

PETITION FOR RULEMAKING TO END OVERFISHING AND REBUILD ATLANTIC COD



BEFORE THE
NATIONAL MARINE FISHERIES SERVICE

February 13, 2020



Acknowledgments

CLF would like to thank all the anonymous reviewers who spent significant time reviewing the content of this Petition. Their scientific and management expertise was invaluable to the process.

Image via Unsplash (Ricardo Resende)

A DVD of the publicly available scientific information cited in this Petition was provided to the agency upon its submission and is also available upon request. If there are difficulties obtaining the scientific journal articles not on the DVD, CLF will facilitate the purchase of those articles. The information cited should properly be considered as part of the basis for a final agency action on the Petition.

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I. Executive Summary

Conservation Law Foundation (“CLF”) submits this petition for rulemaking under 5 U.S.C. § 553(e) of the Administrative Procedure Act seeking to compel the National Marine Fisheries Service (“NMFS”) to end overfishing of Atlantic cod immediately and rebuild the two stocks in this fishery in as short a time as possible as required by the Magnuson-Stevens Fishery Conservation and Management Act (“MSA”). *See* 16 U.S.C. §§ 1853(a)(1)(A) and 1854(e)(3) & (4). NMFS is the agency designated by the Secretary of Commerce to carry out the MSA mandates that CLF asserts are being violated in New England with respect to the Atlantic cod fishery.

One of the most fundamental principles of fishery management in the United States is the requirement that federal managers take affirmative action to end overfishing and expeditiously rebuild a fishery when it declines to a biomass level that threatens its ability to produce optimum yield (“OY”).¹ Rebuilding must be accomplished in as short a time as possible, not to exceed 10

¹ “Overfishing” means “a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis.” 16 U.S.C. § 1802(34); *see also* 50 C.F.R § 600.310(e)(2)(i)(B). Maximum sustainable yield (“MSY”) is the “largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics.” 50 C.F.R. § 600.310(e)(1)(i)(A). When prolonged overfishing occurs, a population may reach an “overfished” state.

years, based primarily on the biological characteristics of the stock.² Effective measures based on this rebuilding requirement, together with the hard work and diligence of managers and fishermen, have successfully rebuilt more than 45 fish stocks from previously overfished levels across the nation.³

Atlantic cod has been central to New England’s social, cultural, and economic development since the 1600s and constitutes the oldest commercial fishery in the country. Fishermen, fishing operations, and coastal communities, however, can no longer count on this once thriving fishery for their livelihood or for the long-term prosperity of their communities. This iconic fishery is now commercially collapsed due to persistent mismanagement.

Deference to short-term economic interests has dominated decisions by the New England Fishery Management Council (“Council” or “NEFMC”), which has long ignored scientific concerns and sets catch limits for Atlantic cod using: (1) inaccurate catch data; (2) an arbitrary control rule process that does not reliably end overfishing; and (3) repeatedly overly optimistic interpretations of stock assessment models that routinely underestimate fishing mortality and overestimate stock biomass and produce growth projections that have not materialized. As the legally responsible party, NMFS has repeatedly approved the Council’s risk-prone recommendations, notwithstanding the failure of these conservation and management measures to achieve core statutory objectives. Making matters worse, NMFS has neither adequately monitored the fishery (leading to unlawful discarding and unreliable catch data), protected necessary habitat (diminishing the species’ ability to rebuild), nor accounted for the impacts of climate change.

In the nearly 30 years since NMFS was first ordered by a federal court to prevent overfishing of Atlantic cod,⁴ NMFS has approved 16 amendments to the Northeast Multispecies Fishery Management Plan (“NE Multispecies FMP”) and 53 framework adjustments,⁵ none of which has actually prevented overfishing. In the 14 years since Congress directed NMFS to *immediately end* overfishing of overfished stocks, such as Atlantic cod, in order to rebuild all overfished fisheries,⁶ NMFS has not ended overfishing in the cod fishery.

50 C.F.R. § 600.310(e)(2)(i)(E) (“biomass has declined below MSST [i.e., minimum stock size threshold]”). “Optimum yield is defined as the amount of fish that will provide the “greatest overall benefit to the Nation” and is determined on the basis of “maximum sustainable yield as reduced by any relevant economic, social, or ecological factors.” 16 U.S.C. § 1802(33).

² *Id.* § 1854(e).

³ NOAA Fisheries. 2019. *Status of the Stocks 2018 Annual Report to Congress on the Status of U.S. Fisheries*, at 4. Available at: <https://www.fisheries.noaa.gov/national/2018-report-congress-status-us-fisheries>.

⁴ See *Conservation Law Found. et al. v. Mosbacher*, 1991 WL 501640 (D. Mass. 1991), *aff’d sub nom. Conservation Law Found. v. Franklin*, 989 F.2d 54 (1st Cir. 1993).

⁵ See NEFMC. “Northeast Multispecies Plan Overview.” Available at: <https://www.nefmc.org/management-plans/northeast-multispecies>.

⁶ See Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, PL 109–479, January 12, 2007, 120 Stat. 3575, 3584.

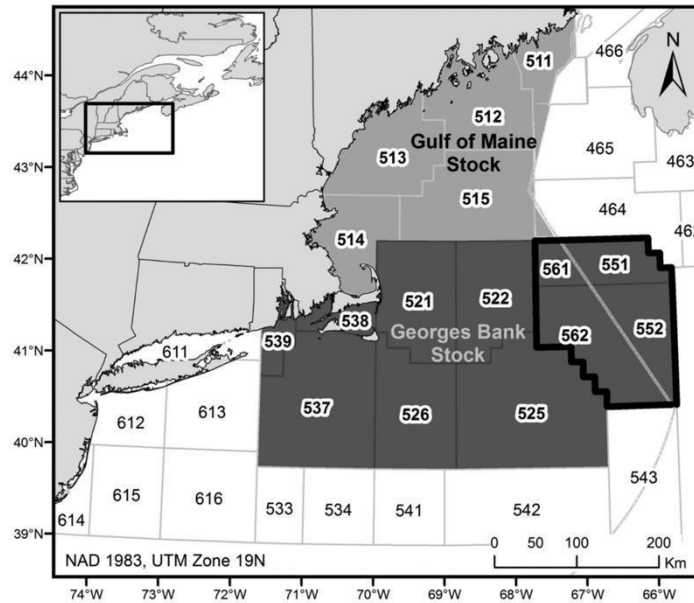


Figure 1: Map showing the Gulf of Maine (GOM) and Georges Bank (GB) stock boundaries used for management of Atlantic cod in the New England region. Area bounded by thick black line indicates the eastern population of Georges Bank cod, which is managed as a transboundary resource jointly by the U.S. and Canada.⁷

According to the most recent stock assessment, not only are both Atlantic cod stocks – Gulf of Maine (“GOM”) cod and Georges Bank (“GB”) cod (Figure 1) – overfished with overfishing still occurring,^{8,9} but the current scientific understanding reveals that they have been subject to overfishing for decades and all attempts to rebuild the stocks as required by law have failed. The best scientific information available shows that GOM cod has been subject to overfishing since 1982 and overfished in all but two years (Figure 2). GB cod fares no better. While no accepted assessment model currently exists for the GB cod stock, undermining the ability to set catch limits and quantitatively assess rebuilding, the most recently accepted assessment concludes that GB cod has been subject to overfishing for the entirety of the time series for which this determination could be made and overfished in all but two years (Figure 3).

⁷ Reproduced from Zemeckis DR, Martins D, Kerr LA, and Cadrin SX. 2014. “Stock identification of Atlantic cod (*Gadus morhua*) in US waters: an interdisciplinary approach.” *ICES Journal of Marine Science* 71:1490-1506.

⁸ The assessment model for Georges Bank cod was deemed not acceptable for management advice during peer review of the 2015 operational assessment. The magnitude of the retrospective pattern increased in the 2015 assessment. Efforts to adjust for the retrospective pattern yielded implausible estimates of stock size, and therefore the model was rejected.

⁹ See NEFSC. *Operational Assessment of 14 Northeast Groundfish Stocks, Updated Through 2018*. Pre-publication copy dated October 3, 2019, at 26 and 38. Available at: <https://s3.amazonaws.com/nefmc.org/Prepublication-NE-Grndfish-10-3-2019.pdf> (hereafter, “2019 Groundfish Operational Assessments”). Although the status of GB cod was designated as unknown, NMFS policy properly holds that “where a known determination had previously been provided and a new assessment is rejected or the results are inconclusive, the [last] known status will continue to be the official stock status.” See also Letter from NMFS Regional Administrator John K. Bullard to Council Chairman John F. Quinn dated August 31, 2017, at 2. Available at: https://s3.amazonaws.com/nefmc.org/A8_170831_Bullard-to-Quinn_Groundfish-Inadequate-Rebuilding-Progress.pdf.

GOM Cod Stock Assessment 1982-2018

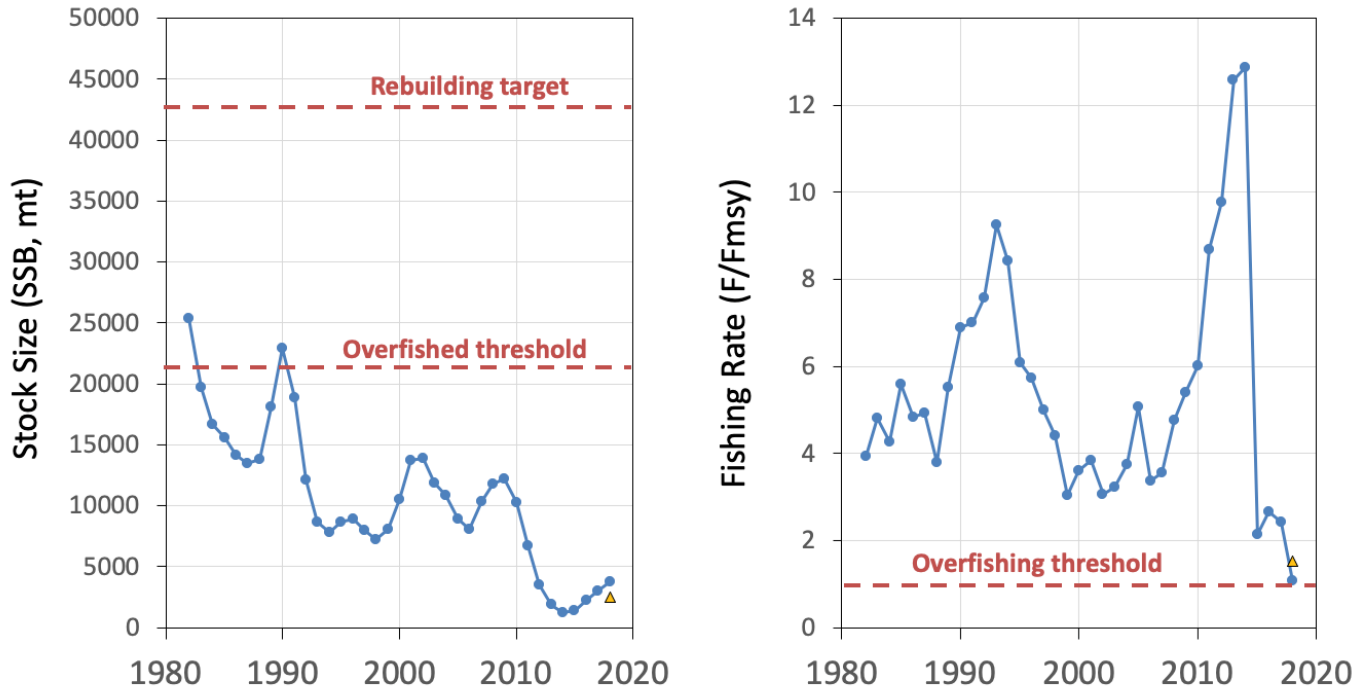


Figure 2: GOM cod stock size and fishing rates (1982-2018). Based on current definitions and reference points, together with the latest approved models, the stock was subject to overfishing for the entirety of the assessment’s time period and overfished in all but two years. Stock size is shown as spawning stock biomass (“SSB”) (SSB, mt). The upper red line shows the rebuilding target (current estimated SSB of maximum sustainable yield, SSB_{MSY}). The lower red line shows the threshold for designating the stock overfished (half of SSB_{MSY}). Fishing rate is shown as estimated fishing mortality rate (F) relative to the current estimate of the overfishing threshold F_{MSY} (the fishing mortality rate associated with the maximum sustainable yield); overfishing is occurring when this ratio exceeds 1. Data plotted are estimates from the $M=0.2$ model (the other accepted model for this stock, M -ramp, is not graphed here but shows a similar pattern). This $M=0.2$ model suffers from a significant retrospective pattern, which acts to decrease estimated fishing mortality and inflate SSB for years towards the end of the time series. The yellow triangles show corrected values for 2018 (the last year included in the assessment) as adjusted for the retrospective pattern.¹⁰

¹⁰ Data Source: NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables (Draft)*, at 32, 33, 39 and 40.

GB Cod Stock Assessment 1978-2011

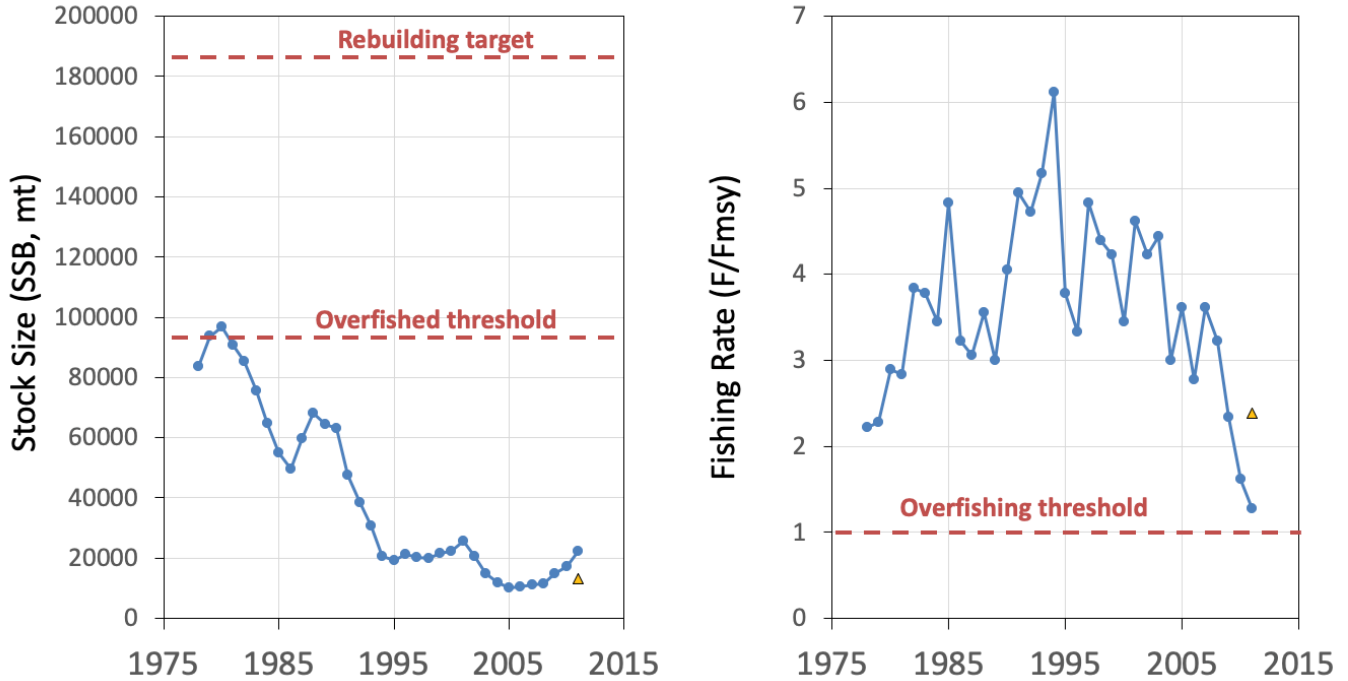


Figure 3: GB cod stock size and fishing rates (1978-2011). Based on current definitions and reference points, together with the latest approved models, the stock was subject to overfishing for the entirety of the time period and overfished in all but two years. This model suffers from a significant retrospective pattern, which acts to decrease estimated fishing mortality and inflate SSB for years towards the end of the time series. The yellow triangles show corrected values for 2011 (the last year included in the assessment) as adjusted for the retrospective pattern. This pattern became so strong by the 2015 operational assessment that the model was rejected as a basis for management advice, and 2011 is the last year that quantitative information is available for the stock.¹¹

¹¹ Data Sources: NEFSC. 2013. *55th Northeast Regional Stock Assessment Workshop Assessment Report*. NEFSC Ref. Doc. 13-11, at 742. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1311/partb.pdf> (hereafter, “55th SAW Assessment Report”); NEFSC. 2013. *55th Northeast Regional Stock Assessment Workshop Assessment Summary Report*. NEFSC Ref. Doc. 13-01, at 26. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1301/crd1301.pdf> (hereafter, “55th SAW Summary Report”).

In addition to the persistent overfished stock status, neither stock is on track to rebuild consistent with the legal requirements of the MSA. Alarming, the probability that GOM cod will rebuild within its scheduled 2024 timeline—the second ten-year rebuilding period allowed for this stock—has plummeted in the two years between the 2017 and 2019 assessments from a zero to 26 percent chance of rebuilding on schedule to a zero to one percent chance of rebuilding on schedule, even in the absence of fishing.¹² While rebuilding progress cannot currently be quantitatively assessed for GB cod, there is no evidence to suggest that this stock can rebuild within its scheduled 2026 timeline. It appears, however, that no recent assessments of adequate rebuilding progress for either stock have been conducted—at least there are no review documents or no findings of inadequate progress in documents available to CLF or the public—despite the statutory requirement of conducting such an assessment and making such a determination at least biannually. 16 U.S.C. § 1854(e)(7).

It is well past time for NMFS to take this situation in hand and require adequate and necessary conservation and management measures. The Administrative Procedure Act’s (“APA”) arbitrary-and-capricious standard requires the agency to “examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made.”¹³ Yet the Council has repeatedly recommended catch limits for Atlantic cod based on overly optimistic interpretations of stock assessments, and NMFS has repeatedly approved those recommendations and associated management actions that neither end overfishing nor rebuild the stocks.¹⁴

* * *

CLF petitions the Department of Commerce and NMFS to initiate a Secretarial Amendment and implement all necessary and appropriate conservation and management measures to end overfishing of Atlantic cod immediately and rebuild the fishery. The Council has failed for decades to prepare and submit a plan or amendment for Atlantic cod that achieves the goals of the MSA and is consistent with its National Standards,¹⁵ the National Standard 1 guidelines,¹⁶ and other applicable law. Now, given chronic overfishing, historic low biomass survey results, and lack of rebuilding progress, NMFS must prepare an amendment that

¹² Memorandum from Groundfish Plan Development Team to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2018 to 2020” dated Oct. 13, 2017, at 6. Available at: https://s3.amazonaws.com/nefmc.org/3d_171013-GF-PDT-memo-to-SSC-re-FY2018-FY2020-Groundfish-OFLs-ABCs.pdf; Memorandum from Groundfish Plan Development Team to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022” dated Oct. 10, 2019 & revised Oct. 15, 2019, at 7. Available at: https://s3.amazonaws.com/nefmc.org/A.8-GF-PDT-memo-to-SSC-re-FY2020-FY2022-Groundfish-OFLs-ABCs_20191001-REVISED.pdf.

¹³ *Motor Vehicle Mfrs. Ass’n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

¹⁴ A committee of the best experts in the fisheries science community concluded effective management actions allow virtually all fish populations to rebuild. See National Research Council. 2014. *Evaluating the Effectiveness of Stock Rebuilding Plans of the 2008 Fishery Conservation and Management Reauthorization Act*. Washington, DC: The National Academies Press, at 180 (hereafter, “NRC Report”). Available at: <https://www.nap.edu/catalog/18488/evaluating-the-effectiveness-of-fish-stock-rebuilding-plans-in-the-united-states>.

¹⁵ 16 U.S.C. § 1851(a)(1)-(10).

¹⁶ See NOAA Fisheries. “National Standard Guidelines.” Available at: <https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-guidelines>.

requires meaningful and effective conservation and management measures that immediately end overfishing of GOM cod and GB cod and rebuild the stocks in as short a time as possible.

Essential to fulfilling NMFS’s legal obligations here, new conservation and management measures must address the inadequate monitoring in the fishery and the spreading failure to report and account for all cod catch.¹⁷ Full monitoring in this fishery is necessary to ensure that assessments are based on accurate and precise catch data and that management decisions are therefore based on the best scientific information available. Full monitoring will help ensure that management actions have an appropriately high probability of success in meeting NMFS’s statutory obligations. And, perhaps most importantly, full monitoring will ensure that all groundfish fishing operations are playing by the same rules, eliminating the current incentives to misreport and under-report cod catch.

Specifically, CLF petitions NMFS to require the following conservation and management measures in a Secretarial Amendment to the NE Multispecies FMP and other relevant fisheries that use gear capable of catching any more than *de minimis* amount of Atlantic cod:

- 1) 100 percent at-sea monitoring on all commercial groundfish trips
- 2) A prohibition on directed commercial and recreational fishing for Atlantic cod that:
 - a. Implements large area closures once a stock’s incidental catch limit¹⁸ is caught
 - b. Reduces the incidental catch rate annually consistent with the current acceptable biological catch (“ABC”) control rule until overfishing at sea is ended
 - c. Prioritizes the allocation of incidental catch to groundfish vessels consistent with the current methodology
 - d. Ensures that any incidental catch history during the closure of the directed fishery will not count towards future potential sector contributions¹⁹
- 3) Area closures to protect all identified Atlantic cod spawning locations and favorable habitat for juvenile and adult cod
- 4) A requirement to use modified groundfish gear, such as a haddock separator trawl or other selective fishing technology, throughout the U.S. range of Atlantic cod to reduce incidental cod catch
- 5) Additional measures in the recreational fisheries to reduce the mortality of incidental catch of Atlantic cod

¹⁷ See Groundfish Plan Development Team. *Groundfish Plan Development Team Conclusions Based on Monitoring Analyses Conducted* dated April 15, 2019. Available at:

https://s3.amazonaws.com/nefmc.org/1e_190415_Groundfish-PDT_Conclusions-for-SSC-Review.pdf.

