD model	yes	no	Relatively low biomass
Wolffish	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	75%Fmsy constant (no projection)	NA	Data poor, SCALE	NA	NA	Little response to low catch and F

75%Fmsy or Frebuild	7	4	4
75%Fmsy or Frebuild and held constant	5	6	5
75%Fmsy and held constant, no projection	6	7	6
other	2	3	5

Note that no Frebuild ABCs were used in 2015 or 2017

Appendix II: Overview of rebuilding plans for groundfish stocks, following the result of the 2019 assessments

Groundfish Rebuilding

stock	Rebuild End date	F-Rebuild	B _{MSY}	
GB cod	2026	NA	Unknown	no projection
GOM cod	2024	dynamic	Known	
GB Haddock	rebuilt		Known	
GOM Haddock	rebuilt		Known	
GB Yellowtail Flounder	2032	NA	Unknown	no projection
SNE Yellowtail Flounder	2029	70%F _{MSY}	Known	
CC/GOM Yellowtail Flounder	2023	dynamic	Known	
Plaice	2024		Known	
Witch Flounder	2043	exp rate	Unknown	no projection
GB Winter Flounder	2029	70%F _{MSY}	Known	
GOM Winter Flounder	NA		Unknown	no projection
SNE/MA Winter Flounder	2023	dynamic	Known	
Redfish	rebuilt		Known	
White Hake	2014	75%F _{MSY}	Known	
Pollock	rebuilt		Known	
Northern Windowpane Flounder	2029	70%F _{MSY}	Known	no projection
Southern Windowpane Flounder	rebuilt		Known	
Ocean Pout	2029	70%F _{MSY}	Known	no projection
Halibut	2056	NA	Unknown	no projection
Wolffish	undefined		Known	no projection

Rebuilt Stocks

6

Overfished Stocks

- 3 On schedule from projection at 75%F_{MSY} or 70%F_{MSY}
- 7 Overfished and no projection
- 2 Overfished and doesn't rebuild with F=0 from projection
- 1 Overfished, past rebuilding deadline

Unknown Biomass Status Stocks

1

Appendix III: Overview of rebuilding plans following the 2017 groundfish assessments

Stock	Official Stock Status Based on 2017 Assessments		Rebuilding Plan Start	Planned Rebuilding Date	Actions
	Subject to	Overfished?			
Georges Bank Cod	Yes*	Yes	5/1/2004	2026	Amendment 13
Gulf of Maine Cod	Yes	Yes	5/1/2004	2024	Amendment 13 (target date 2014); Framework 51 (target date 2024)
Georges Bank Haddock	No	No	5/1/2004	Rebuilt (2010)	Amendment 13
Gulf of Maine Haddock	No	No	5/1/2004	Rebuilt (2011)	Amendment 13
Georges Bank Yellowtail Flounder	Yes*	Yes	11/22/2006	2032	Framework 42 (target date 2014); Framework 45 (target date 2016); Framework 47 (target date 2032, based on F of 0.21)
Southern New England/Mid-Atlantic Yellowtail Flounder	Yes	Yes	5/1/2004	2029	Amendment 13 (target date 2014); Considered rebuilt in 2011; Framework 58 (target date 2029)
Cape Cod/Gulf of Maine Yellowtail Flounder	Yes	Yes	5/1/2004	2023	Amendment 13
American Plaice	No	No	5/1/2004	2024	Amendment 13 (target date 2014); Framework 51 (target date 2024)
Witch Flounder	Unknown	Yes	5/1/2010	2043	Amendment 16 (target date 2017); Framework 58 (target date 2043)
Georges Bank Winter Flounder	No	Approaching	5/1/2010	2029	Amendment 16 (target date 2017); Framework 58 (target date 2029)
Gulf of Maine Winter Flounder	No	No	N/A	N/A	Not in rebuilding Plan
Southern New England/Mid-Atlantic Winter Flounder	No	Yes	5/1/2004	2023	Amendment 13 (target date 2014); Amendment 16 (prohibited possession, goal to set F as close to rebuild by 2015 or 2016); Framework 50 (target date 2023)
Acadian Redfish	No	No	5/1/2004	Rebuilt (2012)	Amendment 13 (target date 2051)
White Hake	No	No	5/1/2004	2014	Amendment 13 (target date 2014); Rebuilding target not met by 2014, but not revised yet because based on the 2015 assessment the stock was rebuilding (adequate process) - Council was advised to continue setting catch limits to maintain fishing mortality at 75 percent of FMSY (Aug. 31, 2017 Letter).
Pollock	No	No	5/1/2010	Rebuilt (2009)	Amendment 16 (target date 2017)
Northern Windowpane Flounder	No	Yes	5/1/2010	2029	Amendment 16 (target date 2017); Framework 58 (target date 2029)
Southern Windowpane Flounder	No	No	5/1/2004	Rebuilt (2012)	Amendment 13 (target date 2014);
Ocean Pout	No	Yes	5/1/2004	2029	Amendment 13 (target date 2014); Framework 58 (target date 2029)
Atlantic Halibut	No*	Yes	5/1/2004	2055	Amendment 13 (target date 2014); Amendment 16 (target date 2055)
Atlantic Wolffish	No	Yes	5/1/2010	In rebuilding, data poor; end date not defined.	Amendment 16 (no target date)