¹⁸ Under this scenario, CLF envisions ABC to be equal to incidental catch and ACL to be equal to incidental catch as reduced by management uncertainty. The ACL should be interpreted as the incidental catch limit at which closures would be triggered. Further, the ACL should be allocated to sectors in proportion to the sum of the potential sector contribution per standard operating procedure. CLF also envisions, however, that limited fishing could continue through exempted fishing permits (“EFP”) or an equivalent opportunity on the basis of collecting necessary data for stock assessments. Any fishing under an EFP or equivalent must require an observer on board and prohibit groundfish fishing in groundfish closures, spawning closures, or habitat management areas (“HMA”).

¹⁹ The Council defines potential sector contribution (“PSC”) as: “The percentage of the available catch a limited access permit is entitled to after joining a sector. Based on landings history as defined in Amendment 16. The sum of the PSC’s in a sector is multiplied by the groundfish sub-ACL to get the ACE for the sector.” Available at: <https://www.nefmc.org/files/Glossary.pdf>.

These measures are intended to reduce catch of Atlantic cod, improve productivity, and increase recruitment by restoring a normalized age-structure to the population, increasing spawning success of adult cod, and increasing the survival and growth of juvenile cod.

Further, NMFS and the Northeast Fisheries Science Center (“Science Center” or “NEFSC”) should address longstanding sources of uncertainty in the models associated with retrospective patterns and natural mortality estimates, account for the true stock structure of Atlantic cod in the region, and adequately recognize and adjust for potential reduced productivity, including accounting for the impacts of climate change. These actions are critical to rebuild cod spawning stock biomass as well as to restore public confidence in the science undertaken by the NEFSC.

Until these measures are fully implemented, CLF petitions NMFS to exercise its authority under the APA, 5 U.S.C. § 553(e), and the MSA, 16 U.S.C. § 1855(c) to promulgate emergency regulations and interim measures necessary to reduce overfishing of GOM cod, including a prohibition on further directed commercial or recreational fishing and a requirement to use modified fishing gear in the GOM cod stock area.

II. Petitioner’s Interest

Founded in 1966, CLF is a non-profit member-supported organization that works to solve environmental problems threatening the people, natural environment, and communities of New England. Throughout the last 30 years, CLF, on its own behalf and in the interests of its diverse membership, has advocated for sustainable fisheries management, including the need to prevent overfishing, rebuild overfished stocks, and ensure adequate accountability to “protect, restore, and promote the long-term health and stability” of fisheries consistent with the requirements of the MSA.

CLF first challenged NMFS’s failure to prevent overfishing and rebuild several overfished groundfish stocks—including Atlantic cod—in 1991. *See Conservation Law Found. et al. v. Mosbacher*, 1991 WL 501640 (D. Mass. 1991), *aff’d sub nom. Conservation Law Found. v. Franklin*, 989 F.2d 54 (1st Cir. 1993). In finding that the resulting settlement agreement was just, fair and equitable, the Court allowed the Council the “initial opportunity to develop a groundfish rebuilding program that meets the terms and conditions of this Consent Decree; provided, however, that if Council efforts to develop a program fall short of successful and timely development and submission to the Secretary, the Federal Defendants shall not be excused from complying with the deadlines for development of a groundfish rebuilding program . . .” *Id.* at *1. CLF also challenged NMFS’s implementation of the 1996 Sustainable Fisheries Act amendments to the MSA in *Conservation Law Found. v. Evans*, 209 F. Supp. 2d 1 (D.D.C. 2001). More recently, CLF challenged NMFS’s unlawful catch limits for GOM cod. *See Conservation Law Found. v. Pritzker*, 37 F.Supp.3d 254 (D.D.C. 2014) (holding NMFS’s Atlantic cod carryover adjustments violated the MSA).

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TABLE OF CONTENTS

NOTICE OF PETITION.....	II
I. EXECUTIVE SUMMARY	II
II. PETITIONER’S INTEREST	IX
III. STATUTORY AND REGULATORY FRAMEWORK	1
A. Fishery Management Plans Must Comply with the National Standards.....	1
1. National Standard 1 – FMPs Shall Prevent Overfishing	1
2. National Standard 2 – FMPs Shall Use Best Scientific Information Available.....	2
3. National Standard 9 – FMPs Shall Minimize Bycatch	2
B. Fishery Management Plans Must Establish Annual Catch Limits that Prevent Overfishing Including Measures to Ensure Accountability.....	3
1. Annual Catch Limits Must Prevent Overfishing	3
2. Accountability Measures Must Prevent Overfishing.....	4
C. Secretarial Duty to Rebuild Overfished Fisheries	5
D. Secretarial Duty to Prepare a Plan or Amendment Where the Council has not Prepared One Consistent with Rebuilding Requirements	7
E. Emergency Action Required to End Overfishing	8
F. Petitioner’s Right to Petition.....	8
IV. HISTORICAL BACKGROUND	9
V. NMFS REPEATEDLY APPROVED COUNCIL ACTIONS THAT FAILED TO PREVENT AND END OVERFISHING TO REBUILD OVERFISHED ATLANTIC COD STOCKS	10
A. NMFS’s Longstanding Failure to Prevent and End Overfishing.....	11
1. Failure to Prevent and End Overfishing of Gulf of Maine Cod.....	13

2.	Failure to Prevent and End Overfishing of Georges Bank Cod.....	17
3.	Failure to Account for Low Recruitment Despite Persistent Overfishing	19
4.	Failure to Account for Significant Bias and Uncertainty in the Stock Assessments Despite Persistent Overfishing	20
5.	Failure to Adjust Uncertainty Buffers Despite Persistent Overfishing	22
6.	Failure to Apply the Approved ABC Control Rule	22
B.	Failure to Rebuild Atlantic Cod Consistent with MSA	27
1.	Inadequate Progress Toward Ending Overfishing and Rebuilding Atlantic Cod	28
2.	National Research Council Rebuilding Guidance	34
3.	NMFS’s Denial of the 2015 Cod Petition was Based on a Promise of New Management Measures that Never Materialized	35
C.	A Catch Monitoring Program that Provides Accurate and Precise Catch Data is Necessary to End Overfishing and Ensure Accountability.....	36
D.	Additional Measures are Critical to Cod Recovery	41
1.	Value of Essential Fish Habitat for Rebuilding Stocks	42
2.	Failure to Rebuild Age-Structure in Cod Populations	43
3.	Failure to Consider Sub-Population Structure	45
4.	Failure to Account for Climate Change Impacts	47
E.	Ineffective Fishery Management Has Caused Significant Economic Harm	49
VI.	A SECRETARIAL AMENDMENT IS REQUIRED UNDER THE CIRCUMSTANCES.....	50
A.	New Conservation and Management Measures Are Necessary and Appropriate to End Overfishing and Rebuild Atlantic Cod.....	50

1.	100 Percent At-Sea Monitoring on All Commercial Groundfish Trips	50
2.	A Prohibition on Directed Commercial and Recreational Fishing for Atlantic Cod	51
3.	Area Closures to Protect All Identified Atlantic Cod Spawning Locations and Favorable Habitat for Juvenile and Adult Cod	52
4.	Use of Modified Fishing Gear Throughout the U.S. Range of Atlantic Cod to Reduce Incidental Catch	55
5.	Additional Measures to Reduce the Mortality of Incidental Catch of Atlantic Cod in Recreational Fisheries	56
VII.	THE SECRETARY MUST TAKE EMERGENCY ACTION TO END OVERFISHING OF GULF OF MAINE COD IMMEDIATELY	57
A.	Recent Unforeseen Events Require Emergency Action	57
B.	Failure to Act Presents Serious Conservation and Management Problems	57
C.	Immediate Benefits Outweigh Those Provided by Public Notice, Comment, and Deliberation	58
VIII.	THE SCIENCE CENTER MUST IMPROVE SCIENTIFIC ASSESSMENTS OF ATLANTIC COD	58
	CONCLUSION	60
	APPENDIX A: STOCK ASSESSMENT TABLE	61
	APPENDIX B: GULF OF MAINE CLOSURES (2003-2019)	69
	APPENDIX C: ECONOMIC ANALYSIS	73

III. Statutory and Regulatory Framework

The Secretarial Amendment sought here, as with all FMPs, must contain those measures that are “necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery,” consistent with the national standards. 16 U.S.C. § 1853(a)(1). The term “conservation and management” is expansive and encompasses “all of the rules, regulations, conditions, methods, and other measures (A) which are required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource....” 16 U.S.C. § 1802(5). Additionally, because Gulf of Maine (“GOM”) cod and Georges Bank (“GB”) cod are overfished, the conservation and management measures must be sufficient to end overfishing immediately in order to rebuild in a manner consistent with the Magnuson-Stevens Act’s (“MSA”) statutory mandate. 16 U.S.C. § 1854(e)(2).

A. Fishery Management Plans Must Comply with the National Standards

The MSA “is designed in large part to prevent overfishing in U.S. coastal waters and mitigate and reverse its effects where it has already begun. To that end, the MSA empowers federal agencies to ‘provide for the preparation and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield from each fishery.’ *Id.* § 1801(b)(4).” *Oceana, Inc. v. Ross*, 363 F. Supp. 3d 67, 71 (D.D.C. 2019).

Pursuant to 16 U.S.C. § 1851(b) of the MSA, the National Marine Fisheries Service (“NMFS”) provides its interpretation of the statute’s mandatory national standards through a set of guidelines, codified at 50 C.F.R. §§ 600.305-600.355. Although the guidelines do not have the force and effect of law, the councils and NMFS staff are instructed to use them “to assist in the development of fishery management plans.” 16 U.S.C. § 1851(b). The guidelines clarify how to develop and implement annual catch limits (“ACLs”) and accountability measures (“AMs”). *See, e.g., id.* § 600.310(g)(3).

1. National Standard 1 – FMPs Shall Prevent Overfishing

Since the MSA was originally enacted in 1976, one of its prime management directives has been to prevent overfishing. Pub. L. 94-265, 90 Stat. 331 (1976). As set forth in National Standard 1: “Conservation and management measures *shall prevent overfishing while achieving, on a continuing basis, the optimum yield* from each fishery for the United States fishing industry.” 16 U.S.C. § 1851(a)(1) (emphasis added).

Congress reauthorized the MSA most recently in 2007 in response to continued overfishing in the nation’s fisheries despite 30 years of federal management. Pub. L. No. 109–479, 120 Stat. 3575, (2007). This most recent reauthorization added new mandates to prevent overfishing including the establishment of annual catch limits and accountability measures for all stocks in need of conservation and management. The law required NMFS to implement these new science-based ACLs and accountability measures for overfished stocks such as Atlantic cod by 2010 and for all other stocks by 2011. It bears noting in this context that Congress also

directed NMFS in this reauthorization to end fishing immediately in all situations involving an overfished stock. 16 U.S.C. § 1854(e)(3)(A).

The National Standard 1 guidelines link the requirement to prevent overfishing with achieving optimum yield (“OY”) of the nation’s fisheries, stating: “The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it *must* prevent overfishing.” 50 C.F.R. § 600.310(b)(2)(ii) (emphasis added).

Courts have repeatedly held that the unequivocal language of National Standard 1’s mandate to prevent overfishing elevates conservation considerations over competing economic considerations. *See Nat. Res. Def. Council v. Daley Inc. v. Daley*, 209 F.3d 747, 753 (D.C. Cir. 2000) (“[U]nder the Fishery Act, the Service must give priority to conservation measures” and “[i]t is only when two different plans achieve similar conservation measures that the Service takes into consideration adverse economic consequences.”). As the court noted in *Nat. Res. Def. Council v. Nat’l Marine Fisheries Serv.*, 421 F.3d 872, 879 (9th Cir. 2005): “The Act sets this priority in part because the longer-term economic interests of fishing communities are aligned with the conservation goals set forth in the Act. Without immediate efforts at rebuilding depleted fisheries, the very long-term survival of those fishing communities is in doubt.” Similarly in *Nat. Res. Def. Council v. Locke*, 2010 WL 11545702, at *5 (N.D. Cal. Apr. 23, 2010) the court noted that: “Part of the reason Congress elevated conservation over economic interests is that conserving fish populations yields the double benefit of both improving the environment and providing long-term economic return.”

2. National Standard 2 – FMPs Shall Use Best Scientific Information Available

National Standard 2 states: “Conservation and management measures shall be based upon the best scientific information available.” 16 U.S.C. § 1851(a)(2); *see also Oceana, Inc. v. Ross*, 363 F. Supp. 3d 67, 71 (D.D.C. 2019). National Standard 2 “requires that rules issued by the NMFS be based on a thorough review of all the relevant information available at the time the decision was made . . . and insures that the NMFS does not ‘disregard superior data’ in reaching its conclusions.” *Flaherty v. Bryson*, 850 F. Supp. 2d 38, 61 (D.D.C. 2012); *see also Guindon v. Pritzker*, 31 F.Supp.3d 169, 195 (D.D.C. 2014).

3. National Standard 9 – FMPs Shall Minimize Bycatch

National Standard 9 requires: “Conservation and management measures [that], to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.” 16 U.S.C. § 1851(a)(9). Consistent with National Standard 9, NMFS must minimize and account for bycatch, even when an ACL is set to an incidental catch limit. As interpreted by the National Standard 1 guidelines (existing and proposed), ACLs and accountability measures must account for “the total quantity of fish . . . taken in commercial, recreational, subsistence, tribal, and other fisheries . . . as well as mortality

of fish that are discarded.”²⁰ And 16 U.S.C. § 1853(a)(11) requires “a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery.”

Courts have addressed National Standard 9’s bycatch mandate. In *Conservation Law Foundation v. Evans*, the court found that an amendment lacked measures to minimize bycatch and failed to analyze whether pre-existing measures “specifically complied with” the bycatch mandate. 209 F. Supp. 2d 1, 14 (D.D.C. 2001). In *Pacific Marine Conservation Council, Inc. v. Evans*, the court observed that the statute “requires timely action on bycatch reduction and further requires that *all practicable measures* be included in the fishery management plan.” 200 F. Supp. 2d 1194, 1201 (N.D. Cal. 2002) (emphasis added). And in *Flaherty v. Bryson*, the court rejected an amendment that lacked bycatch-reduction measures even though several pre-existing measures had an “incidental effect” on bycatch, stating NMFS needed to address “whether the FMP, as amended, actually minimizes bycatch to the extent practicable.” 850 F. Supp. 2d 38, 58 (D.D.C. 2012). These cases show that even small amounts of catch and bycatch must be accounted for and minimized in this Secretarial Amendment.

B. Fishery Management Plans Must Establish Annual Catch Limits that Prevent Overfishing Including Measures to Ensure Accountability

The central importance of preventing overfishing to the entire fishery management scheme created by the MSA in order to achieve OY is manifest from the terms of the MSA and NMFS’s regulations. To prevent overfishing, FMPs must contain certain provisions. 16 U.S.C. § 1853(a) (1) - (15). Among them, the MSA requires that all FMPs “contain the conservation and management measures, . . . necessary and appropriate for the conservation and management of the fishery to *prevent overfishing and rebuild overfished stocks* . . .” and “establish a mechanism for specifying annual catch limits in the plan . . . , implementing regulations, or annual specifications, at a level *such that overfishing does not occur* in the fishery, including measures to ensure accountability.” *Id.* § 1853(a)(1), (15) (emphasis added). In addition, NMFS has ample authority to take action in an FMP under the non-discretionary provisions of the MSA. *Id.* § 1853(b)(1) - (14). For example, it may “include management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations.” *Id.* § 1853(b)(12).²¹

1. Annual Catch Limits Must Prevent Overfishing

Each stock must have an acceptable biological catch (“ABC”) control rule that accounts for the scientific uncertainty in the overfishing limit (“OFL”) and that is based on an analysis that shows how it will prevent overfishing. 50 C.F.R. § 600.310(f)(2). An ABC control rule is the specified approach approved by NMFS for setting the ABC for a stock or stock complex as a

²⁰ See 50 C.F.R. § 600.310(f)(2)(i) (proposed rule at 600.310(f)(1)(i) (defining “catch”); see also *Oceana*, 831 F. Supp. 2d at 115-16 (“Since the ‘catch’ limited by ACLs includes both fish that are retained (landed) and bycatch that are discarded at sea, see 50 C.F.R. § 600.310(f)(2)(i), the [annual catch limits for the stocks at issue] may be exceeded by accumulation of bycatch alone.”).

²¹ NMFS has used its authority under 16 U.S.C. § 1853(b)(12) to create incidental catch caps for river herring and shad that close the Atlantic herring and Atlantic mackerel fisheries when a hard limit on catch of these species hit. Most recently, NMFS used this authority to implement regulations that would close the California/Oregon drift gillnet fishery if a hard limit on mortality/injury of high priority protected species is met or exceeded.

function of the scientific uncertainty in the estimate of the OFL and any other scientific uncertainty. *Id.* at § 600.310(b)(3), (f)(2)(iii). Because of their essential purpose, control rules should become more conservative as biomass estimates, or other proxies, for a stock or stock complex decline and as science and management uncertainty increases. 50 C.F.R. § 600.310(f)(1); *see also Oceana v. Locke*, 831 F. Supp. 2d 95, 128 (D.D.C. 2011) (discussing ABC control rules and stating, “the MSA [] requires NEFMC to set each stock’s ‘acceptable biological catch’ (ABC) at a level sufficiently below the predicted overfishing level.” *See* 16 U.S.C. § 852(g)(1)(B); 50 C.F.R. § 600.310(f)(2) (ii)-(4). Moreover, for an overfished stock like Atlantic cod, “a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates (i.e., $F_{REBUILD}$) in the rebuilding plan.” *Id.* at § 600.310(f)(3)(ii). It must also be set at a level that ends overfishing immediately. 16 U.S.C. § 1854(e)(3)(A).

Each council must establish a scientific and statistical committee (“SSC”) whose members must include federal and state employees, academicians, or independent experts with “strong scientific or technical credentials and experience.” 16 U.S.C. § 1852(g)(1)(A), (C). The SSC provides “ongoing scientific advice for fishery management decisions,” including the setting of OFL and ABC. *Id.* § 1852(g)(1)(B). The mandatory ABC control rule required for all FMPs must be based on scientific advice from the SSC. 50 C.F.R. § 600.310(f)(4). Additionally, ACLs “may not exceed the fishing level recommendations” (i.e., ABCs) of the Council’s SSC. 16 U.S.C. § 1852(h)(6).

2. Accountability Measures Must Prevent Overfishing

Although the MSA is not prescriptive, the guidelines provide clarification on accountability measures that will ensure overfishing does not occur. *See* 50 C.F.R. § 600.310(g). Accountability measures are defined as “management controls to prevent ACLs, including sector-ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur.” *Id.* § 600.310(g)(1). “AMs should address and minimize both the frequency and magnitude of overages and correct the problems that caused the overage in as short a time as possible.” *Id.* Even if an ACL is set to zero and an AM closes the fishery, additional AMs are required if catch or bycatch is likely to result in overfishing. *Id.* § 600.310(g)(3) (“If an ACL is set equal to zero and the AM for the fishery is a closure that prohibits fishing for a stock, additional AMs are not required if only small amounts of catch (including bycatch) occur, and the catch is unlikely to result in overfishing.”).²²

Courts have concluded that *specific* accountability measures are not necessarily required so long as NMFS implements sufficient overall accountability measures to prevent overfishing, citing 50 C.F.R. § 600.310(f)(5)(ii). In *Oceana v. Locke*, the court ordered NMFS to prepare accountability measures for five species where a prohibition on retention was not enough to prevent overfishing. Otherwise, the court reasoned, they could be caught as bycatch “with

²² Similarly, whereas here the evidence suggests that the reported catch and bycatch of Atlantic cod vastly underreports true mortality, i.e., it is not a “small” number nor is it unlikely to result in overfishing, the ACLs sought for GOM and GB cod, set at incidental catch, should not be the only measure to assure the ACL is not exceeded and must be accompanied by additional AMs to account for catch and bycatch in the NE Multispecies fishery as well as other fisheries using gears capable of catching cod.

impunity, and in doing so, cause their continued overfishing.” 831 F. Supp. 2d 95, 116, 120 (D.D.C. 2011). In *Guindon v. Pritzker*, the court similarly concluded that though the MSA is not prescriptive as to what the accountability measures must be, they must prevent overfishing:

NMFS need not implement so many accountability measures that overharvesting and overfishing become utterly beyond possibility. That reads too much into the MSA. However, Section 303(a)(15) would lose all teeth and coherence if NMFS, faced with persistent overages and high management uncertainty, could claim compliance by simply identifying any control that technically qualifies as an “accountability measure.” In this case, it is apparent from the record that the existing scheme does not “ensure accountability” within the meaning of Section 303(a)(15).

31 F. Supp. 3d 169, 200 (D.D.C. 2014). Along the same lines, the court in *Oceana, Inc. v. Ross*, noted that “[t]he primary evil the MSA guards against is overfishing; the law’s various proscriptions and prescriptions exist to protect fish populations. . . [s]o while ACLs and AMs should—and in some cases, must—be used by the Fisheries Service, they are not *ends* in themselves, but rather *means* to end overfishing and rebuild populations.” 363 F. Supp. 3d 67, 86 (D.D.C. 2019).

C. Secretarial Duty to Rebuild Overfished Fisheries

In 1996, the MSA was amended by the Sustainable Fisheries Act (“SFA”) to provide stringent protections for overfished species. Pub. L. No. 104–297, 110 Stat. 3559 (1996); *see also Nat. Res. Def. Council v. Evans*, 168 F. Supp. 2d 1149, 1152 (N.D. Cal. 2001), *order aff’d in part, vacated in part*, 316 F.3d 904 (9th Cir. 2003) (“NMFS is responsible under the MSA for ensuring the protection and repopulation of these species through the implementation of rebuilding plans and its annual fishing specifications and limits.”). As part of these amendments, a specific definition of the term “overfished” was included as well as an explicit mandate to rebuild overfished fisheries. 16 U.S.C. § 1802(34); *Nat. Res. Def. Council*, 168 F. Supp. 2d at 1158.

To address persistent overfished fisheries and further strengthen rebuilding requirements, the MSA was reauthorized in its current form in 2007. Pub. L. No. 109–479, January 12, 2007, 120 Stat. 3575, 3584. Under the reauthorized MSA, once NMFS determines an affected stock is overfished, Congress directed that it must immediately notify the appropriate council and request action “to end overfishing immediately in the fishery” and prepare and implement additional conservation and management measures “to rebuild affected stocks of fish.” 16 U.S.C. § 1854(e)(2); *see also S. Rep. 109-229 at *6* (“The SFA attempted to address overfishing by capping fish harvests at maximum sustainable yield (MSY) and requiring FMPs to include measures to rebuild overfished stocks. However, recent evaluations of stock status have shown that ten years after enactment of the SFA, overfishing is still occurring in a number of fisheries, even those fisheries under a rebuilding plan established early in the SFA implementation process.”).

Within two years of such request for action on an overfished stock such as Atlantic cod, a council has a mandatory duty to develop and implement an FMP or amendment, or proposed

regulations sufficient “to end overfishing immediately in the fishery and to rebuild affected stocks of fish.” *Id.* § 1854(e)(3)(A). The rebuilding plan “shall (A) specify a time period for rebuilding the fishery that shall—(i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock of fish within the marine ecosystem; and (ii) not to exceed 10 years.” *Id.* § 1854(e)(4)(A). If the council has not submitted an FMP, amendment, or proposed regulations that ends overfishing immediately and rebuilds the affected stock within two years of notice of the overfished status, NMFS has a mandatory duty to prepare a plan that meets the requirements of section 304(e)(3)(A), *i.e.*, ends overfishing immediately and rebuilds the affected stocks, within 9 months. *Id.* § 1854(e)(5).

After a rebuilding plan that meets the requirements of section 304(e)(3)(A) is implemented, NMFS has a further mandatory duty to review any FMP, amendment, or regulations to determine whether adequate progress towards rebuilding is occurring as projected: NMFS “shall review any fishery management plan, plan amendment, or regulations required by this subsection at routine intervals that may not exceed two years.” *Id.* § 1854(e)(7). If NMFS finds as a result of such review that the plan, amendment, or regulations have not resulted in adequate progress toward ending overfishing and rebuilding affected fish stocks, NMFS is required to “immediately notify the appropriate Council. Such notification shall recommend further conservation and management measures which the Council should consider ... to achieve adequate progress.” *Id.* § 1854(e)(7)(B).

The regulations reiterate NMFS’s mandatory duty to biannually monitor and review rebuilding plans to ensure adequate progress:

(iv) Adequate Progress. The Secretary shall review rebuilding plans at routine intervals that may not exceed two years to determine whether the plans have resulted in adequate progress toward ending overfishing and rebuilding affected fish stocks (MSA section 304(e)(7)). Such reviews could include the review of recent stock assessments, comparisons of catches to the ACL, or other appropriate performance measures. The Secretary may find that adequate progress is not being made if $F_{REBUILD}$ or the ACL associated with $F_{REBUILD}$ is exceeded, and AMs are not correcting the operational issue that caused the overage, nor addressing any biological consequences to the stock or stock complex resulting from the overage when it is known (see paragraph (g)(3) of this section). A lack of adequate progress may also be found when the rebuilding expectations of a stock or stock complex are significantly changed due to new and unexpected information about the status of the stock. If a determination is made under this provision, the Secretary will notify the appropriate Council and recommend further conservation and management measures, and the Council must develop and implement a new or revised rebuilding plan within two years (see MSA sections 304(e)(3) and (e)(7)(B)). For Secretarially-managed fisheries, the Secretary would take immediate action necessary to achieve adequate progress toward rebuilding and ending overfishing. 50 C.F.R. § 600.310(j)(3)(C)(iv).

D. Secretarial Duty to Prepare a Plan or Amendment Where the Council has not Prepared One Consistent with Rebuilding Requirements

Under the MSA, fishery management councils propose fishery management plans and implementing regulations “for each fishery under its authority that requires conservation and management....” 16 U.S.C. § 1852(h)(1). Councils also propose amendments to these plans when “necessary from time to time,” *id.*, and suggest regulations to implement these proposed amendments, *id.* § 1853(c). NMFS has limited authority to change a plan submitted by a council—after receiving a plan or amendment it may only approve, disapprove, or partially approve the proposed plan or amendment. *Id.* § 1854(a)(3).

Here, however, NMFS has ample authority to develop a Secretarial Amendment for GOM cod and GB cod: “The Secretary may prepare a fishery management plan, or an amendment to any such plan, in accordance with the national standards, the other provisions of this Act, and any other applicable law, if (A) the appropriate Council fails to develop and submit to the Secretary, after a reasonable period of time, a fishery management plan for such fish, or any necessary amendment to such a plan if such fishery requires conservation and management[.]” *Id.* § 1854(c)(1)(A). CLF is aware of at least 12 times that NMFS has used this authority.²³

Further, as noted above, NMFS has a non-discretionary duty to prepare a Secretarial plan or amendment where the Council has failed to submit a plan or amendment that complies with rebuilding requirements. *Id.* § 1854(e)(5): “If . . . the Council does not submit to the Secretary a fishery management plan, plan amendment, or proposed regulations required by paragraph (3)(A)[that ends overfishing immediately and rebuilds affected stocks of fish], the Secretary shall prepare a fishery management plan or plan amendment and any accompanying regulations to stop overfishing and rebuild affected stocks of fish. . . .” *Id.*

²³ Northeast Multispecies Secretarial Amendment, 59 Fed. Reg. 32,134 (June 22, 1994) (implementing disapproved measures in Amendment 5 to ensure emergency rule measures to protect haddock were permanent); Red Grouper Secretarial Amendment, 69 Fed. Reg. 33,315 (June 15, 2004) and Amberjack Secretarial Amendment, 68 Fed. Reg. 39,898 (July 3, 2003) (implementing measures to bring fishery into compliance with rebuilding requirements after council failed to meet the deadline); Pacific Coast Groundfish Fishery Management Plan Secretarial Amendment, 76 Fed. Reg. 77,415 (Dec. 13, 2011) (implementing rebuilding plans for overfished species after NMFS disapproved council’s proposed Amendment 16-5 and council decided not to resubmit a revised amendment); New England Small-Mesh Multispecies Fishery Secretarial Amendment, 77 Fed. Reg. 19,138 (Mar. 30, 2012) (implementing ACLs and AMs to bring fishery into compliance with new MSA requirements pending Council development of Amendment 19 to the FMP); Tanner Crab Secretarial Amendment, 52 Fed. Reg. 17,577 (May 11, 1987) (implementing emergency measures until the Council could prepare a new FMP to properly specify MSY and OY); Atlantic Sea Scallop Secretarial Amendment, 52 Fed. Reg. 1,462 (Jan. 14, 1987) (implementing emergency measures to avert severe economic hardship in the fishery and allow experimental fishing exemptions); Red Drum Fishery Secretarial Amendment, 51 Fed. Reg. 46,675 (Dec. 24, 1986) (implementing measures to replace emergency rules establishing quotas and harvest limitations, permitting and reporting requirements, and procedures for annual modification of the quotas to prevent overfishing); Ocean Salmon Secretarial Amendment, 47 Fed. Reg. 38,545 (Sept. 1, 1982) (implementing season and gear restrictions for commercial ocean salmon fisheries to replace disapproved portion of FMP amendment after Council notified NMFS of its intent not to alter its recommendations); Atlantic Mackerel and Butterfish Secretarial Amendment, 47 Fed. Reg. 33,512 (Aug. 3, 1982) (extending effective dates to allow Council sufficient time to prepare Amendment 3 merging the Atlantic Mackerel, Squid, and Butterfish FMPs); and Atlantic Surf Clam and Ocean Quahog Secretarial Amendment, 47 Fed. Reg. 42,68 (Jan. 29, 1982) (extending vessel moratorium until Council could develop a limited entry permit system).

E. Emergency Action Required to End Overfishing

NMFS has established criteria to guide any emergency action decision, a procedure that by-passes notice and comment rulemaking. 16 U.S.C. § 1855(c). First, the need for the action must be driven by recent, unforeseen events. Second, the failure to act through emergency action must present serious conservation and management problems. And third, the criteria require that the immediate benefits of the emergency rulemaking must outweigh those that would otherwise be provided by public notice, comment, and deliberation.²⁴ The circumstances here underlying CLF's request for emergency action meet those criteria as we will demonstrate below.

F. Petitioner's Right to Petition

Under the APA, all citizens have the right to petition federal agencies for the "issuance, amendment, or repeal" of an agency rule. 5 U.S.C. § 553(e). A "rule" is the "whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy." *Id.* § 551(4). This petition for emergency and permanent rulemaking is brought before NMFS under that authority.

The APA further requires that "within a reasonable time, each agency shall proceed to conclude a matter presented to it." *Id.* § 555(b). Accordingly, the Secretary must "fully and promptly consider" all petitions presented to him. *WWHT, Inc. v. F.C.C.*, 656 F.2d 807, 813 (D.C. Cir. 1981). If a petition is denied, the agency must provide "a brief statement of the grounds for denial," 5 U.S.C. § 553(3), and the petitioning party is entitled to a "response on the merits of the petition." *Fund for Animals v. Babbitt*, 903 F. Supp. 96, 115-116 (D.D.C. 1995). Federal courts have authority to compel agency action on petitions that is unlawfully withheld or unreasonably delayed. 5 U.S.C. § 555(b).

Finally, the APA provides for judicial review of NMFS's final agency action on this Petition. *Id.* §§ 701-706. Under the APA's judicial review provision, agency actions are to be set aside if they are arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law. *See Id.* § 706(2). It is well settled that in any such action an "agency must examine the relevant data and articulate a satisfactory explanation for its action" that does not "run[] counter to the evidence before the agency" and that "include[s] a rational connection between the facts found and the choice made." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto Ins. Co.*, 463 U.S. 29, 43 (1983) (internal quotation marks omitted).

As discussed above, because the Council has repeatedly failed to develop and submit the necessary measures to end overfishing and rebuild Atlantic cod, NMFS has both ample legal authority and a statutory mandate to take the requested Secretarial actions under the MSA. 16 U.S.C. § 1854(b)(1)(B), (b)(3), (c)(1)(A), (e); *Id.* § 1855(c), (d). NMFS must now prepare an appropriate suite of conservation and management measures that will end overfishing immediately and rebuild the two cod stocks in a timeframe that does not exceed 10 years.

²⁴ *See* NMFS Policy Guidelines for the Use of Emergency Rules, 62 Fed. Reg. 44,421 (Aug. 21, 1997).

IV. Historical Background

Atlantic cod has been a dominant predatory fish species in the cold waters off the U.S. northeast coast for millennia. Plentiful populations of cod fed the first humans to inhabit New England's coast over ten thousand years ago and provided a steady source of protein for generations of coast-dwelling indigenous Americans. For the European colonies, Atlantic cod was New England's founding fish, fueling a global trade in the sought-after species that lasted for centuries. A wooden carving of the "Sacred Cod" hangs in the Massachusetts State House in recognition of the fish's historic cultural and economic importance to the state and region.

While the cod fishery has experienced centuries of population fluctuations, the conservation and management measures developed by the New England Fishery Management Council ("Council" or "NEFMC") and approved by NMFS²⁵ over the last four decades have allowed persistent overfishing and produced overfished cod stocks that hover at historic lows with no meaningful prospects of rebuilding within the statutory timeframe.²⁶

Following the passage of the MSA, Atlantic cod faced new pressure from a growing U.S. domestic fleet eager to replace the fishing capacity of the ousted foreign fleets.²⁷ As a result, cod catch in New England boomed in the late 1970s to 1980s, but then quickly went bust (Figure 4). Rather than learn from the painful lessons of previous decades of foreign overfishing, ineffective limits were placed on the fishing power of this burgeoning offshore fleet despite scientists' warnings of vulnerable stocks.²⁸ NMFS briefly adopted an Interim Groundfish Management Plan for Atlantic cod stocks and others in 1982,²⁹ which was soon replaced by the permanent NE Multispecies FMP in 1986.³⁰ These management efforts were futile in the face of the expanded U.S. fishing fleet as well as new electronic technologies and higher horsepower fishing vessels that allowed them to locate fish and to tow heavy bottom trawling gear through complex habitats that previously had been *de facto* refugia for cod and other species.

²⁵ The MSA holds NMFS, not the regional councils, responsible for ensuring that all FMPs are consistent with MSA requirements. 16 U.S.C. § 1854(a); e.g., *North Carolina Fisheries Ass'n*, 518 F. Supp. 2d 62 at 71-72 (Secretarial review of FMP amendment focuses on its consistency with the substantive criteria set forth in, and the overall objectives of the MSA); see also *Guindon v. Pritzker*, 31 F. Supp. 3d 169 at 197, 201 (if the FMP is inadequate the Fisheries Service "is not left helpless," it "cannot excuse its obligation[s]" by arguing that the Councils should have authorized the conservation measure, and it has a "statutory duty" to ensure the Magnuson-Stevens Act's requirements are met); *Flaherty*, 850 F. Supp. 2d at 54 n.6 (explaining that although the council generally develops an FMP in the first instance, "[the Fisheries Service] may develop its own FMP if a council fails to do so within a reasonable time for a fishery in need of conservation and management, or [the Service] may order a council to take action"); see also S. Rep. No. 94-711, at *41 (1976) (Conf. Rep.), as reprinted in 1976 U.S.C.C.A.N. 660, 664 ("The general responsibility for the carrying out of fishery management plans rests with the Secretary of Commerce.").

²⁶ See 2019 Groundfish Operational Assessments at 26-46.

²⁷ See Anthony VC. 1990. "The New England Groundfish Fishery after 10 Years under the Magnuson Fishery Conservation and Management Act." *North American Journal of Fisheries Management* 10(2):175-184.

²⁸ See Anthony VC. 1990; see also Brown BE. 1980. *The Status of the Fishery Resources on Georges Bank*. Woods Hole Laboratory Ref. Doc. 80-10, at 2. ("Cod on Georges Bank are at a relatively high level, and recent catches exceed 35,000 metric tons per year. The average sustainable long term catch for the Georges Bank area is estimated to be between 30,000-35,000 metric tons.").

²⁹ See NEFMC. "Northeast Multispecies (Groundfish) Fishery Management Plan Overview." Available at: <http://s3.amazonaws.com/nefmc.org/GroundfishFMPOverview.pdf>.

³⁰ NE Multispecies FMP, 51 Fed. Reg. 29,642 (Aug. 20, 1986).

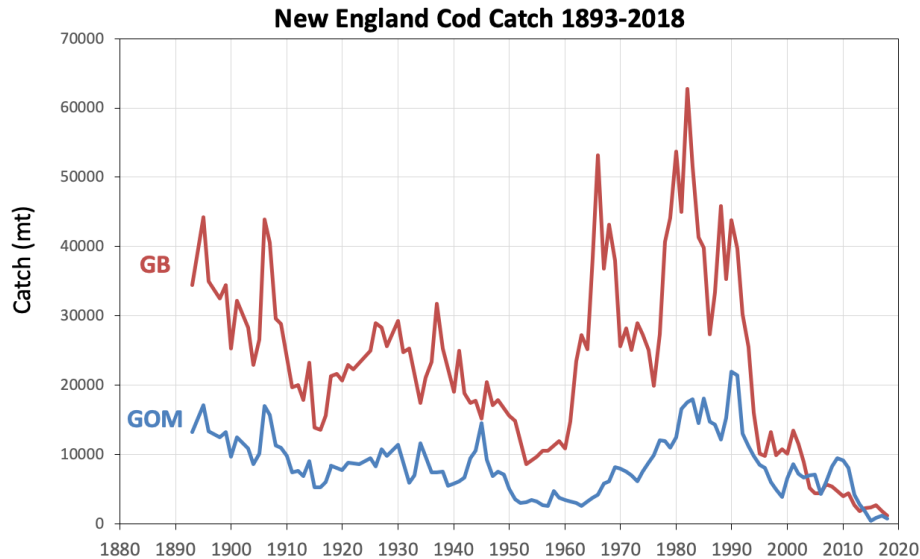


Figure 4: Catch (mt) estimates for GB and GOM cod (1893-2018) showing the increase in catch in the 1960s and 1970s associated with foreign fleets followed by the post-MSA increase in catch by the US fleet in the 1970s and 1980s. Following these periods of heavy overfishing, catches for both stocks declined in the 1990s to current historic lows. Data shown are estimates of total commercial landings until 1981 for GOM cod and until 1977 for GB cod.³¹ Thereafter, data points are estimates of total commercial and recreational catch, including landings and discards.³²

The abundance of the entire groundfish complex declined by *65 percent* in the first ten years of management by NMFS and the Council (1977 to 1987).³³ Catch of Atlantic cod has never again reached the peak that it achieved in the early 1980s nor even the more stable catches of the early 20th century (Figure 4). Today, some forty years later, the situation has grown significantly worse: U.S. cod stocks have plummeted to even lower levels of biomass, overfishing has continued unabated, and there is virtually no prospect of rebuilding within statutory timeframes under the management actions currently approved by NMFS.³⁴

V. NMFS Repeatedly Approved Council Actions that Failed to Prevent and End Overfishing to Rebuild Overfished Atlantic Cod Stocks

Rather than create a flagship of U.S. fisheries management, NMFS made Atlantic cod the poster child for fishery management failure and the consequences of adopting short-term economic decisions that jeopardized the long-term future of this once seemingly inexhaustible fishery. With full knowledge of the circumstances and the scientific advice, NMFS has

³¹ Data sources: Mayo RK, O'Brien L, and Serchuk FM. 1993. *Assessment of the Gulf of Maine Cod Stock for 1992*. NEFSC Ref. Doc. 93-04, at 1. Available at: <https://www.nefsc.noaa.gov/publications/crd/pdfs/crd9304.pdf>; Serchuk FM, O'Brien L, Mayo RK, and Wigley SE. 1993. *Assessment of the Georges Bank cod stock for 1992*. NEFSC Ref. Doc. 93-05, at 1. Available at: <https://www.nefsc.noaa.gov/publications/crd/pdfs/crd9305.pdf>.

³² Data sources: 55th SAW Assessment Report at 114 and 689; NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 3; NEFSC. 2019. *Georges Bank Atlantic Cod Tables* (Draft; Supplement to 2019 Operational Groundfish Assessments), at 2.

³³ Anthony VC. 1990 at 182.

³⁴ See 2019 Groundfish Operational Assessments at 24-46.

repeatedly approved actions that did not end overfishing or rebuild cod due to the failure to: (1) address low recruitment; (2) address bias and uncertainty in stock assessments; (3) increase uncertainty buffers when setting catch limits; and (4) select appropriate control rule options. NMFS cannot keep falling back on its hollow claim that the approved catch limits for cod technically fell within the maximum bounds authorized by the quantitative results of the stock assessments—that strategy has failed time and again.

A. NMFS’s Longstanding Failure to Prevent and End Overfishing

NMFS has failed to prevent and end overfishing of Atlantic cod for decades. In fact, the first assessment of Atlantic cod after implementation of the MSA that was conducted in 1977 determined that both stocks were subject to overfishing.^{35, 36} With the advent of the current Northeast Stock Assessment Workshop (“SAW”) process, the resulting peer-reviewed, model-based assessments (1986 for GB cod and 1988 for GOM cod) found that the stocks were in poor condition with spawning stock biomass (“SSB”) at historic lows and fishing mortality at historic highs with overfishing occurring (Table 1).^{37, 38} Under the current definitions based on the fishing mortality rate and spawning stock biomass that would produce the maximum sustainable yield (respectively, “ F_{MSY} ” and “ SSB_{MSY} ”),³⁹ GOM and GB cod were designated as “overfished” and “subject to overfishing” in the 2002 stock assessments.⁴⁰ Every assessment since then has reached the same conclusion, with the sole exception being the 2008 assessment, where the GOM cod stock, while still identified as being subject to overfishing, was determined to be not overfished.⁴¹ This determination, however, was based on unusually high uncertainty associated with the 2007 federal survey data,⁴² and subsequent assessments soon found that the stock had been in fact overfished at the time of the 2008 assessment.⁴³

³⁵ See Serchuk FM, Wood PW, Clark SH, and Brown BE. 1977. *Analysis of the Georges Bank and Gulf of Maine cod stocks*. NEFC Ref. Doc. 77-24. Available at:

<https://www.nefsc.noaa.gov/publications/series/whlrd/whlrd7724.pdf>.

³⁶ “Growth overfishing” was determined to be occurring: fishing mortality exceeded F_{MAX} , one of the biological reference points of the time, defined as the rate that produces the maximum yield per recruit. F_{MAX} is generally higher than F_{MSY} , the current biological reference point used to define overfishing.

³⁷ Fishing mortality for both stocks far exceeded F_{MAX} , indicating that the stocks were growth overfished and the reviews expressed concern that the stocks were also in danger of “recruitment overfishing,” the point at which the stock is so depleted that the population cannot replenish itself (i.e., recruitment is compromised).

³⁸ Serchuk FM and Wigley SE. 1986. *Assessment and status of the Georges Bank and Gulf of Maine Atlantic cod stocks - 1986*. NEFC Ref. Doc. 86-12. Available at:

https://www.researchgate.net/publication/285587022_Assessment_and_status_of_the_Georges_Bank_and_Gulf_of_Maine_Atlantic_cod_stocks_-_1986.

³⁹ Presently, reported fishing mortality rates and F_{MSY} are based on fully-recruited fishing mortality. F_{MSY} is estimated based on the proxy of $F_{40\%}$, the fishing mortality rate that reduces the SSB per recruit to 40% of that present in the absence of fishing.

⁴⁰ 55th SAW Summary Report.

⁴¹ NEFSC. 2008. *Assessment of 19 Northeast Groundfish Stocks through 2007: Report of the 3rd Groundfish Assessment Review Meeting (GARM III)*. NEFSC Ref. Doc. 08-15, at 234. Available at:

<https://www.nefsc.noaa.gov/publications/crd/crd0815/crd0815.pdf>.

⁴² NEFSC. 2012. *53rd Northeast Regional Stock Assessment Workshop Assessment Summary Report*. NEFSC Ref. Doc. 12-03, at 14. Available at: <https://www.nefsc.noaa.gov/saw/saw53/crd1203.pdf>.