*Biological reference point can not be estimated. The official stock status is based on the last assessment where we were able to estimate the reference points (status determination criteria) for the stock.

Appendix IV: Estimates of CY 2019 catches

Table 1: Projected CY 2019 Northeast Multispecies Total Catch (mt)

Stock	Total Catch	Groundfish Fishery	Sector	Common Pool	Recreational	Midwater Trawl Herring Fishery	Scallop Fishery	Small Mesh Fisheries	State Water	Other Subcomponent
	A to H	A+B+C	A	B	C	D	E	F	G	H
GB Cod	1,117.1	992.4	985.8	6.7					32.8	91.8
GOM cod	709.5	631.0	318.3	3.3	309.4				66.8	11.7
GB Haddock	6,928.6	6,647.3	6,642.0	5.3		43.2			14.7	223.3
GOM Haddock	5,239.2	5,135.2	3,743.3	6.5	1,385.4	0.0			15.9	88.0
GB Yellowtail Flounder	20.6	6.3	6.3	0.0			12.7	1.6	0.0	0.0
SNE/MA Yellowtail Flounder	15.7	5.7	4.5	1.2			2.6		1.4	6.0
CC/GOM Yellowtail Flounder	270.9	170.2	165.7	4.5					59.5	41.3
American Plaice	1,130.7	1,077.2	1,069.3	7.9					32.2	21.3
Witch Flounder	896.2	810.9	805.7	5.2					45.2	40.1
GB Winter Flounder	307.7	297.5	297.5	0.0					0.0	10.1
GOM Winter Flounder	256.9	80.3	78.6	1.8					165.4	11.2
SNE/MA Winter Flounder	338.3	162.1	148.6	13.5					60.4	115.7
Redfish	6,034.7	6,020.6	6,019.4	1.2					6.2	7.9
White Hake	2,101.0	2,089.5	2,087.7	1.8					1.2	10.3
Pollock	5,139.9	3,360.1	3,355.1	5.0					1,315.7	464.1
Northern Windowpane	77.1	46.2	46.0	0.2			22.3		1.0	7.7
Southern Windowpane	426.3	39.4	27.9	11.5			157.1		28.9	200.9
Ocean Pout	52.9	33.2	33.1	0.1					1.0	18.8
Halibut	126.1	83.3	83.0	0.3					37.1	5.7
Wolfish	2.8	2.5	2.4	0.1					0.3	0.0

Values in metric tons of live weight

Sector and common pool include estimate of missing dealer reports

Any value for a non-allocated species may include landings of that stock or misreporting of species and/or stock area. These are northern windowpane, southern windowpane, ocean pout, halibut, and wolfish.

Source: NMFS Greater Atlantic Regional Fisheries Office

August 9, 2019

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; (4) Observers and at-sea monitors via the Northeast Fisheries Observer Program. Differences with previous reports are due to corrections made to the database.

Table 2: Projected CY 2019 Northeast Multispecies Landings (mt)