⁴³ *Id.*

YEAR	MEETING	GOM COD STATUS	GB COD STATUS
1986	SAW 3	Overfishing *	Overfishing
1988	SAW 7	Overfishing	Overfishing
1990	SAW 11	N/A	Over-exploited, not depleted
1991	SAW 12 (GOM) & SAW 13 (GB)	Over-exploited, medium stock level	Over-exploited, medium stock level
1993	SAW 15	Over-exploited, low biomass level	Over-exploited, low biomass level
1994	SAW 18	N/A	Over-exploited, low biomass level
1995	SAW 19	Over-exploited, low biomass level	N/A
1997	SAW 24	Over-exploited, low biomass level	Over-exploited, low biomass level
1998	SAW 27	Over-exploited, low biomass level	Over-exploited, low biomass level
2000	TRAC 3	N/A	Overfishing not occurring, not overfished
2001	SAW 33 (GOM) & TRAC 4 (GB)	Overfishing occurring, not overfished	Overfishing not occurring, not overfished
2002	GARM I	Overfishing occurring, overfished	Overfishing occurring, overfished
2005	GARM II	Overfishing occurring, overfished	Overfishing occurring, overfished
2008	GARM III	Overfishing occurring, not overfished **	Overfishing occurring, overfished
2011	SAW 53	Overfishing occurring, overfished	N/A
2012	Update	N/A	Overfishing occurring, overfished
2012	SAW 55	Overfishing occurring, overfished	Overfishing occurring, overfished
2014	Update	Overfishing occurring, overfished	N/A
2015	Operational Assessment	Overfishing occurring, overfished	Overfishing occurring,*** overfished
2017	Operational Assessment	Overfishing occurring, overfished	Overfishing occurring,*** overfished
2019	Operational Assessment	Overfishing occurring, overfished	Overfishing occurring,*** overfished

Table 1: GOM cod and GB cod status determinations based on stock assessments (1986-2019). *See Appendix A for full table with citations and relevant quotations regarding management advice and citations.* * SAW 3 was based on analysis of empirical data rather than an analytical model. The 1986 GB cod assessment, and most subsequent assessments for both stocks, were model-based. ** GARM III “not overfished” determination for GOM cod was based on unusually high uncertainty associated with the 2007 federal survey data; subsequent assessments found that the stock was in fact overfished at the time of the 2008 assessment (see text and Appendix A). *** Recent GB assessments have recommended that overfishing status was unknown, given the lack of an accepted assessment model. As explained above, however, NMFS policy is to base the determination on the last known status, hence the GB stock status continues to be overfishing occurring.

The best scientific information available, notably including the 2019 operational stock assessment, demonstrates that Atlantic cod has experienced overfishing for 100 percent of the time periods covered by the assessments (GOM cod: 1982-2018; GB cod: 1978-2011), and has been overfished in all but two years of these time frames (Table 1; Figures 2 and 3, respectively). The “historic lows” in biomass of the 1980s identified at the time of the initial SAWs now represent historic highs in the time period covered by the assessment models, and the most recently accepted assessment models estimate SSB in both stocks at less than 10 percent of the target SSB_{MSY} . Given the earlier history of the fisheries (Figure 4), moreover, it is highly likely that both stocks have been subject to overfishing for much longer. In both stocks, fishing mortality has routinely exceeded the overfishing reference points by more than a factor of three, and as recently as 2014, fishing mortality in the GOM was more than ten times higher than F_{MSY} .⁴⁴

Translating the magnitude of these fishing mortality rates into more intuitive quantities, the peaks in fishing mortality for the two stocks during the early 1990s and again in the 2010s (Figure 2) correspond to *60-80 percent of the entire recruited stock being caught each year*.

1. Failure to Prevent and End Overfishing of Gulf of Maine Cod

Stock assessments consider myriad factors to determine stock status including stock size, fishing pressure, stock range and abundance, and age structure, all of which are indicative of management success or failure. GOM cod is presently overfished with overfishing occurring.⁴⁵ The most recent assessment for GOM cod estimates that the stock is at only 6 to 9 percent of its spawning stock biomass target (Figure 5).⁴⁶ SSB has been gradually inching up from its 2014 nadir, but as developed further below, survey indices continue to decrease, recruitment continues to hover around historic lows, and the assessment model is plagued by uncertainty. While fishing pressure has been reduced in recent years (at least on paper), it still remains at least 9 to 13 percent higher than F_{MSY} .⁴⁷ Note also that these percent overages are likely under-estimates as they do not account for the retrospective patterns evident in the models, which tend to decrease estimates of fishing mortality. Furthermore, although fishing mortality is increasingly nearing F_{MSY} , it remains far above levels necessary for rebuilding. F_{MSY} is the fishing rate that is only meant to be associated with a healthy stock, not an overfished stock, and even then, the Council’s control rule sets the proper fishing mortality for a healthy stock at $75\%F_{MSY}$.

⁴⁴ NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 33.

⁴⁵ 2019 Groundfish Operational Assessments at 26.

⁴⁶ *Id.*

⁴⁷ *Id.*

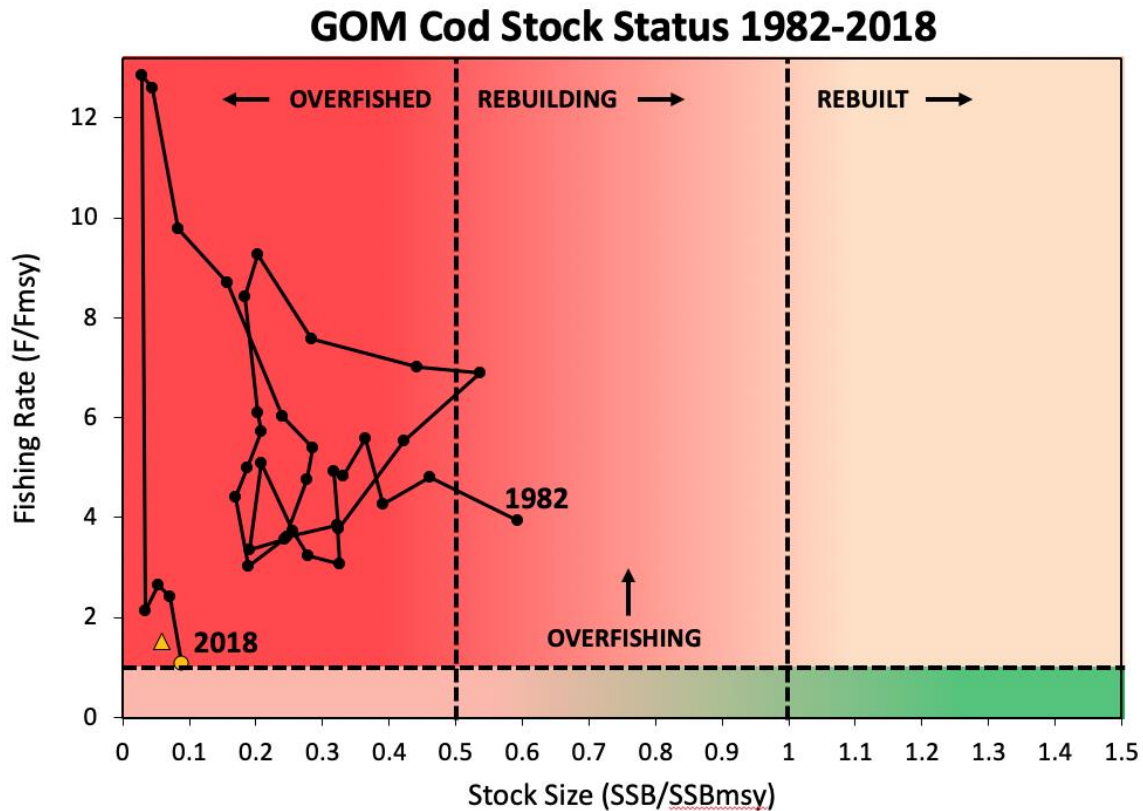


Figure 5: GOM cod stock status (1982-2018). The stock has been subject to overfishing for the entirety of the assessment time period and overfished for all but two years. Each point corresponds to a year and shows the estimated fishing mortality (F) relative to target F_{MSY} as well as the estimated spawning stock biomass relative to target SSB_{MSY} . Under current definitions, a stock is subject to overfishing when the F/F_{MSY} ratio exceeds 1 and overfished when SSB is less than half of SSB_{MSY} . A stock is only rebuilt when SSB exceeds the target SSB_{MSY} . Data plotted are estimates from the $M=0.2$ model (the other accepted model for this stock, M -ramp, is not graphed here but shows a similar pattern). This $M=0.2$ model suffers from a significant retrospective pattern, which acts to decrease estimated fishing pressure and inflate SSB for years towards the end of the time series. The yellow dot indicates 2018, the last year included in the assessment. The yellow triangle shows corrected 2018 values as adjusted for the retrospective pattern.⁴⁸

In addition, spring and fall trawl surveys conducted by the Northeast Fisheries Science Center (“Science Center” or “NEFSC”) reveal a substantial contraction in spatial distribution relative to the stock’s historical range (Figure 6), leaving the remnants of the GOM cod population concentrated in a small area in the western GOM and making them especially vulnerable to continued overfishing.⁴⁹ Such concentration potentially leads to the perception

⁴⁸ Data Source: NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 32, 33, 39, and 40.

⁴⁹ Cardigan N. 2012. *55th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC): Benchmark stock assessments for Georges Bank cod and Gulf of Maine cod*. Center for Independent Experts (CIE) Independent Peer Review Report, at 27. Available at: https://www.nefsc.noaa.gov/saw/saw55/2013_01_02%20Cadigan%20SARC%2055%20review%20report.pdf;

among some fishermen that the stock is in a healthier state than it really is.⁵⁰ The federal trawl surveys further reveal that stock size has steadily, albeit variably, declined since the 1960s, with the biomass index reaching its lowest level on record in the fall of 2019 (Figure 7). This decline is mirrored in the annual survey of inshore waters conducted by the Massachusetts Division of Marine Fisheries (“MA DMF”),⁵¹ as well as the MA-sponsored Industry-Based Survey,⁵² which uses industry vessels to sample the inshore region where GOM cod are presently concentrated.

Spatial Distribution of GOM Cod

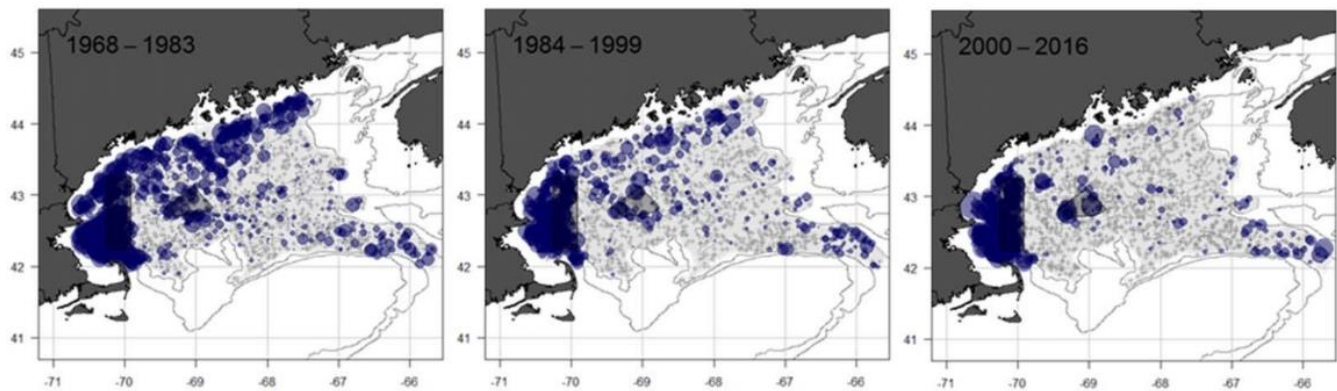


Figure 6: Spatial distribution of NEFSC spring and fall bottom trawl survey cod catches (numbers/tow, larger catch size indicated by larger circles), showing the contraction in distribution in recent years for the GOM stock. Grey shaded areas show Western Gulf of Maine and Cashes Ledge closures.⁵³

The Science Center, MA DMF, and Industry-Based surveys also confirm a severely truncated age structure⁵⁴ with few older, adult cod (Figure 8), indicative of a population experiencing high mortality.⁵⁵ Furthermore, recruitment remains near record lows with few positive signs of incoming recruitment.⁵⁶ This low recruitment coupled with continued

⁵⁰ Casey J. 2012. *Independent Peer Review Report on the 55th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC): Benchmark stock assessments for Georges Bank cod and Gulf of Maine cod*, at 24. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.387.6445&rep=rep1&type=pdf>. (“A concentration of the fishery on the areas where the remaining population is concentrated may result in the maintenance of fishery catch rates, make the stock more vulnerable to fishing and give the perception that the stock is in a healthier state than it really is.”).

⁵¹ NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 24.

⁵² MA DMF. “Marine Fisheries’ Gulf of Maine Cod Industry-Based Survey (IBS): Spring/Summer 2017 to Begin and 2016/2017 Preliminary Results.” Notice dated March 29, 2017. Available at: <https://www.mass.gov/files/documents/2017/03/bab/IBS%2520Survey%25202017.pdf>.

⁵³ Reproduced from NEFSC. 2017. *Gulf of Maine Atlantic Cod 2017 Assessment Update Report Supplemental Information* (Draft), at 78.

⁵⁴ 2019 Groundfish Operational Assessment at 29; see also MA DMF. “Marine Fisheries’ Gulf of Maine Cod Industry-Based Survey (IBS): Spring/Summer 2017 to Begin and 2016/2017 Preliminary Results.” Notice dated March 29, 2017. Available at: <https://www.mass.gov/files/2017-08/ibs-survey-2017.pdf>.

⁵⁵ 2019 Groundfish Operational Assessment at 29.

⁵⁶ *Id.*

overfishing eliminates any prospects of the GOM cod stock meeting its 2024 rebuilding date.⁵⁷ Scientific concerns regarding low recruitment rates, and the related issue of truncated age structure, have been repeatedly raised in the many stock assessments of the past several decades (Appendix A), but any development or implementation of conservation and management measures that would respond to those concerns has been routinely ignored by managers.

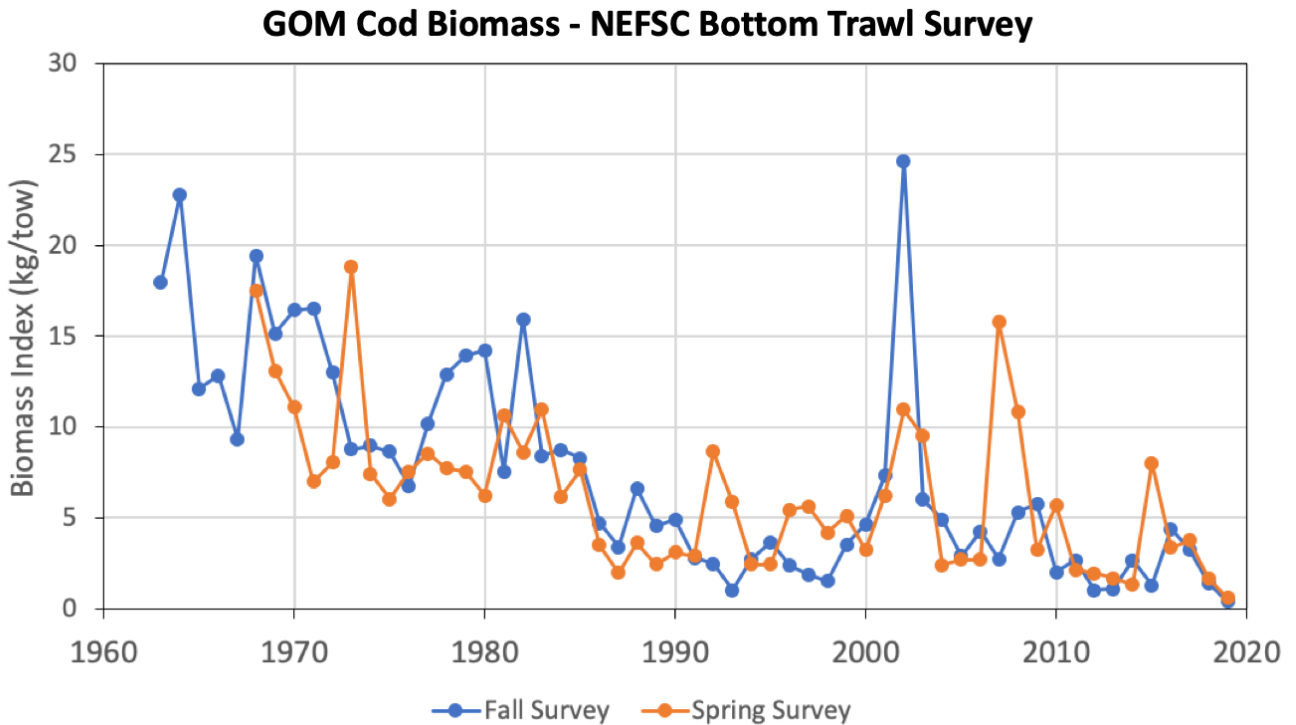


Figure 7: GOM cod biomass index (kg/tow) from NEFSC bottom trawl surveys conducted biannually in spring and fall, 1963-2019. These survey data are independent of fishery catch data and show a strong decline from highs in the 60s-70s to a historical low in the most recent survey (fall 2019).⁵⁸

⁵⁷ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022” dated Oct. 10, 2019 & revised Oct. 15, 2019, at 7.

⁵⁸ Data Source: NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 24. Updated for fall 2019 survey based on C. Perretti (NEFSC) pers. comm.

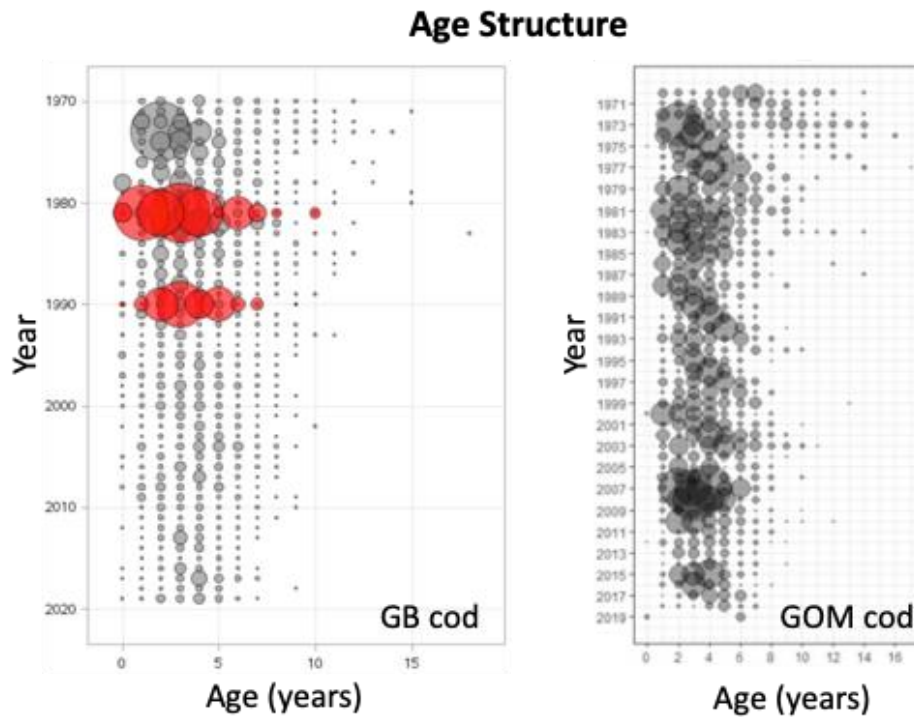


Figure 8: Age frequency distributions of GB and GOM cod from NEFSC spring bottom trawl surveys (1970 through 2019) demonstrate truncated age structure in both stocks in recent years.⁵⁹ The red data points represent years with incomplete sampling or age-length information.

2. Failure to Prevent and End Overfishing of Georges Bank Cod

Currently, without an accepted analytical model, stock size and fishing mortality cannot be quantitatively assessed for GB cod. Based on the last accepted assessment model (2012) though, the stock was only at 7 percent of its spawning stock biomass target, and fishing pressure was more than twice as high as F_{MSY} (Figure 9).⁶⁰

⁵⁹ Reproduced from NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Figures (Draft)*, at 22; NEFSC. 2019. *Georges Bank Atlantic Cod Figures (Draft; Supplement to 2019 Operational Groundfish Assessments)*, at 31.

⁶⁰ 55th SAW Summary Report.

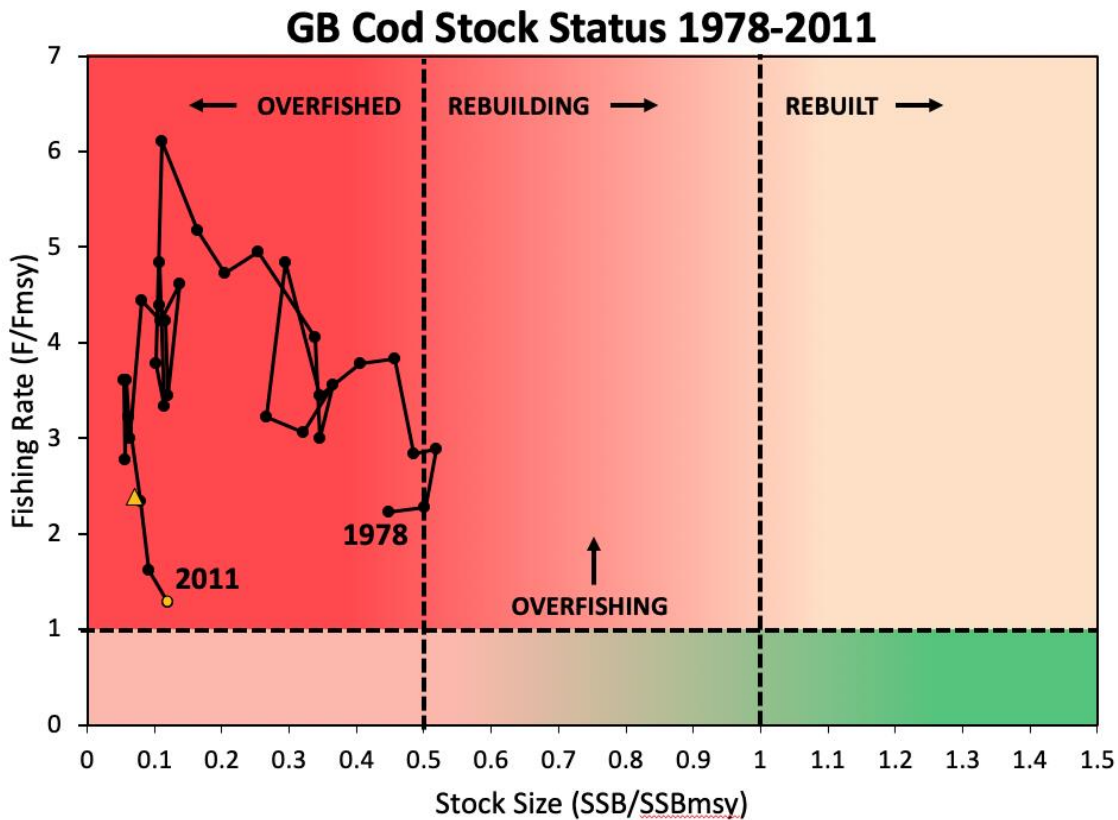


Figure 9: GB cod stock status (1978-2011). The stock has been subject to overfishing for the entirety of the time period and overfished for all but two years. The 2012 benchmark assessment is the last accepted analytical model, so estimates of SSB and fishing mortality are not available for more recent years. This model suffers from a significant retrospective pattern, which acts to understate estimated fishing pressure and overstate SSB for years towards the end of the time series. The yellow dot indicates 2010, the last year included in the assessment. The yellow triangle shows corrected 2010 values as adjusted for the retrospective pattern.⁶¹

In the absence of an accepted analytical model, survey indices provide the primary basis for assessing the fishery and show no robust evidence of recovery. The Science Center trawl surveys have shown a substantial decrease in the abundance and biomass of GB cod as compared to highs in the 1970s and 1980s. Since the mid-1990s, abundance and biomass have varied but continue to linger at reduced levels (Figure 10). Trawl surveys conducted by the Canadian Department of Fisheries and Oceans on the eastern portion of Georges Bank mirror the U.S. surveys and show similar low abundance and biomass for cod in this area.⁶² Also, similar to GOM cod, GB cod exhibits a severely truncated age structure (Figure 8).⁶³

⁶¹ Data Sources: 55th SAW Assessment Report at 742; 55th SAW Summary Report at 26.

⁶² Barrett M, Legault CM, Irvine F, and Andrushchenko I. 2019. *Data Update for Eastern Georges Bank Cod in 2019*. Transboundary Resources Assessment Committee Ref. Doc. (Draft).

⁶³ 2019 Operational Groundfish Assessments at 40.

GB Cod Biomass - NEFSC Bottom Trawl Survey

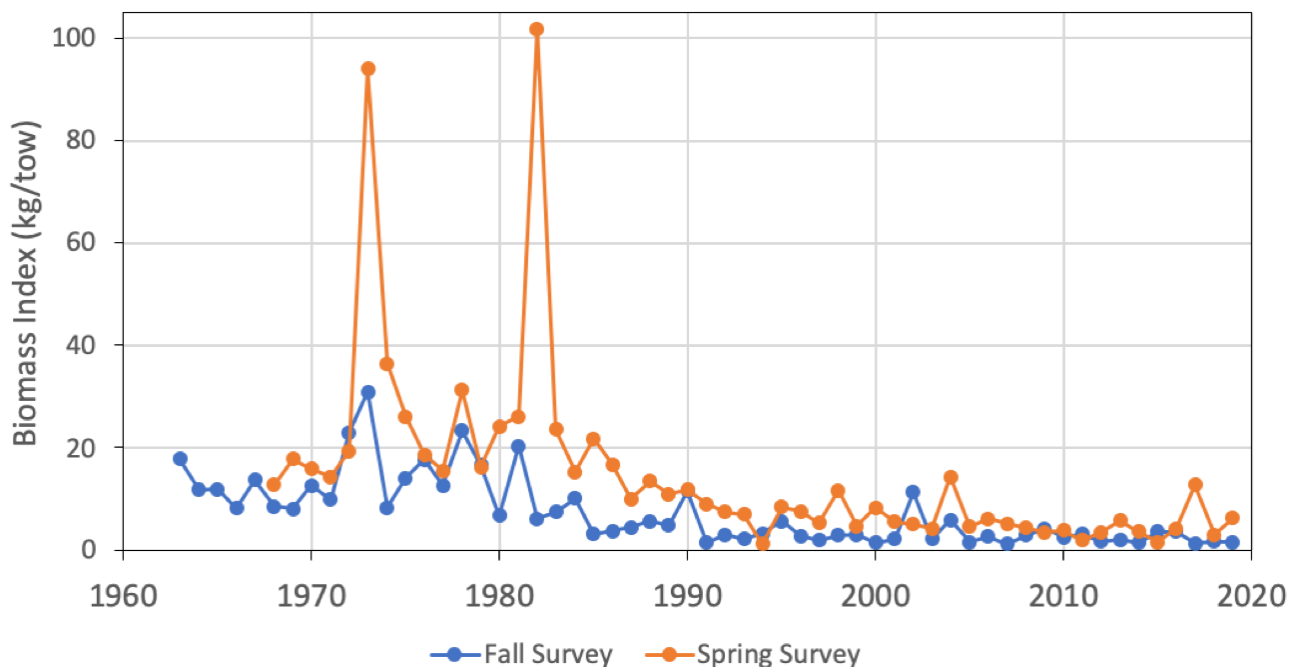


Figure 10: GB cod biomass index (kg/tow) from NEFSC bottom trawl surveys conducted biannually in spring and fall, 1963-2019. These survey data are independent of fishery catch data and show a strong decline from overall highs in the 60s-80s and overall low but variable biomass from the 90s through present.⁶⁴

3. Failure to Account for Low Recruitment Despite Persistent Overfishing

Rebuilding GOM and GB cod populations depends upon improved recruitment into the fishery—that is, on the ability to add new fish to the adult population each year. For both stocks, the number of age-1 fish recruiting to the stocks is at or near record low levels, having dropped significantly from the highs of the 1980s.⁶⁵ A high number of age-0 fish caught in the MA DMF spring 2019 survey⁶⁶ provides a glimmer of hope for future GOM cod recruitment although in the past, similar age-0 signals have not carried through to recruitment of older, reproductively mature fish.⁶⁷ Stock assessment scientists have cautioned: “If recent weak recruitment of Gulf of Maine cod continues, productivity and rebuilding of the stock will be less than projected.”⁶⁸

In addition to low stock size due to excessively high fishing rates, low recruitment can be caused by other factors. For example, as discussed further below, a lack of large female cod in

⁶⁴ Data Source: NEFSC. 2019. *Georges Bank Atlantic Cod Tables*. (Draft; Supplement to 2019 Operational Groundfish Assessments), at 10.

⁶⁵ 2019 Groundfish Operational Assessment at 35; 55th SAW Summary Report.

⁶⁶ NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 24.

⁶⁷ 2019 Groundfish Operational Assessment at 31.

⁶⁸ Palmer MC. 2014. *2014 Assessment update report of the Gulf of Maine Atlantic cod stock*. NEFSC Ref. Doc. 14-14, at 11. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1414/crd1414.pdf>.

both stocks has been repeatedly identified as likely contributing to low recruitment rates.⁶⁹ Likewise, warming ocean temperatures, increased mortality, and changing prey availability for developing larvae due to climate change have been implicated in reducing the current recruitment success of GOM cod and potentially GB cod.⁷⁰ Impaired population dynamics and reproduction at low spawning stock biomass,⁷¹ depletion of spawning grounds,⁷² and disruption of spawning behaviors by fishing activities⁷³ all likely also play a role.

To date, NMFS has unreasonably approved conservation and management measures that consistently fail to account for and respond to the many factors associated with the low recruitment of Atlantic cod.

4. Failure to Account for Significant Bias and Uncertainty in the Stock Assessments Despite Persistent Overfishing

The assessment models for both stocks are confounded by multiple sources of error. Chief among these is a consistent pattern of bias, referred to as a retrospective pattern, wherein each successive time the stocks are assessed, the stock biomass estimates from the latter years of the previous assessment prove to have been too high and fishing level estimates to have been too low.⁷⁴ Specific scientific caveats about retrospective patterns in the assessments should have cautioned managers to be conservative when setting catch limits, but these have been ignored by the Council and NMFS. For example, in the 2017 GOM cod stock assessment, a retrospective pattern adjustment to one of the models would have set the ABC more than 36 percent lower than the uncorrected model.⁷⁵ At the time, the assessment “special comments section” cautioned that “[w]hen setting catch advice, careful attention should be given to the retrospective error present in both models, particularly given the poor performance of previous stock projections.”⁷⁶ Prior to the catch limits currently under consideration in Framework 59,⁷⁷ however, the adjustment has not been used for catch advice, and up until the 2019 assessment was only

⁶⁹ See Appendix A.

⁷⁰ Pershing AJ, Alexander MA, Hernandez CM, Kerr LA, Le Bris A, Mills KE, Nye JA, Record NR, Scannell HA, Scott JD, Sherwood GD, and Thomas AC. 2015. “Slow adaptation in the face of rapid warming leads to collapse of the Gulf of Maine cod fishery.” *Science* 350(6292): 809-812.; Friedland KD, Kane J, Hare HA, Lough RG, Fratantoni PS, Fogarty MJ, and Nye JA. 2013. “Thermal habitat constraints on zooplankton species associated with Atlantic cod (*Gadus morhua*) on the US Northeast Continental Shelf.” *Progress in Oceanography* 116:1-13.

⁷¹ Hutchings JA. 2014. “Renaissance of a caveat: Allee effects in marine fish.” *ICES Journal of Marine Science* 71:2152-2157; Rowe S, Hutchings JA, Bekkevold D, and Rakitin A. 2004. “Depensation, probability of fertilization, and the mating system of Atlantic cod (*Gadus morhua* L.)” *ICES Journal of Marine Science* 61:1144-1150.

⁷² Ames EP. 2004. “Atlantic cod stock structure in the Gulf of Maine.” *Fisheries*. 29(1):10–28.

⁷³ Dean MJ, Hoffman WS, and Armstrong MP. 2012. “Disruption of an Atlantic Cod Spawning Aggregation Resulting from the Opening of a Directed Gill-Net Fishery.” *North American Journal of Fisheries Management* 32:124-134.

⁷⁴ 2019 Groundfish Operational Assessments at 28 and 39.

⁷⁵ NEFSC 2017. *Gulf of Maine Atlantic Cod 2017 Assessment Update Report Supplemental Information* (Draft), at 42.

⁷⁶ NEFSC. 2017. *Operational Assessment of 19 Northeast Groundfish Stocks, Updated Through 2016*. NEFSC Ref. Doc. 17-17, at 30. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1717/crd1717.pdf>.

⁷⁷ See NEFMC. *Groundfish: Council Approves Framework 59; Receives Progress Report on Monitoring Amendment 23*. Press release published Dec. 17, 2019. Available at: <https://s3.amazonaws.com/nefmc.org/Groundfish-Council-Approves-FW-59-Receives-A23-Update.pdf>.

provided as a sensitivity analysis. The result of this risk-prone approach, predictably, has been persistent overfishing even when annual catch limits have technically been set below the modeled overfishing limit.

In the case of the GB stock, the retrospective pattern became so severe by the 2015 assessment that attempted technical model adjustments led to implausible outcomes and the model was rejected for management advice.⁷⁸ In its place, as discussed below, an empirical model that combines recent catch levels with survey results has been used to provide catch advice. Significant uncertainty remains in the GB stock assessment because the empirical approach cannot make any quantitative estimates or projections of current or future biomass and fishing levels, and hence quantitative stock status and rebuilding progress.

The specific causes of the retrospective patterns relate to conditions changing over the course of the model time period in ways not captured by the input data and/or model parameterization. Among other reasons, this could relate to: (1) unaccounted-for catch such as illegal discards; (2) changes in natural mortality, including relating to climate change; (3) changes in commercial or recreational catch selectivity; and (4) changes in survey selectivity, or some combination of those reasons. Discerning among these possibilities and solving them is not easy, but 100 percent monitoring—which the agency to date has refused to require⁷⁹—would at a minimum address unaccounted-for catch as a potential factor.

An additional significant source of uncertainty in the GOM cod assessment is the estimate of natural mortality (“M”). Currently, two GOM cod models are accepted for management advice (M=0.2 and M-ramp), each with different assumptions about the level of natural mortality.⁸⁰ The M-ramp model was introduced at the 2012 benchmark assessment in an effort to address the significant retrospective pattern in the M=0.2 model and, on the basis of limited evidence, potential changes in natural mortality over time.⁸¹ Although the stock trends evidenced by the two models are relatively similar, they differ in the magnitude of their estimates of stock biomass, recruitment, and fishing mortality⁸² and hence lead to different calculations of catch advice. A related issue concerns the assumed level of natural mortality used in making projections with the M-ramp model, which further increases the range of options available in determining catch advice. This increasing range of options has provided the rationale and excuse for setting higher catch limits than a more conservative approach would produce. Further, given

⁷⁸ NEFSC. 2015. *Stock Assessment Update of 20 Northeast Groundfish Stocks Through 2014*. NEFSC Ref. Doc. 15-24, at 39. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1524/crd1524.pdf>.

⁷⁹ See Amendment 16, 75 Fed. Reg. 18,262, 18,342 (Apr. 9, 2010) (“Beginning in fishing year 2012, coverage levels for an at-sea monitoring program shall be specified by NMFS, but shall be less than 100 percent of all sector trips.”).

⁸⁰ The M=0.2 model assumes the standard natural mortality level of 0.2. The M-ramp model assumes that over the assessment time period natural mortality has increased from 0.2 to a current level of 0.4. Two variants of the M-ramp model are used for projections, either assuming that natural mortality would decrease back to 0.2 or that it would remain at 0.4. As recently as 2015 both variants were used in setting catch advice, despite assessment scientists agreeing that an immediate return to 0.2 (the variant that leads to higher catch advice) is an unlikely scenario.

⁸¹ 55th SAW Assessment Report. Note also that concerns about a possible increase in natural mortality were raised for GB cod as well, at the time of the last accepted model-based assessment.

⁸² 2019 Groundfish Operational Assessment at 28.

that the M-ramp model itself now suffers from a growing retrospective pattern⁸³ and given the confusion introduced by multiple model options and associated projections, the uncertainties related to the true natural mortality must be reconciled.

As elaborated below, substantial additional error, i.e., beyond just the implications for retrospective patterns, is introduced into the assessments and models by uncertainty with respect to the accuracy of fishery catch data, the true population structure of cod in the New England region relative to the two stock units (i.e., GOM and GB cod) assumed for assessment and management, and possible environmental and climate change-related impacts on stock and ecosystem productivity.

5. Failure to Adjust Uncertainty Buffers Despite Persistent Overfishing

To account for uncertainty in stock assessments, catch data, and catch advice, scientists and managers are required to apply a scientific uncertainty buffer between the OFL and ABC and a management uncertainty buffer between the ABC and ACL.⁸⁴ As NMFS has stated, “additional uncertainty buffers are established when setting ACLs to help make up for any lack of absolute precision and accuracy in estimating overall catch[.]”⁸⁵ Given the growing uncertainties associated with each cod stock and the persistent pattern of overestimating biomass and underestimating fishing pressure, the Council and NMFS should have been increasing uncertainty buffers routinely to end overfishing on these stocks. Since 2010, however, the uncertainty buffers for GOM and GB cod have remained largely unchanged.

NMFS has unreasonably approved the Council’s management measures and catch limits without requiring significantly more conservative and larger scientific and management uncertainty buffers to end overfishing on GOM cod and GB cod in response to the continued decline in the stocks.

6. Failure to Apply the Approved ABC Control Rule

Since the implementation of Amendment 16 (2010), NMFS has repeatedly approved catch limits for the two cod stocks based on the selection of a control rule option that has no rational connection to the facts: GOM cod and GB cod are overfished, subject to unlawful overfishing, and not on track to rebuild in the statutory timeframes. Under the National Standard 1 guidelines, FMPs must include an ABC control rule that produces progressively more conservative management actions as biomass estimates or their proxies decline. 50 C.F.R. § 600.310(f)(1), (2). Specifically, “[f]or stocks and stock complexes required to have an ABC, each Council must establish an ABC control rule that accounts for scientific uncertainty in the

⁸³ *Id.*

⁸⁴ To ensure that overfishing does not occur, NMFS recommends an OFL that corresponds to MSY, an ABC set at or below the OFL to account for scientific uncertainty, an ACL set at or below the ABC recommended by the SSC, and an annual catch target set at or below the ACL to account for management uncertainty. *See* 50 C.F.R. § 600.310(f).

⁸⁵ NOAA Fisheries. *Summary of Analyses Conducted to Determine At-Sea Monitoring for Multispecies Sectors FY2019*, at 2. Available at: https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sectors/ASM/FY2019_Multispecies_Sector_ASM_Requirements_Summary.pdf.

OFL and for the Council’s risk policy, and that is based on a comprehensive analysis that shows how the control rule prevents overfishing.” *Id.* 600.310(f)(2).

To that end, the Council recommended, and NMFS approved, a control rule for all groundfish stocks in Amendment 16 that prescribes a hierarchy of increasingly stringent options:

These 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} [hereafter, “Option A”].
- 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 ($F_{REBUILD}$) [hereafter, “Option B”].
- c. **For stocks that cannot rebuild to B_{MSY} ⁸⁶ in the specified rebuilding period even in the absence of fishing, the ABC should be based on incidental bycatch, including a reduction in the bycatch rate (i.e., the proportion of the cod stock caught as bycatch) [hereafter, “Option C”].**
- d. Interim ABC’s should be determined for stocks with unknown status according to case-by-case recommendations from the SSC [hereafter, “Option D”].⁸⁷

The Council’s control rules, like other management actions, must achieve at least a 50 percent probability of preventing overfishing.⁸⁸ Fifty percent, however, as the *target* probability of preventing overfishing is not appropriate when a stock is overfished, where the applicable legal standard is to “end overfishing immediately.” Stated another way, the Council’s groundfish control rule unlawfully sanctions ABCs that allow overfishing up to 50 percent of the time. Such odds—no better than the flip of a coin—are patently inconsistent with the requirement that overfishing be *ended immediately* for any stock in a rebuilding plan. It is illogical and contrary to law for NMFS to approve use of such a control rule for managing overfished cod stocks.

⁸⁶ The Council defines B_{MSY} as “The stock biomass that would produce MSY when fished at a fishing mortality rate equal to F_{MSY} . For most stocks, B_{MSY} is about ½ of the carrying capacity. The proposed overfishing definition control rules call for action when biomass is below ¼ or ½ B_{MSY} , depending on the species.” Available at: <https://www.nefmc.org/files/Glossary.pdf>.

⁸⁷ NEFMC. *Final Amendment 16 to the NE Multispecies FMP including its Environmental Impact Statement and Initial Regulatory Flexibility Analysis*. Submitted October 16, 2009, at 78-79. Available at: https://s3.amazonaws.com/nefmc.org/091016_Final_Amendment_16.pdf (hereafter, “Amendment 16 FEIS”) (emphasis added).

⁸⁸ 50 C.F.R. 600.310 (f)(2)(i).

a. Application of the ABC Control Rule to GOM Cod

Putting aside the legal question of whether the existing control rule is appropriate, which it is not, managers have not even applied it according to its own terms nor has NMFS articulated a satisfactory explanation for its approvals of the resulting catch limits that do not end overfishing.

In Framework 51, NMFS approved a rebuilding plan that was designed such that $F_{REBUILD}$ was not limiting. That is, at least initially, $F_{REBUILD}$ was greater than $75\%F_{MSY}$, such that under the control rule's Option A, catch limits were to be set based on $75\%F_{MSY}$.⁸⁹ NMFS stated there, however, that "In the future, if information shows that GOM cod ... stock sizes have not increased as projected, it is possible that $F_{REBUILD}$ could become less than $75\%F_{MSY}$. Under this scenario, catches would then be set based on the lower rate, or $F_{REBUILD}$, consistent with the Council's control rule."⁹⁰

That decision was almost immediately abandoned. Initial analyses in the 2014 stock assessment update for GOM cod—barely into the new (and second) rebuilding plan—indicated that setting fishing mortality at $75\%F_{MSY}$ under Option A of the control rule could not achieve rebuilding requirements.⁹¹ Consequently, during development of Framework 53 (2015), the Groundfish Plan Development Team ("PDT") and the SSC recommended an ABC of 200 mt based on the lower $F_{REBUILD}$ rate,⁹² consistent with the progressively more stringent Option B of the control rule. However, the SSC subsequently revised its advice to recommend a 386 mt constant catch ABC—essentially based on Option A⁹³ and representing a 93 percent *increase* above the PDT's initial $F_{REBUILD}$ calculation—and claimed without specific scientific justification that rebuilding was still possible within the rebuilding timeframe under the higher limit.⁹⁴

In rationalizing its approval of Framework 53,⁹⁵ NMFS noted that an ABC of 386 mt was "expected to have little functional difference"⁹⁶ in comparison to the 200 mt recommendation, in part because future catches in the out years under a 386 mt ABC would need to be lower. Abandoning its responsibilities in this decision—there is no variance to the mandate to

⁸⁹ Framework Adjustment 51 Final Rule, 79 Fed. Reg. 22,421, 22,424 (April 22, 2014).

⁹⁰ *Id.*

⁹¹ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding "Gulf of Maine (GOM) cod ABCs and OFLs" dated Sept. 11, 2014, at 2. Available at: https://s3.amazonaws.com/nefmc.org/11_140911-GF-PDT-memo-to-SSC-re-GOM-Cod-FINAL_2.pdf.

⁹² See NEFMC. *Framework Adjustment 53 to the NE Multispecies FMP, Appendix I: SSC Recommendations for NE Multispecies ABCs, FY2015-FY2017*, at 6-9. Available at: https://s3.amazonaws.com/nefmc.org/141204_FW53_Appendix_I_SSC_Recommendations_ABCs.pdf.