Stock	Total Landings	Groundfish Fishery	Sector	Common Pool	Recreational	Midwater Trawl Herring Fishery	Scallop Fishery	Small Mesh Fisheries	State Water	Other Subcomponent
	A to H	A+B+C	A	B	C	D	E	F	G	H
GB Cod	1,079.2	987.3	980.9	6.4					23.2	68.6
GOM cod	395.8	323.6	314.6	2.2	6.8				66.0	6.1
GB Haddock	6,339.0	6,281.4	6,276.1	5.3		43.2			1.5	13.0
GOM Haddock	4,794.2	4,769.4	3,692.4	6.5	1,070.5	0.0			12.1	12.7
GB Yellowtail Flounder	6.0	6.0	6.0	0.0			0.0	0.0	0.0	0.0
SNE/MA Yellowtail Flounder	6.3	5.2	4.0	1.2			0.0		1.1	0.0
CC/GOM Yellowtail Flounder	207.9	146.0	142.1	4.0					58.9	2.9
American Plaice	1,055.6	1,019.5	1,012.8	6.7					29.1	7.1
Witch Flounder	811.0	764.9	760.2	4.7					43.4	2.7
GB Winter Flounder	296.1	296.0	296.0	0.0					0.0	0.1
GOM Winter Flounder	246.1	78.2	76.4	1.8					162.6	5.4
SNE/MA Winter Flounder	220.9	159.5	146.7	12.8					50.8	10.5
Redfish	5,933.2	5,925.2	5,924.1	1.1					2.5	5.5
White Hake	2,078.7	2,074.6	2,073.0	1.6					0.6	3.4
Pollock	3,493.5	3,164.7	3,160.0	4.7					211.3	117.5
Northern Windowpane	0.1	0.0	0.0	0.0			0.0		0.1	0.0
Southern Windowpane	15.2	0.0	0.0	0.0			0.0		15.2	0.0
Ocean Pout	0.3	0.0	0.0	0.0					0.2	0.1
Halibut	71.2	30.2	30.0	0.3					36.1	4.9
Wolfish	0.0	0.0	0.0	0.0					0.0	0.0

Values in metric tons of live weight
Sector and common pool include estimate of missing dealer reports
Source: NMFS Greater Atlantic Regional Fisheries Office
August 9, 2019

Any value for a non-allocated species may include landings of that stock or misreporting of species and/or stock area. These are northern windowpane, southern windowpane, ocean pout, halibut, and wolfish.

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; (4) Observers and at-sea monitors via the Northeast Fisheries Observer Program. Differences with previous reports are due to corrections made to the database.

Table 3: Projected CY 2019 Northeast Multispecies Estimated Discards (mt)

Stock	Total Discards	Groundfish Fishery	Sector	Common Pool	Recreational	Midwater Trawl Herring Fishery	Scallop Fishery	Small Mesh Fisheries	State Water	Other Subcomponent
	A to H	A+B+C	A	B	C	D	E	F	G	H
GB Cod	37.9	5.1	4.9	0.2					9.6	23.2
GOM cod	313.7	307.4	3.7	1.1	302.6				0.8	5.6
GB Haddock	589.6	366.0	366.0	0.0		0.0			13.2	210.4
GOM Haddock	444.9	365.9	50.9	0.1	314.9	0.0			3.8	75.3
GB Yellowtail Flounder	14.6	0.3	0.3	0.0			12.7	1.6	0.0	0.0
SNE/MA Yellowtail Flounder	9.3	0.5	0.5	0.0			2.6		0.2	6.0
CC/GOM Yellowtail Flounder	63.0	24.1	23.6	0.5					0.5	38.4
American Plaice	75.0	57.8	56.5	1.2					3.1	14.2
Witch Flounder	85.2	45.9	45.4	0.5					1.8	37.5
GB Winter Flounder	11.5	1.5	1.5	0.0					0.0	10.0
GOM Winter Flounder	10.8	2.2	2.2	0.0					2.8	5.8
SNE/MA Winter Flounder	117.4	2.6	1.9	0.7					9.6	105.2
Redfish	101.5	95.4	95.3	0.1					3.7	2.4
White Hake	22.3	14.8	14.7	0.2					0.6	6.8
Pollock	1,646.4	195.4	195.1	0.3					1,104.4	346.6
Northern Windowpane	77.0	46.1	46.0	0.2			22.3		0.9	7.7
Southern Windowpane	411.1	39.4	27.9	11.5			157.1		13.7	200.9
Ocean Pout	52.6	33.2	33.1	0.1					0.8	18.7
Halibut	54.9	53.0	53.0	0.0					1.0	0.9
Wolffish	2.7	2.5	2.4	0.1					0.3	0.0

Values in metric tons of live weight

Sector and common pool include estimate of missing dealer reports

Source: NMFS Greater Atlantic Regional Fisheries Office

August 9, 2019

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; (4) Observers and at-sea monitors via the Northeast Fisheries Observer Program. Differences with previous reports are due to corrections made to the database.

Table 4: CY2019 Catch estimate including US and Canadian catches, as appropriate.

Stock	US Catch Estimate	Canadian Catch Estimate	Total Catch Estimate
GOM cod	710		710
GB Haddock	6,929	12,516	19,445
GOM Haddock	5,239		5,239
SNE/MA Yellowtail Flounder	16		16
CC/GOM Yellowtail Flounder	271		271
American Plaice	1,131		1,131
GB Winter Flounder	308	26	334
White Hake	2,101	39	2,140
Pollock	5,140		5,140