⁹³ The 386 mt ABC was calculated as 75% of the OFL, which itself was an ensemble average of model outputs based on a fishing mortality rate of F_{MSY} . This results in a slightly lower ABC than would have been the case if the calculations were based on fishing at $75\%F_{MSY}$ (as is indicated by the control rules), but still much higher than the 200 mt recommended under $F_{REBUILD}$. The approach of taking 75% of the OFL based on F_{MSY} rather than on a fishing mortality of $75\%F_{MSY}$ has continued in all later assessments to date.

⁹⁴ *See id.* at 10-15.

⁹⁵ Framework Adjustment 53 Final Rule, 80 Fed. Reg. 25,110 (May 1, 2015).

⁹⁶ 80 Fed. Reg. at 25,113.

immediately end overfishing—NMFS did not determine or require that the ACLs end overfishing immediately as the statute requires. Rather, it based its approval decision on the economic and social needs of fishing communities⁹⁷ and justified its decision stating it would “continue to carefully monitor stock indicators leading into the 2015 assessment to fully inform our re-evaluation of the GOM cod catch limit, and the need to balance of conservation and management objectives.”⁹⁸ The agency did not follow through.

Based on all information available to CLF, neither the Council nor NMFS calculated a new $F_{REBUILD}$ for GOM cod or assessed the probability of rebuilding on time, in order to identify the appropriate control rule option for use in setting GOM cod catch limits in Framework 55 (2016). Instead, NMFS approved a new ABC of 500 mt⁹⁹—a nearly 30 percent increase over the previous year—again, essentially based on Option A without justification. NMFS’s approval was particularly unreasonable here since the 2015 stock assessment found that the prior approved Framework 51 ABCs and ACLs (under the rebuilding plan based on $75\%F_{MSY}$, i.e., Option A) in fact produced a 2014 fishing mortality rate roughly five times higher than F_{MSY} .¹⁰⁰ Further, the SSC expressed concerns and “questioned whether a 30% increase is warranted in the absence of a comparable increase in the survey trend, biomass estimate from the model, or other indicator.”¹⁰¹ NMFS provided no reasoned basis for its continued approval of the use of Option A of the control rule despite the fact that this same approach had previously led to significant overfishing.

In Framework 57 (2018), NMFS once again approved an ABC for GOM cod essentially based on Option A.¹⁰² This time the ABC—703 mt—was set 40 percent higher than the 500 mt ABC approved in Framework 55. Reprising its Framework 55 approach, NMFS approved the higher ABC in Framework 57 despite the fact that the 2017 operational assessment demonstrated there was significant overfishing under the prior and lower Option A-based Framework 55 ABC.¹⁰³ Again, there was no analysis or determination that the new higher ABC for GOM cod would end overfishing in the next fishing year any more than it had failed to do so in the previous year with a lower and more conservative ABC. To the contrary, the PDT estimated that even with no fishing, there was a zero to 26 percent chance of rebuilding on schedule.¹⁰⁴ Under the circumstances, NMFS should have disapproved any action that that did not end overfishing

⁹⁷ *Id.*

⁹⁸ Denial of Petition for Rulemaking on Gulf of Maine Cod, 80 Fed. Reg. 39,731, 39,734 (July 10, 2015) (“Petition Denial”).

⁹⁹ Framework Adjustment 55 Final Rule, 81 Fed. Reg. 26,412, 26,415 (May 2, 2016).

¹⁰⁰ NEFSC. 2015. *Operational Assessment of 20 Northeast Groundfish Stocks Updated Through 2014*. NEFSC Ref. Doc. 15-24, at 25.

¹⁰¹ NEFMC. *Framework Adjustment 55 to the NE Multispecies FMP Appendix I: SSC Recommendations for NE Multispecies ABCs, FY 2016-FY 2018*, at 9. Available at:

https://s3.amazonaws.com/nefmc.org/160210_FW55_Appendix_I_SSC_Recommendations.pdf.

¹⁰² Framework Adjustment 57 Final Rule, 83 Fed. Reg. 18,985, 18,987 (May 1, 2018).

¹⁰³ Fishing mortality in 2016 was estimated to be 31-34 percent higher than F_{MSY} (and as much as 90 percent higher if correcting for the retrospective pattern); NEFSC. 2017. *Operational Assessment of 19 Northeast Groundfish Stocks, Updated Through 2016*. NEFSC Ref. Doc. 17-17, at 26; NEFSC 2017. *Gulf of Maine Atlantic Cod 2017 Assessment Update Report Supplemental Information* (Draft), at 42.

¹⁰⁴ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2018 to 2020” dated Oct. 13, 2017, at 6.

immediately, and per the control rule hierarchy it should have insisted that the Council apply Option C with a closure of the directed fishery and a scheduled reduction in bycatch. Instead, once again, NMFS allowed the Council to abandon the control rule hierarchy protocols without a reasoned basis for doing so.

NMFS rubberstamping the Council’s recommendations that would predictably result in overfishing have led to the stock status and the lack of rebuilding potential identified in the 2019 operational groundfish stock assessment for GOM cod. The probability of rebuilding by 2024 as required has now plummeted to between zero and 1 percent, even under a no fishing scenario.¹⁰⁵ **Notably, based on the 2019 operational assessment, the SSC and Council again recommended an ABC (presently awaiting approval¹⁰⁶) essentially based on Option A, despite circumstances that would require them, unequivocally, to use Option C and set an ABC based on “incidental bycatch, including a reduction in bycatch rate.”¹⁰⁷** This pattern of approving measures for GOM cod that continually fail to end overfishing is inconsistent with NMFS’s own National Standard 1 guidelines, the control rule protocols adopted in Amendment 16, and the Magnuson-Stevens Act. NMFS’s actions have not been based on any rational connection between the facts found and the choices made.

b. Application of the ABC Control Rule to GB Cod

Without a GB cod stock assessment model approved for management advice, the SSC adopted an empirical approach that combines recent catch levels with survey results to provide ABC recommendations during development of Framework 55 (2016), presumably following Option D of the control rule. The SSC since has subsequently relied on and applied this empirical approach to recommend ABCs, even though at the time it was adopted it was noted that it would produce a fishing mortality rate similar to one “that so far has not led to rebuilding.”¹⁰⁸ The empirical approach does not specify how it is preventing or ending overfishing or addressing rebuilding requirements even though GB cod remains an overfished stock subject to overfishing with biomass indices at persistent historic low levels. The only apparent rationale for the empirical approach is to allow continued fishing in the absence of an accepted model, including increases in ABCs for this depleted stock.

In Framework 57 (2018), relying again on this *ad hoc* empirical approach and despite no known change in stock status, NMFS approved an ABC that represented an 83 percent increase in the overall ABC (1,249 mt to 2,285 mt) and a 139 percent increase in U.S. ABC (665 mt to

¹⁰⁵ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022” dated Oct. 10, 2019 & revised Oct. 15, 2019, at 7.

¹⁰⁶ See NEFMC. *Groundfish: Council Approves Framework 59; Receives Progress Report on Monitoring Amendment 23*. Press release published Dec. 17, 2019.

¹⁰⁷ Amendment 16 FEIS at 78-79.

¹⁰⁸ NEFMC. *Framework Adjustment 55 to the NE Multispecies FMP Appendix I: SSC Recommendations for NE Multispecies ABCs, FY 2016-FY 2018*, at 9.

1,591mt) for GB cod¹⁰⁹ without any determination that adequate progress is being made toward reaching the 2026 rebuilding deadline.

Most recently, in developing Framework 59, the SSC and the Council randomly deviated from their prior protocols for the empirical approach. The OFL was previously set as a proportion of the most recent 3-year average catch based on survey trends, and the ABC was the OFL reduced by 25 percent to account for scientific uncertainty. In Framework 59, however, the SSC and Council recommended that the OFL for GB cod be designated as “unknown,” and the ABC be based on a proportion of the most recent 3-year average catch (i.e., the quantity previously identified as the OFL).¹¹⁰ This recommendation removed the “crucial buffer”¹¹¹ for scientific uncertainty that was previously included even though there was no demonstration that prior ABCs with the buffer had ended overfishing or allowed any rebuilding. Justification for this decision was based on the SSC wanting to reconcile the application of GB cod stock empirical approach with that of other stocks with empirical approaches in the NE Multispecies fishery, coupled with stated concern that quotas could ratchet downwards under the prior buffered approach. The implicit goal apparent in this decision was to set a higher ACL than would otherwise apply had the uncertainty buffer been used. Given the uncertainty surrounding GB cod, NMFS should not approve an ABC for the stock without a scientific uncertainty buffer.¹¹²

NMFS has unreasonably approved ABCs for GB cod that consistently fail to prevent overfishing without a rational justification as well as the Council-recommended conservation and management measures that do not end overfishing immediately and or rebuild this overfished stock as required by statute. NMFS must now initiate a Secretarial Amendment to meet its statutory obligations.

B. Failure to Rebuild Atlantic Cod Consistent with MSA

Despite notifying the Council that Atlantic cod was overfished multiple times, NMFS has repeatedly approved Council FMP management actions that are not rationally related to redressing the longstanding failure to rebuild Atlantic cod consistent with its legal obligations. A legally compliant FMP was required by law to have been submitted and implemented within two years of the first NMFS “overfished” notification.

NMFS first implemented formal rebuilding plans for GOM cod and GB cod under 16 U.S.C. § 1854(e) in Amendment 13 (2004).¹¹³ GOM cod failed to rebuild under this plan, and

¹⁰⁹ Framework Adjustment 57 Final Rule, 83 Fed. Reg. 18,985, 18,987 (May 1, 2018); GB cod is a jointly managed stock with Canada, so a shared/overall ABCs is set for the entire stock. A portion of the overall ABC is allocated to Canada, and the remainder is the U.S. ABC.

¹¹⁰ SSC Report to Council Executive Director Tom Nies regarding “Terms of Reference – Overfishing Levels (OFLs) and acceptable biological catch (ABC) recommendations for groundfish stocks for fishing years 2020 to 2022” dated Nov. 22, 2019, at 4. Available at: https://s3.amazonaws.com/nefmc.org/3g_SSC_response_GFSpecies_Oct17_FINAL.pdf.

¹¹¹ *Id.* at 12-13.

¹¹² The Council took final action on Framework 59 in December 2019. A proposed rule has not yet been published in the federal register.

¹¹³ Amendment 13 Final Rule, 69 Fed. Reg. 22,906 (April 27, 2004).

now, halfway through its second 10-year rebuilding plan, GOM cod has *at best* a 1 percent chance of rebuilding on schedule, even in the absence of fishing. GB cod fares no better. Although still in its original 2004 rebuilding plan with a terminal date of 2026, the lack of an accepted model makes it impossible to quantitatively assess the stock's rebuilding progress. At the time of the most recent rebuilding analysis, however, the then-current (2010) fishing mortality rate was at least *3.75 times higher*, and at least *7 times higher* if correcting for the retrospective pattern, than the estimated F_{REBUILD} , the fishing mortality necessary to rebuild on schedule, and even then with only a 50-percent probability of success.^{114, 115} Given recent biomass indices from federal and Canadian trawl surveys, there can be no reasonable expectation based on science that GB cod will rebuild by 2026.

Since NMFS approved Amendment 13, the Council has submitted, and the agency has approved, another seven amendments and 21 framework adjustments to the NE Multispecies FMP. Not a single action included conservation and management measures sufficient to immediately end overfishing or to realize meaningful progress with respect to successfully rebuilding the GOM or GB cod stocks as the MSA requires. *See* 16 U.S.C. § 1854(e)(3)(A).

1. Inadequate Progress Toward Ending Overfishing and Rebuilding Atlantic Cod

Under the statute, NMFS is required to conduct “adequate rebuilding progress” reviews at intervals not greater than two years, 16 U.S.C. § 1854(e)(7), and notify the appropriate council if there is a finding of inadequate progress with specific recommendations for additional conservation and management measures. 16 U.S.C. § 1854(e)(7)(B). The importance that Congress attached to these reviews and rebuilding is clearly revealed by the mandatory nature of the directive to NMFS.

For GOM cod, whose second ten-year rebuilding plan started on May 1, 2014, NMFS was required to undertake this review not later than April 2016 and another by at least April 2018. Based on documents provided to CLF, these reviews were either never done or they were done and concluded that adequate progress was being made. There is no basis for any review, however, to conclude that there is adequate rebuilding progress for GOM cod. The published 2015 stock assessment did not contain any rebuilding analyses.¹¹⁶ The 2017 stock assessment concluded the stock was not rebuilding on schedule,¹¹⁷ and the PDT estimated that there was a zero to 26 percent probability of rebuilding on schedule even in the absence of fishing.¹¹⁸ The 2019 stock assessment also concluded the stock was not rebuilding on schedule, and the PDT

¹¹⁴ NEFSC. 2012. *Assessment or Data Updates of 13 Northeast Groundfish Stocks Through 2010*. NEFSC Ref. Doc. 12-06. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1206/>.

¹¹⁵ No rebuilding analyses were conducted at the SAW 55 benchmark assessment in 2012 and at the next assessment update in 2015 the model was rejected for management advice so rebuilding analyses based on models are currently not possible.

¹¹⁶ NEFSC. 2015. *Stock Assessment Update of 20 Northeast Groundfish Stocks Through 2014*. NEFSC Ref. Doc. 15-24.

¹¹⁷ NEFSC. 2017. *Operational Assessment of 19 Northeast Groundfish Stocks, Updated Through 2016*. NEFSC Ref. Doc. 17-17, at 29. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1717/crd1717.pdf>.

¹¹⁸ Memorandum from Groundfish Plan Development Team to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2018 to 2020” dated Oct. 13, 2017, at 6.

estimated that **the probability of rebuilding on schedule has plummeted to zero to one percent even in the absence of fishing.**¹¹⁹

NMFS also approved a rebuilding program review mechanism applicable to the Council in Framework 51. That program, which was identified as being *in addition to* NMFS’s statutory required rebuilding plan review, indicated that the Council would initiate a rebuilding plan review if three conditions were met:

- the total catch limit has not been exceeded during the rebuilding program;
- new scientific information indicates that the stock is below its rebuilding trajectory (i.e. rebuilding has not progressed as expected); and
- $F_{REBUILD}$ becomes less than $75\%F_{MSY}$.¹²⁰

NMFS endorsed this activity, despite concerns that it would duplicate to some degree what the agency was already obligated to do “because it commits the Council to a thorough evaluation of rebuilding progress, should a stock drop below its rebuilding trajectory.”¹²¹ NMFS also approved the review because it expected that the Council review would “provide the Council with the necessary information to adjust management measures and ensure that the stocks still rebuild by the rebuilding end date.”¹²² As far as CLF knows, all three conditions have been met in recent years for GOM cod, and yet the Council has not undertaken the required rebuilding review process nor has NMFS directed the Council to do so.

For GB cod, which is almost 16 years into its 22-year rebuilding plan, NMFS was required to undertake similar reviews of adequate progress. Unlike GOM cod, NMFS here took the position that the agency would not conduct an adequate progress review for GB cod in absence of quantitative estimates and projections about the stock.¹²³ This is no basis, however, for not undertaking a review. The National Standard 1 Guidelines are not prescriptive with respect to the means by which the review is done. For example, the guidelines state that “[I]ack of progress may also be found when the rebuilding expectations of the stock are significantly changed due to new or unexpected information about the status of the stock.” 50 C.F.R. § 600.310(j)(3)(C)9iv). Recent U.S. and Canadian trawl survey results for GB cod clearly show there has not been any meaningful response to rebuilding management measures for the stock. Certainly, the survey results should have triggered some thoughts about the expectations assumed around rebuilding the stock by 2026.

¹¹⁹ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022” dated Oct. 10, 2019 & revised Oct. 15, 2019, at 7.

¹²⁰ 79 Fed. Reg. 22,425 (April 22, 2014).

¹²¹ *Id.*

¹²² *Id.*

¹²³ Framework 55, Final Rule. 84 Fed. Reg. at 26,413. (“Although numerical estimates of status determination criteria are currently not available, to ensure that rebuilding progress is made, catch limits will continue to be set at levels that the Council’s Scientific and Statistical Committee (SSC) determines will prevent overfishing. Additionally, at whatever point the stock assessment for GB cod . . . can provide biomass estimates, these estimates will be used to evaluate progress towards the rebuilding targets.”); *see also* Email from NMFS Fishery Policy Analyst Mark Grant to Karen Green regarding “Determinations of adequate rebuilding progress NE multispecies 2017 operational assessment” dated Oct. 3, 2018. (Email attachments not provided to CLF.).

In the absence of NMFS's required progress review, CLF will review that record of progress here. The following chronology summarizes the numerous NMFS notifications of stock status determination regarding the GOM and GB cod stocks between 2002 and the date of filing this Petition:

- In 2002, stock assessments determined that GOM cod and GB cod were overfished, subject to overfishing, and required formal rebuilding plans.¹²⁴
- In 2004, NMFS implemented Amendment 13 to the NE Multispecies FMP (April 27, 2004) to comply with its rebuilding requirements.¹²⁵
- In January 2012, NMFS notified the Council that the NE Multispecies FMP “has not resulted in adequate progress toward ending overfishing and rebuilding of GOM cod.” NMFS directed the Council to implement “measures that would end overfishing on the GOM stock . . . [,] effective May 1, 2013[.]” following a year of NMFS-developed interim measures. NMFS noted at the time that “any temporary reprieve from addressing overfishing requirements immediately while the council revises its rebuilding program can only be justified for fishing year 2012.”¹²⁶
- In May 2012, NMFS notified the Council that GB cod was still overfished and subject to overfishing.¹²⁷
- In 2013, NMFS notified the Council that GOM cod and GB cod were overfished and subject to overfishing.¹²⁸
- In 2014, NMFS “urge[d] the Council to take meaningful and timely actions for Gulf of Maine (GOM) cod)”¹²⁹ following the 2014 stock assessment update, which found “that the GOM cod stock is overfished, subject to overfishing, and in very poor overall condition.”¹³⁰ NMFS later took emergency action, at the request of the Council, to implement measures to reduce overfishing of GOM cod.¹³¹

¹²⁴ 55th SAW Summary Report.

¹²⁵ Amendment 13 Final Rule, 69 Fed. Reg. 22,906 (April 27, 2004).

¹²⁶ Letter from NMFS Acting Assistant Administrator for Fisheries Samuel Rauch to Council Chairman C.M. “Rip” Cunningham dated January 26, 2012. Available at: https://s3.amazonaws.com/nefmc.org/11_NOAA_reSAW53.pdf.

¹²⁷ Letter from NMFS Acting Regional Administrator Daniel S. Morris to Council Chairman C.M. “Rip” Cunningham dated May 30, 2012. Available at: https://s3.amazonaws.com/nefmc.org/8_NMFS-STOCK-STATUS.pdf.

¹²⁸ 78 Fed. Reg. 64,480 (Oct. 29, 2013).

¹²⁹ Letter from NMFS Regional Administrator John K. Bullard to Council Chairman Terry Stockwell dated Sept. 25, 2014. Available at: <https://s3.amazonaws.com/nefmc.org/18a-Additional-Correspondence.pdf>.

¹³⁰ *Id.*

¹³¹ 79 Fed. Reg. 67,362 (Nov. 13, 2014).

- In 2015, NMFS notified the Council that GOM cod was overfished and subject to overfishing and that the Council “must end overfishing and rebuild this stock.”¹³²
- In 2016, in approving Framework 55, NMFS confirmed that GB cod was overfished and subject to overfishing.¹³³
- In 2017, NMFS notified the Council that GOM cod and GB cod were overfished and subject to overfishing.¹³⁴
- In 2018, NMFS notified the Council that GOM cod and GB cod were overfished and subject to overfishing.¹³⁵

The NE Multispecies FMP has been adjusted several times after notifications that the stock is overfished with some measurable improvements in slowing overfishing, but neither the Council nor NMFS has complied with the requirement to prepare a plan or amendment that actually ends overfishing immediately or that rebuilds the fishery consistent with 16 U.S.C. § 1854 (e)(3)(A).

At the time of original 2004 rebuilding plan for GOM cod, it was acknowledged that GOM cod was among those stocks “needing the largest reduction in fishing mortality.”¹³⁶ Based on the most recent assessment (2019), by 2014, that is after the first full 10-year rebuilding period, GOM cod was subject to overfishing rates that were more than *12 times* greater than the overfishing threshold (Figure 2). Rather than rebuilding, spawning stock biomass *fell 8-fold* between 2004 and 2014 (Figure 11).¹³⁷

It appears that no lessons from the first failed GOM cod rebuilding plan were applied to the second attempt in 2014. As detailed above in the chronology of recent decisions concerning the failure to adhere to the hierarchy of control rule options, there has been a failure to restrict fishing mortality rates to those necessary for rebuilding. Although spawning stock biomass has inched up slightly from its 2014 nadir, it is estimated at only 6 to 9 percent of its rebuilding target.¹³⁸ Also, as discussed above there is only a zero to one percent chance at best of rebuilding by the target year of 2024 even without fishing.¹³⁹ Ultimately, the projections underlying both

¹³² 80 Fed. Reg. 12,621 (March 10, 2015).

¹³³ Framework 55 Final Rule, 81 Fed. Reg. at 23,413, 25,414.

¹³⁴ Letter from NMFS Regional Administrator John K. Bullard to Council Chairman Dr. John Quinn dated August 31, 2017.

¹³⁵ 83 Fed. Reg. 9,298 (March 5, 2018).

¹³⁶ NEFMC. *Amendment 13 to the NE Multispecies FMP including its Final Supplemental Environmental Impact Statement and an Initial Regulatory Flexibility Analysis, Volume 1 Management Alternatives and Impacts*. Final Revised Dec. 18, 2003, at i-v. Available at: <https://s3.amazonaws.com/nefmc.org/Final-Amendment-13-SEISVol.-I-II.pdf>.

¹³⁷ Based on the M=0.2 model; NEFSC 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 32.

¹³⁸ *Id.*

¹³⁹ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022” dated Oct. 10, 2019 & revised Oct. 15, 2019, at 7.

rebuilding plans never materialized due to the combination of continued overfishing, low recruitment, and over-estimated initial biomass starting points (Figure 11). Both rebuilding plans have failed.

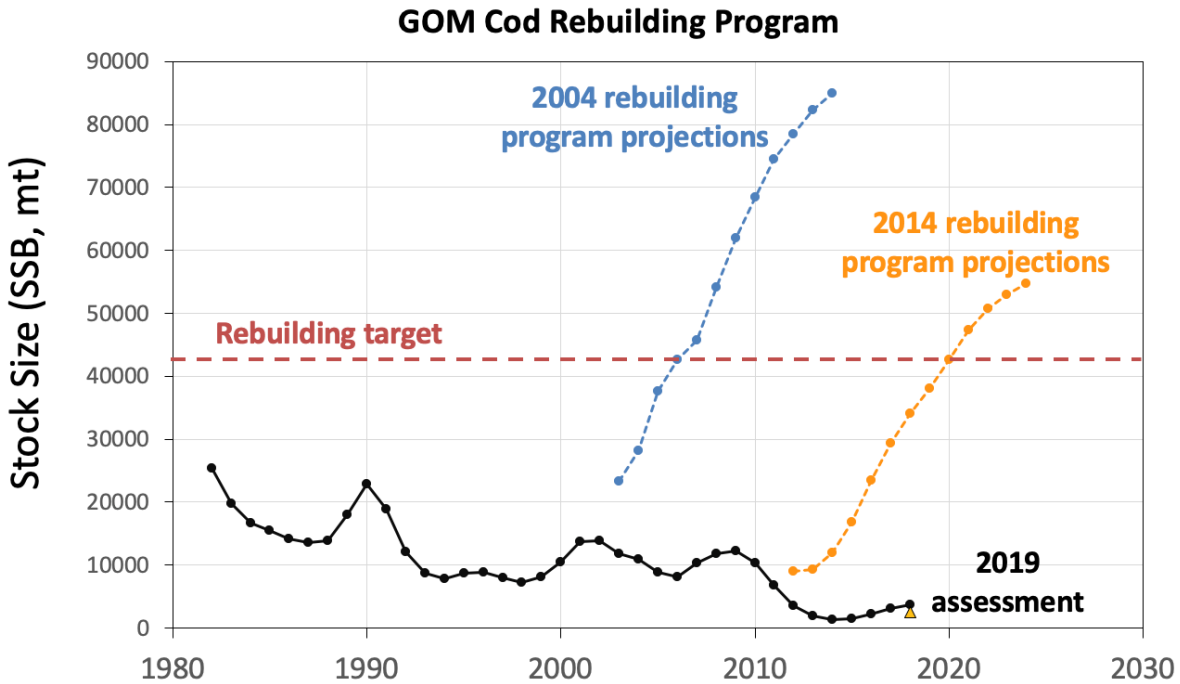


Figure 11: GOM cod stock size projections underlying the 2004 (blue) and 2014 (orange) rebuilding plan relative to stock size estimates from the 2019 operational assessment (black). Rather than rebuilding as projected, biomass declined under both programs. The red line shows the current rebuilding target (estimated SSB_{MSY}), which is lower than the estimates that the rebuilding plans were based on. Stock size is shown as spawning stock biomass (SSB, mt). 2014 projections and 2019 assessment data plotted are estimates from the $M=0.2$ model; the other accepted model for this stock, M -ramp, is not graphed here but shows a similar pattern. This $M=0.2$ model suffers from a significant retrospective pattern, which acts to decrease estimated fishing pressure and inflate SSB for years towards the end of the time series. Yellow triangle shows corrected values for 2018 (the last year included in the assessment), adjusted for the retrospective pattern.¹⁴⁰

¹⁴⁰ Data Sources: NEFSC 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 32, 33, 39, and 40; NEFMC. *Amendment 13 to the Northeast Multispecies Fishery Management Plan Final Supplemental Environmental Impact Statement and an Initial Regulatory Flexibility Analysis, Volume 1 Management Alternatives and Impacts*. Final Revised Dec. 18, 2003, at I-229; NEFMC. *Framework Adjustment 51 to the NE Multispecies FMP, Appendix II Analytic Techniques: Rebuilding Plan Analysis*, at 7. Available at: http://s3.amazonaws.com/nefmc.org/FW_51_Appendices.pdf.

GB cod was also one of the stocks “needing the largest reduction in fishing mortality”¹⁴¹ in 2004, when its original and current rebuilding plan was implemented. Based on the last accepted assessment, however, fishing mortality during the 2004 rebuilding plan has ranged from 1.3 to as much as 3.6 times greater than the overfishing threshold (Figure 3).¹⁴² Like GOM cod, the stock rebuilding projections underlying the GB cod plan have consistently failed to materialize (Figure 12). Although current stock size is unknown, survey biomass indices continue to hover around historic lows and GB cod shows little progress toward any sustained semblance of rebuilding.¹⁴³ This plan too has failed. It is irresponsible to wait until 2026 to acknowledge that reality.

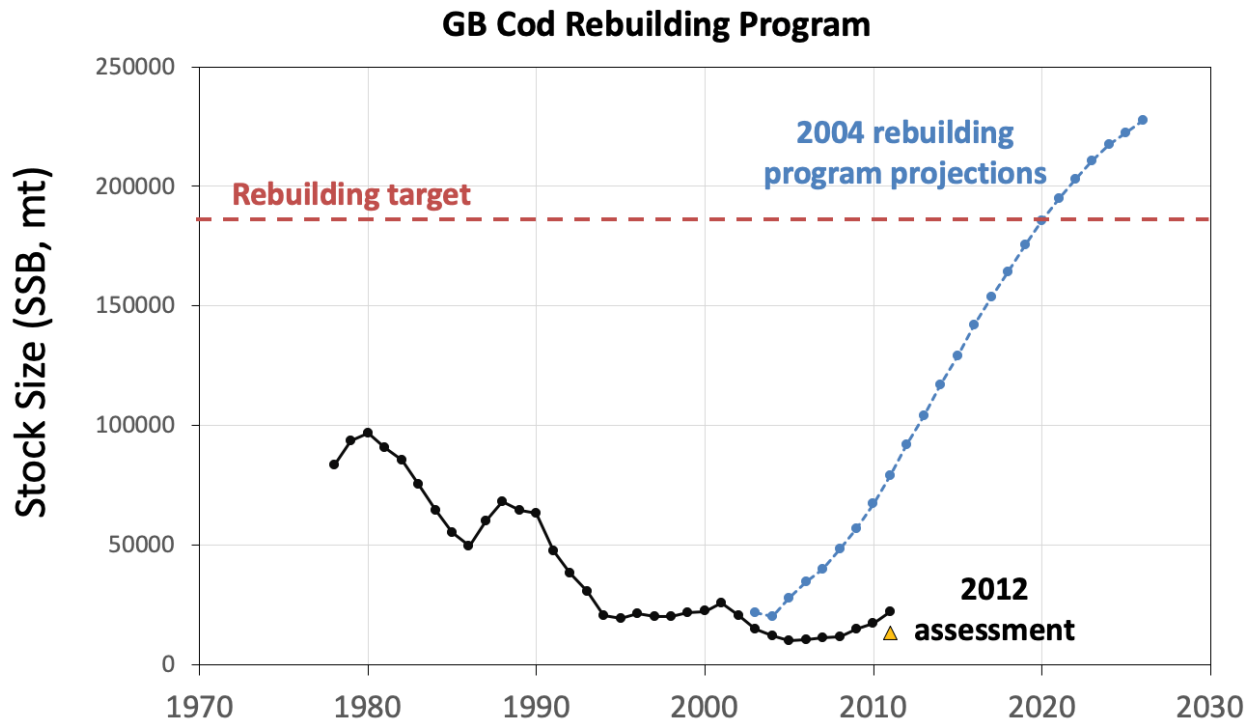


Figure 12: GB cod stock size projections underlying the 2004 (blue) rebuilding plan relative to stock size estimates from the most recent accepted assessment (2012; black). Rather than rebuilding as projected, biomass declined under the program. Although the current stock size is not known due to the lack of an accepted model, it is undoubtedly far from rebuilt. The red line shows the most recent rebuilding target (estimated SSB_{MSY}), which is lower than the estimate the rebuilding plan was based on. The 2012 model suffers from a significant retrospective pattern, which acts to inflate SSB for years towards the end of the time series. The yellow triangle shows the corrected value for 2011 (the last year included in the assessment), adjusted for the retrospective pattern.¹⁴⁴

¹⁴¹ NEFMC. *Amendment 13 to the NE Multispecies FMP including its Final Supplemental Environmental Impact Statement and an Initial Regulatory Flexibility Analysis, Volume 1 Management Alternatives and Impacts*. Final Revised Dec. 18, 2003, at I-v.

¹⁴² 55th SAW Assessment Report at 742; 55th SAW Summary Report at 26.

¹⁴³ NEFSC. 2019. *Georges Bank Atlantic Cod Tables* (Draft; Supplement to 2019 Operational Groundfish Assessments), at 10.

¹⁴⁴ Data Sources: 55th SAW Assessment Report at 742; 55th SAW Summary Report at 26; NEFMC. *Amendment 13 to the Northeast Multispecies Fishery Management Plan Final Supplemental Environmental Impact Statement and an Initial Regulatory Flexibility Analysis*. Final Revised Dec. 18, 2003, at I-229.

NMFS notified the Council at least six times between 2013 and 2018 about the continued overfished status of Atlantic cod, the latest following the 2017 operational assessments.¹⁴⁵ Yet not even two months after its notification in 2018, NMFS approved an action that *increased* ACLs by 41 percent for GOM cod and 139 percent for GB cod.¹⁴⁶ A year later, NMFS also approved new recreational measures that reopened a directed recreational GOM cod fishery and created more opportunity to catch GB cod.¹⁴⁷ These changes were made despite the fact that the GOM cod ACL was exceeded by 30 percent in the 2017 fishing year.¹⁴⁸

Based on the best available science, GOM cod will not rebuild by 2024, and GB cod, despite the lack of an accepted assessment model, is highly unlikely to rebuild by 2026 as required under the current rebuilding plans. Unless overfishing of cod is ended immediately and other conservation and management measures are put in place that reduce bycatch of cod and increase the productivity potential for these fish, rebuilding of either stock is essentially impossible.

NMFS not only continues to delay taking appropriate and necessary action, it sanctions conservation measures and management approaches that have repeatedly produced continued overfishing. Rather than disapprove Council recommendations that do not end overfishing and are unlikely to make adequate progress toward rebuilding, NMFS has repeatedly approved them, contributing to further population declines. NMFS's actions are without rationale given the historical context, the persistent patterns of overfishing, and the rebuilding plan failures present here.

2. National Research Council Rebuilding Guidance

A committee of expert scientists convened by the National Research Council (“NRC”) evaluated numerous rebuilding plans and requirements in U.S. and international fisheries (hereafter, “NRC Rebuilding Committee”).¹⁴⁹ The NRC Rebuilding Committee pointed to three principal reasons why stocks usually did not rebuild as expected even after a rebuilding plan was developed, two of which apply to U.S. Atlantic cod stocks. First, as described above, the target exploitation rates and resulting ACLs are too high because of analytical problems and inappropriate risk approaches, such as the failure to account for retrospective patterns, insufficient control rules, and rebuilding probabilities that are often no greater than a coin toss.¹⁵⁰ Second, rebuilding plans failed because the realized fishing mortality rates continued to be too high during the rebuilding period, a reflection of implementation problems including ineffective accountability measures.¹⁵¹ It is axiomatic that an overfished stock cannot rebuild to its potential

¹⁴⁵ See 78 Fed. Reg. 64,480 (Oct. 29, 2013); 80 Fed. Reg. 12,621 (Mar. 10, 2015); Letter from NMFS Regional Administrator John K. Bullard to Council Chairman Dr. John Quinn dated August 31, 2017; 83 Fed. Reg. 9,298 (Mar. 5, 2018).

¹⁴⁶ Framework Adjustment 57 Final Rule, 83 Fed. Reg. 18,985, 18,987 (May 1, 2018).

¹⁴⁷ Fishing Year 2019 Recreational Management Measures Final Rule, 84 Fed. Reg. 32,649 (July 9, 2019).

¹⁴⁸ Framework Adjustment 58 Final Rule, 84 Fed. Reg. 34,799, 34,807 (July 19, 2019).

¹⁴⁹ NRC Report at 180.

¹⁵⁰ NRC Report at 56 (emphasis added). (“Under such a criterion, *even if everything went according to plan*, only half of the stocks would be expected to recover within the selected time period.”)

¹⁵¹ *Id.* at 56-57 (emphasis added).

unless overfishing is ended. The two Atlantic cod stocks are prime examples of the rebuilding failures that the NRC Rebuilding Committee analyzed; yet NMFS refuses to acknowledge, let alone address these core deficiencies.

3. NMFS's Denial of the 2015 Cod Petition was Based on a Promise of New Management Measures that Never Materialized

Alarm over NMFS's approvals of ever-increasing ABCs and failure to rebuild in light of the persistent ongoing overfishing of GOM cod was the focus of a petition filed in 2015 by the Center for Biological Diversity and others ("Conservation Groups"), which sought rulemaking to prohibit directed fishing for GOM cod until the incidental mortality was less than an ABC based on $F_{REBUILD}$.¹⁵² In its denial of the Conservation Groups' 2015 petition, NMFS stated, "We remain concerned about the status of GOM cod"¹⁵³ but asserted that existing conservation and management measures in Framework 53 combined with other measures implemented in the recreational fishery would "prevent catch from exceeding the ABC, prevent overfishing, and rebuild the GOM cod stock within the rebuilding period. **Further we intend to carefully monitor updated stock assessment information [coming later in 2015] ... and will adjust measures, if necessary, to address any changes to stock condition.**"¹⁵⁴

However, the conservation and management measures implemented for the commercial fishery in Framework 53 and later actions, as well as those implemented in the recreational fishery, have not ended overfishing. Further, and contrary to its commitments in the 2015 petition denial, NMFS did not make the necessary adjustments for the 2016 fishing year in response to the 2015 stock assessment.¹⁵⁵ In fact, the 2015 assessment did not even calculate $F_{REBUILD}$ or the likelihood of rebuilding for NMFS to be able to make proper adjustments in 2016. Moreover, as reviewed above, NMFS has done nothing since that time to effectively adjust its approaches to reviewing Council-proposed conservation and management measures to respond to the continuing management failures and collapsed stock condition.

Finally, in its denial of the Conservation Groups' petition, NMFS rationalized its actions by stating that it was applying a balancing standard that offset the value of adequate conservation measures against the socioeconomic impacts of those measures on the fishing industry. This balancing approach is patently inconsistent with NMFS's obligations under the MSA when dealing with an overfished stock—the FMP must end overfishing immediately and the timeline cannot exceed 10 years except under three circumstances (biology of the stock, environmental conditions, or an international agreement). *See* 16 U.S.C. § 1854(e)(3)(A), (4)(A)(1). The statutory requirement to balance the needs of fishing communities in the rebuilding section applies only to the establishment of a timeline that is "as short as possible," so long as it does not

¹⁵² Center for Biological Diversity, Greenpeace, SandyHook SeaLife Foundation, and Turtle Island Restoration Network. *Petition for Immediate and Permanent Rulemaking to Prohibit Fishing for Gulf of Maine Cod until Incidental Mortality Does Not Exceed the Acceptable Biological Catch Limit*. Submitted before the National Marine Fisheries Service March 3, 2015. Available at: https://www.biologicaldiversity.org/species/fish/pdfs/Gulf_of_Maine_cod_petition_3_3_15.pdf.

¹⁵³ Petition Denial, 80 Fed. Reg. at 39,734.

¹⁵⁴ 80 Fed. Reg. at 39,731. (emphasis added).

¹⁵⁵ 80 Fed. Reg. at 39,731, 39,733; *see also* Framework 55, 81 Fed. Reg. at 26,415.

to exceed 10 years, *Id.* at § 1854(e)(4)(A), not to ending overfishing. *Id.* at § 1854(e)(3)(A). There is no exemption from the statutory requirement to end overfishing immediately, and NMFS may only balance socioeconomic considerations in developing a rebuilding plan where overfishing has already ended.

C. A Catch Monitoring Program that Provides Accurate and Precise Catch Data is Necessary to End Overfishing and Ensure Accountability

For years, NMFS has defended woefully inadequate at-sea monitoring (“ASM”) in the groundfish fishery, though recent developments regarding Amendment 23 to the Northeast Multispecies FMP¹⁵⁶ and new monitoring coverage targets reflect the agency’s awareness of this issue.¹⁵⁷ Overall, low monitoring coverage targets—between 14 and 38 percent (Table 2)¹⁵⁸—combined with hard catch limits and discard incentives associated with low quotas¹⁵⁹ have created the opportunity for illegal discarding, high grading, and misreporting of cod catch.¹⁶⁰ There is also a significant “observer effect”¹⁶¹ in New England’s groundfish fishery. As a result, scientists and managers lack accurate catch data that they need to inform decisions to prevent and end overfishing and rebuild Atlantic cod.

Significant unreported discarding has been documented in the groundfish fishery since at least the 1990s.¹⁶² More recently, in Spring 2018, there were reports of illegal discards of up to 2,000-3,000 pounds per trip and observers not recording discards of legally-sized cod.¹⁶³ That

¹⁵⁶ See NEFMC. *Groundfish Monitoring Amendment 23: Council Votes to Send Draft Document out for Comment with Preferred Alternatives*. Press release dated February 5, 2020. Available at: <https://s3.amazonaws.com/nefmc.org/NEFMC-Votes-to-Send-Draft-Groundfish-Amendment-23-out-for-Comment-with-Preferred-Alternatives.pdf>.

¹⁵⁷ See Letter from NMFS Regional Administrator Michael Pentony to Council Chairman John Quinn dated Jan. 28, 2020. Available at: <https://content.govdelivery.com/accounts/USNOAAFISHERIES/bulletins/2789b07>.

¹⁵⁸ This range refers to previous and ongoing fishing years 2010-2019. NMFS recently announced a monitoring coverage target of 40 percent for the upcoming 2020 fishing year.

¹⁵⁹ See Henry A, Demarest C, and Errend M. *Modelling Discard Incentives for Northeast Multispecies (Groundfish) Stocks*. Groundfish PDT Document dated April 12, 2019. Available at: https://s3.amazonaws.com/nefmc.org/Amendment-23_Appendix-V_Groundfish-PDT-Monitoring-Analyses-and-SSC-Panel-Peer-Review-Report.pdf.

¹⁶⁰ See Palmer MC. 2017. *Vessel Trip Reports Catch-area Reporting Errors: Potential Impacts on the Monitoring and Management of the Northeast United States Groundfish Resource*. NEFSC Ref. Doc. 17-02. Available at: <https://www.nefsc.noaa.gov/publications/crd/crd1702/crd1702.pdf>.

¹⁶¹ Demarest C. *Evaluating the Observer Effect for the Northeast U.S. Groundfish Fishery (DRAFT)*. Updated April 18, 2019. Available at: https://s3.amazonaws.com/nefmc.org/Amendment-23_Appendix-V_Groundfish-PDT-Monitoring-Analyses-and-SSC-Panel-Peer-Review-Report.pdf. (“The analyses point toward a consistent pattern of different fishing behaviors when an observer is on board [a vessel]” compared to when a trip is unobserved.” Specifically, “vessels appear to retain less fish, fish for less time, and obtain lower revenues when an observer is on board.”)

¹⁶² See 64 Fed. Reg. 42,042, 42,042 (Aug. 3, 1999) (“These interim measures will provide intermediate relief from overfishing due to excessive discards while permanent measures to remedy the problem are developed...”).

¹⁶³ See Recording of the April 2018 Council Meeting, Introductions, Announcements, and Reports on Recent Activities at around 21:00. Available at: https://s3.amazonaws.com/nefmc.org/180417_1_Intros-and-Reports.mp3. (“This Spring, the number of individuals coming to us with reports about cod discarding is unusually high...Reports we are receiving this spring are that there are discards up to 2000-3000 pounds per trip happening in this area. We

same spring, other reports showed that vessels targeting haddock in the inshore Gulf of Maine were discarding large quantities of cod.¹⁶⁴ Further, a 2019 Coast Guard report revealed broader misreporting issues not limited to cod stocks.¹⁶⁵ The report identified that over 350 trips between 2011 and 2015 had evidence of misreporting and that as much as 2.5 million pounds of regulated species could have been misreported.¹⁶⁶ Regarding cod, the report “suspected that up to 400,000 pounds of cod were potentially harvested in the GOM stock area and misreported as coming from GB West, primarily in [fishing years 2011 and 2012]. In addition, it is suspected that up to 800,000 pounds of cod were potentially harvested from GB East [but] were misreported as coming from GB West.”¹⁶⁷ These instances, and the flawed assessment science and accountability that flow from them, are a direct result of inadequate at-sea monitoring.

An ASM program was first implemented in the NE Multispecies fishery through Amendment 16 (2010) during the transition to the sector system and hard catch limits. At the time, NMFS approved an ASM program that specifically set target monitoring coverage substantially less than 100 percent,¹⁶⁸ despite its acknowledgement that “higher levels of observer coverage are more effective at collecting the data necessary to monitor groundfish landings and discards . . . and reducing the potential of an observer effect that could potentially compromise data collected with less than 100 percent coverage.”¹⁶⁹ NMFS justified its action on the basis of available funding, rather than the scientific needs of the fishery for accurate and precise data.¹⁷⁰ By way of a stark management contrast, NMFS, also in 2010, approved the Pacific Fishery Management Council’s requirement for 100 percent industry-funded coverage in its multispecies groundfish fishery, a comparable fishery that also included several overfished stocks. The implementing amendment stated:

. . . with 100 percent observer coverage, the Council would be able to better monitor total mortality of all groundfish species. Better mortality estimates would improve both stock assessments and the Council’s ability to keep catch below the harvest limits developed based on those assessments, substantially contributing to conservation goals.¹⁷¹

are hearing reports from not just groundfish vessels but other non-groundfish vessels that they are catching dead cod in many of their tows. We are also hearing reports about observers not recording these discards.”)

¹⁶⁴ *Id.*

¹⁶⁵ USCG First District Enforcement Staff. *Summary of Stock Area Analysis and Investigation of Misreporting in the Northeast Multispecies Fishery*. Available at: <https://s3.amazonaws.com/nefmc.org/USCG-Groundfish-Misreporting-Investigation-and-Analysis.pdf>.

¹⁶⁶ *Id.* at 2 and 21.

¹⁶⁷ *Id.* at 20.

¹⁶⁸ Amendment 16 Final Rule, 75 Fed. Reg. at 18,342.

¹⁶⁹ Amendment 16 Final Rule, 75 Fed. Reg. at 18,297.

¹⁷⁰ Amendment 16 Final, Rule, 75 Fed. Reg. at 18,278. (“Based upon available funding, NMFS intends to increase the NMFS-funded observer and at-sea monitor coverage to include approximately 38 percent of sector trips and 30 percent of common pool trips during FY 2010, and possibly future FYs.”).

¹⁷¹ Pacific Fishery Management Council. *Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery, Final Environmental Impact Statement including Regulatory Impact Review and Initial Regulatory Flexibility Analysis*. Dated June 2010, at 52. Available at: https://www.pcouncil.org/wp-content/uploads/1_Pacific-Coast-Groundfish-Limited-Entry-Trawl-Fishery-FEIS.pdf.

In New England, however, NMFS presided over the development of an inferior ASM program that sets coverage based on just an estimate of precision, not accuracy.¹⁷² Such an approach can just as easily produce data that are precisely *wrong*. Worse still, NMFS’s monitoring coverage targets have steadily declined since 2010,¹⁷³ and realized coverage most often does not even meet these targets (Table 2). Further, neither the Council nor NMFS have increased management uncertainty buffers to account for the increasingly known uncertainty associated with declining coverage¹⁷⁴ and the inherent lack of accuracy of catch-at-sea data associated with the approved program.

Fishing Year	NEFOP target coverage	ASM target coverage	Total target coverage	Realized coverage
FY 2010	8%	30%	38%	32%
FY 2011	8%	30%	38%	27%
FY 2012	8%	17%	25%	22%
FY 2013	8%	14%	22%	20%
FY 2014	8%	18%	26%	25.7%
FY 2015	4%	20%	24%	19.8%
FY 2016	4%	10%	14%	14.8%
FY 2017	4%	12%	16%	14.1%
FY 2018	5%	10%	15%	n/a
FY 2019	n/a	n/a	31%	n/a

Table 2: Target and realized monitoring coverage levels for fishing years 2010-2019.¹⁷⁵

The lack of accurate and precise catch data is a leading candidate among several in explaining the increasing retrospective patterns in the cod assessment models discussed above and the inability to rebuild cod stocks. More than once, the PDT has expressed concern about the current ASM program and the program’s inability to provide confidence that overfishing is not

¹⁷² See NEFMC. *Draft Amendment 23 to the NE Multispecies FMP including its Draft Environmental Impact Statement and Initial Regulatory Flexibility Analysis, Part 1*. Draft for Committee Review dated Jan. 14, 2020, at 46 and 48. Available at: https://s3.amazonaws.com/nefmc.org/200114_Groundfish_A23_DEIS_Part-1.pdf. (Precision is defined as: “How much estimates of the same quantity differ from each other across multiple samples, due both to sample variation and sample size.” Accuracy is defined as: “The closeness of the estimated value of some quantity to the true value.”)

¹⁷³ Since 2010, ASM coverage levels have been steadily declining until fishing year 2019 during which total target coverage was set at 31%. Total target coverage is 40% for fishing year 2020.

¹⁷⁴ See, e.g., 50 C.F.R. § 600.310(g)(2) (“For fisheries without in season management control to prevent the ACL from being exceeded, AMs should utilize ACTs that are set below ACLs so that catches do not exceed the ACL.”).

¹⁷⁵ NOAA Fisheries. *Summary of Analyses Conducted to Determine At-Sea Monitoring Requirements for Sectors FY19*, at 7.

occurring, particularly for Atlantic cod. During development of Framework 53, for example, the PDT noted:

[T]he PDT remains concerned about the ability for the fishery to stay within the very low GOM cod ACL in [fishing year] 2015 and the potential incentive a low ACL creates for misreporting or discarding. The PDT is less concerned with the catch being met on paper but the PDT is concerned with the large incentive for observer effects that a low ABC produces. . . . The PDT recognizes that increasing observer coverage to 100% for the commercial fleet in the GOM would likely be the best way to directly account for all catch in the commercial fishery. Observer coverage at 100% would give the fishery more options with where and how fishing can occur while avoiding GOM cod.¹⁷⁶

Since then, concerns about inadequate monitoring, evidence of its effects, and the case for 100 percent at-sea monitoring in New England’s groundfish fishery have only grown. Among the conclusions from PDT analyses conducted during the development of Amendment 23 are:

- “Fishing vessels in the [NE Multispecies] fishery alter their behavior in response to human observers (distinct from selection bias/observer deployment effects).” Particularly, “data show a trend in three key metrics, in almost all circumstances, such that when an observer is onboard, vessels appear to: (1) retain fewer fish, (2) fish for less time and, (3) obtain lower revenues.”¹⁷⁷
- “[The] composition of catch on observed trips is different than unobserved trips.”¹⁷⁸
- “In general, . . . cod stocks have [one of] the highest modeled discard incentives over time,” and “cod stocks had higher discard incentives in recent years (2015-2017).”¹⁷⁹
- “For the Gulf of Maine broad stock area . . . there were slightly more cod landings seen on observed trips relative to unobserved trips despite incentives to avoid cod on observed trips due to low ACLs from 2015 to 2017.”¹⁸⁰
- For the Georges Bank broad stock area, “more haddock are consistently landed on unobserved trips relative to observed trips. The differences in the haddock ratios may have less to do with the influences of haddock which was not constraining but

¹⁷⁶ Memorandum from Groundfish Plan Development Team Development to Groundfish Committee regarding “Development of Framework Adjustment 53 (FW 53) to the Multispecies (Groundfish) Fishery Management Plan” dated Nov. 5, 2014, at 1-2. Available at: https://s3.amazonaws.com/nefmc.org/8_141105_GF-PDT-memo-to-GF-Committee-re-FW-53-FINAL-2-with-Appendicies.pdf.

¹⁷⁷ Groundfish Plan Development Team. *Groundfish Plan Development Team Conclusions Based on Monitoring Analyses Conducted* dated April 15, 2019, at 1.

¹⁷⁸ *Id.* at 2.

¹⁷⁹ *Id.* at 1.

¹⁸⁰ *Id.* at 2.

perhaps more a function of other potentially constraining stocks [e.g., cod] on these trips targeting haddock.”¹⁸¹

- “Documented differences in the stock landing to effort relationships reflects differences in discarding of legal-sized fish on unobserved trips relative to observed trips.” Further, “the sector system increases the incentive to illegally discard legal-sized fish on unobserved trips.”¹⁸²
- “There is some evidence that the magnitude of unreported cod catch (potentially illegal discarding) could have been >60% of reported catch on unobserved trips.”¹⁸³

Public testimony from two members of the New England fishing community further point to how broken the current monitoring system is. The first speaker stated: “There’s a high grading situation going on in seafood that we aren’t looking at.” The second speaker elaborated: “As a previous observer in 2016 and 2017, I faced a lot of experiences where I’d show up to a boat and the captain would go, ‘OK . . . you got two choices, he’d say, you can either . . . steam out for a couple hours, do one tow, come back in, and there’s your day. Or if you, you know, would turn an eye, we can go out and have a full day and come back in.’”¹⁸⁴ Everyone knows that the current ASM program is inadequate for management and that the agency’s failure to address this core issue has produced a situation where there are no incentives to properly record and report cod catches.

Overall, the current ASM program does not use “an appropriate method to set at-sea monitoring coverage levels because the assumption that observed trips are representative of unobserved trips is false. . . . The [PDT] analyses support more comprehensive monitoring in the fishery.”¹⁸⁵ This conclusion is further supported by the SSC sub-panel review of the PDT’s analyses¹⁸⁶ and the 2019 Coast Guard report,¹⁸⁷ both of which concluded that the current ASM program is having adverse impact on proper management.

Inadequate monitoring and NMFS’s failure to end overfishing of Atlantic cod are inextricably linked. Without a robust, accurate and precise ASM program, the NE Multispecies

¹⁸¹ *Id.* at 2 and 3.

¹⁸² *Id.* at 2.

¹⁸³ *Id.*

¹⁸⁴ See Recording of the January 2019 Council Meeting, FDSA WF con’d at 31:19 and 32:49. Available at: https://s3.amazonaws.com/nefmc.org/10_FDSA WG-Contd mp3.

¹⁸⁵ Groundfish Plan Development Team. *Groundfish Plan Development Team Conclusions Based on Monitoring Analyses Conducted* dated April 15, 2019, at 3 and 4.

¹⁸⁶ SSC Sub-Panel. *Peer Review Report for the Groundfish Plan Development Team Analyses of Groundfish Monitoring* conducted April 24-25, 2019. Available at: https://s3.amazonaws.com/nefmc.org/3b_190513_SSC_Sub_Panel_Peer-Review-Report_OEMethods_FINAL.pdf. (“[The] work taken collectively show that there is an observer effect, and therefore managers need to account for this when basing management information off information derived from observed trips. The analyses suggest that estimates of discards on unobserved trips. . . [are] likely to be an underestimated reflection of actual discards.”)

¹⁸⁷ USCG First District Enforcement Staff. *Summary of Stock Area Analysis and Investigation of Misreporting in the Northeast Multispecies Fishery*, at 20. (“[The] current regulation regime is vulnerable to stock area misreporting and limits the ability of enforcement to detect and document misreporting of stock areas.”)

FMP cannot achieve statutory requirements to prevent, let alone end, overfishing and rebuild the fishery. Among other things, FMPs must prevent overfishing by “including measures to ensure accountability.” 16 U.S.C. §§ 1853(a)(15), 1854(a). Under the sector system in New England’s groundfish fishery, the accountability measure that exists to prevent overfishing requires a “pound-for-pound payback” in the event that a sector exceeds its quota, without having acquired additional quota from another sector.¹⁸⁸ Compliance with this accountability measure—and therefore ensuring overfishing is not occurring—is dependent on accurate and precise catch data, which the analyses demonstrate does not exist.

Additionally, monitoring coverage is an accountability measure in and of itself. As NMFS has acknowledged, monitoring coverage levels in the fishery should “provide confidence that the overall catch estimate is accurate enough to ensure that sector fishing activities are consistent with National Standard 1 requirements to prevent overfishing while achieving on a continuing basis optimum yield from each fishery.”¹⁸⁹ In other words, the level of at-sea monitoring coverage is a critical measure to ensure accountability that overfishing is not occurring and that the imposition of remedial consequences follow when it is. Ultimately, the lack of an adequate monitoring program wholly undermines the accountability measures built into the NE Multispecies FMP for purposes of preventing overfishing as well as the stock assessment science that is attempting to support appropriate catch limits.

While NMFS generally has not taken responsive actions to address the fundamental flaws of the current monitoring program, recent developments provide a glimmer of hope that the situation may improve. After significant delays, the Council recently voted to send out Amendment 23 for public comment. This Amendment aims “to implement measures to improve the reliability and accountability of catch reporting in the commercial groundfish fishery to ensure there is precise and accurate representation of catch (landings and discards).”¹⁹⁰ Additionally, in acknowledgement that bias exists in catch data collected by the current monitoring program, NMFS set the monitoring coverage target for fishing year 2020 above what would be necessary based on the existing program’s methodology.¹⁹¹ Though this new target (40 percent) is still completely inadequate and not supported by science, Amendment 23 presents the opportunity for NMFS to fix the monitoring problem that has contributed so significantly to cod’s rebuilding failure to date.

D. Additional Measures are Critical to Cod Recovery

In addition to preventing and ending overfishing by ensuring that all catch, directed and incidental, is monitored and correctly reported, and catch is effectively controlled, additional measures are critical to restoration of cod stock productivity and successful rebuilding including:

¹⁸⁸ NOAA Fisheries. “Northeast Multispecies Annual Catch Limits and Accountability Measures.” Available at: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/northeast-multispecies-annual-catch-limits-and>.

¹⁸⁹ Framework 55 Final Rule, 81 Fed. Reg. at 26,435.

¹⁹⁰ NEFMC. *Draft Amendment 23 to the NE Multispecies FMP including its Draft Environmental Impact Statement and Initial Regulatory Flexibility Analysis, Part 1*. Draft for Committee Review dated Jan. 14, 2020, at 11.

¹⁹¹ See Letter from NMFS Regional Administrator Michael Pentony to Council Chairman John Quinn dated Jan. 28, 2020. Available at: <https://content.govdelivery.com/accounts/USNOAAFISHERIES/bulletins/2789b07>.

(1) meaningful habitat protections for juvenile cod, spawning adults, and large older cod; (2) restoring a normalized age structure; (3) accounting for the true structure of cod populations in New England; and (4) addressing the impacts of climate change. In the past few decades, NMFS has unreasonably reduced rather than increased conservation and management measures that address these issues in the face of the two persistently overfished and unproductive cod stocks.

1. Value of Essential Fish Habitat for Rebuilding Stocks

Congress specifically characterized essential fish habitat (“EFH”) protections as an economic and social issue noting that: “One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continued loss of marine, estuarine, and other aquatic habitats.” 16 U.S.C. § 1801(a)(9). To halt the further decline of cod spawning stock biomass, protection of spawning areas, juvenile cod nurseries areas and habitats preferred by bigger and older cod must be achieved through the closure of additional habitat known to be important to cod. The EFH regulations are clear that for an overfished stock such as Atlantic cod, all habitats currently used and certain historic habitats are essential for rebuilding:

If a species is overfished and habitat loss or degradation may be contributing to the species being identified as overfished, all habitats currently used by the species may be considered essential in addition to certain historic habitats that are necessary to support rebuilding the fishery and for which restoration is technologically and economically feasible.

50 C.F.R. § 600.815(a)(1)(iv)(C).

The National Standard 1 guidelines specify: “If manmade environmental changes are partially responsible for a stock or stock complex’s biomass being [overfished], in addition to controlling fishing mortality, Councils should recommend *restoration* of habitat and other ameliorative programs, to the extent possible.” 50 C.F.R. § 600.310(e)(2)(iii)(C)(emphasis added). The NRC Rebuilding Committee also noted the importance of habitat protection in relation to rebuilding stocks stating that “many species depend on particular habitats to support the growth and survival of specific life stages, suggesting that habitat loss could limit rates of rebuilding.”¹⁹² Unfortunately, the importance of restoring cod EFH in order to rebuild the cod stocks has not been part of the rebuilding plans approved by NMFS in this region.

First, the rebuilding plans do not identify and protect spawning areas critical to cod rebuilding. Cod exhibit strong site fidelity to spawning grounds and both the location and timing of historic and current spawning is well described in the available literature. Unfortunately, spawning aggregations that once occurred along the entire coast of the Gulf of Maine¹⁹³ have been serially depleted, and there is little suggestion of recovery by these spawning components. In addition, the degradation of nursery habitats and the loss of key forage stocks such as river herring has likely contributed to the disappearance of important coastal spawning components.¹⁹⁴ Inadequate protection of spawning areas for cod has been an impediment to its recovery as many

¹⁹² NRC Report at 94.

¹⁹³ Ames. 2004.

¹⁹⁴ Ames. 2004.

rolling closures that were previously considered critical to the protection of cod have been reduced or eliminated over time (Appendix B).

Second, NMFS has not protected favorable habitat for juvenile and adult cod despite the proven benefits of closed areas. The Cashes Ledge Closed Area, for instance, has been shown to contain older cod compared to adjacent open areas, which demonstrates the value of closures as one of the few management options for ensuring the survival of larger, older females.¹⁹⁵ However, with one notable exception on Georges Bank, NMFS recently approved habitat protection measures in New England through the Omnibus Essential Fish Habitat Amendment 2¹⁹⁶ (Habitat Amendment) that reduced existing habitat protections in historically important cod areas, such as the Western Gulf of Maine Closure Area, and failed to protect additional areas that were identified by scientists as known hot spots for juvenile cod such as the Bigelow Bight Area.¹⁹⁷ NMFS is now considering a “trailing action”—the Clam Dredge Framework Adjustment¹⁹⁸—that would allow destructive clam dredge gear into specific areas in the Great South Channel Habitat Management Area, further weakening cod habitat protection measures if approved. This framework adjustment proposal is particularly egregious as this closure was developed specifically to protect important habitat for juvenile cod and contains historically important cod spawning grounds.¹⁹⁹

With respect to the NE Multispecies FMP and the two cod stocks, NMFS has repeatedly approved habitat measures that prioritize short-term economic considerations over protections that would produce long-term economic benefits to the coastal communities that depend upon healthy cod populations. While it may be appropriate to consider the needs of fishing communities when establishing the length of a rebuilding period, neither the statute nor the case law allow economic considerations to impede rebuilding to the point that it never occurs and that it results in overfishing and overfished stocks. Closing habitat areas to fishing comes at a cost, but so too does the failure to protect essential cod habitat to facilitate rebuilding.

2. Failure to Rebuild Age-Structure in Cod Populations

Rebuilding normal age demographics in the once-reliably recruiting cod populations is fundamental to improving the anemic recruitment patterns that have set in. The NRC Rebuilding Committee specifically pointed to this aspect of the management challenge: “Truncating the age structure [of a population] may reduce the ability of populations to cope with sequences of poor conditions. . . . Attaining a biomass target may depend on first restoring the age structure of the

¹⁹⁵ Sherwood GD and Grabowski JF. 2016. “A comparison of cod life-history parameters inside and outside of four year-round groundfish closed areas in New England, USA.” *ICES Journal of Marine Science* 73:316-328.

¹⁹⁶ Omnibus Essential Fish Habitat Amendment 2 Final Rule, 83 Fed. Reg. 15,240 (April 9, 2018).

¹⁹⁷ NEFMC. *Omnibus Essential Fish Habitat Amendment 2 and its Final Environmental Impact Statement, Volume 3: Description of spatial management alternatives, including preferred alternatives and considered but rejected alternatives*, at 39. Available at: https://s3.amazonaws.com/nefmc.org/OA2-FEIS_Vol_3_FINAL_161208.pdf; see also NEFMC. *Omnibus Essential Fish Habitat Amendment 2 and its Final Environmental Impact Statement, Appendix E: Synopsis of Closed Area Technical Team analysis of juvenile groundfish habitats and groundfish spawning areas*. Available at:

https://s3.amazonaws.com/nefmc.org/Appendix_E_Synopsis_of_CATT_analysis_171011_091346.pdf.

¹⁹⁸ Habitat Clam Dredge Exemption Framework Proposed Rule, 84 Fed. Reg. 48,899 (Sept. 17, 2019).

¹⁹⁹ 84 Fed. Reg. at 48,900.

stock. For example, the age structure of Georges Bank haddock became truncated following the stock collapse between 1970 and 1995. . . . The expansion of the age structure in the later 1990s preceded very strong year-classes in 1999 and 2004.”²⁰⁰ Likewise, the age structure of both cod stocks in the late 1980s, when recruitment was substantially higher, was much broader than recent years and included significantly more large fish.²⁰¹

As noted in the stock assessments, truncation of the age-structure and the absence of large fish in the Atlantic cod stocks is correlated with compromised recruitment.²⁰² The largest, highly reproductive female cod age-classes—which have been systematically fished out over the last 40 years (Figure 8)—contribute disproportionately to successful spawning and are an essential part of any healthy cod population. The reproductive output in terms of energy of one 66-pound cod, for example, is estimated to be equivalent to that of 37 younger females weighing 4.4 pounds each and with a combined biomass of 163 pounds (Figure 13).²⁰³ Both empirical and laboratory studies also suggest that reproductive success, including egg viability and hatching rates and hence their proportional contribution to recruitment success, is greater for older fish.²⁰⁴ Furthermore, individual cod spawn in multiple batches over many weeks, and large females start spawning earlier and spawn over a longer time period than younger cod.²⁰⁵ This behavior increases the chance of successful spawning by hedging against environmental conditions that may vary over the spawning season year-to-year or with climate change. The unfortunate corollary that managers have now produced in New England is that cod populations with truncated age structures such as GOM and GB cod are likely to be more sensitive to environmental fluctuations, including those related to climate change.²⁰⁶

As a consequence of these multiple age-related effects, when science and management do not account for age structure, the resiliency of cod stocks to fishing is likely overestimated.²⁰⁷ Restoring and maintaining a normal age-structure in the cod population is essential to rebuilding the stocks. This is a fundamental part of the best science available to NMFS that should be brought to bear on this persistent management problem. *See* 16 U.S.C. § 1851(a)(2).

²⁰⁰ NRC Report at 92.

²⁰¹ NEFSC. 2012. *Assessment or Data Updates of 13 Northeast Groundfish Stocks Through 2010*. NEFSC Ref. Doc. 12-06, at 30. (“Current low [GB cod] productivity is related to current age structure, which is truncated compared to age structure in the late 1980’s.”)

²⁰² Palmer MC. 2014. *2014 Assessment update report of the Gulf of Maine Atlantic cod stock*. NEFSC Ref. Doc. 14-14, at 11. (“...truncation of the age-structure...could compromise the future recruitment success of this stock.”)

²⁰³ Barneche DR, Robertson DR, White CR, and Marshall DJ. 2018. “Fish reproductive-energy output increases disproportionately with body size.” *Science* 360:642-645.

²⁰⁴ Trippel EA. 1998. “Egg size and viability and seasonal offspring production of young Atlantic cod.” *Trans. Am. Fish. Soc.* 127:339-359; Hixon MA, Johnson DW, Sogard SM. 2014. “BOFFFFs: on the importance of conserving old-growth age structure in fishery populations.” *ICES Journal of Marine Science* 71:2171-2185.

²⁰⁵ *Id.*; Hutchings JA and Myers RA. 1993. “Effect of age on seasonality of maturation and spawning of Atlantic cod, *Gadus morhua*, in the Northwest Atlantic.” *Canadian Journal of Fisheries and Aquatic Sciences* 50:2468-2474.

²⁰⁶ Rouyer T, Ottersen G, Durant JM, Hidalgo M, Hjermann DO, Persson J, Stige LC, and Stenseth NC. 2011. “Shifting dynamic forces in fish stock fluctuations triggered by age truncation?” *Global Change Biology* 17:3046–3057.

²⁰⁷ Murawski SA, Rago PJ, and Trippel EA. 2001. “Impacts of demographic variation in spawning characteristics on reference points for fishery management.” *ICES Journal of Marine Science* 58:1002–1014.

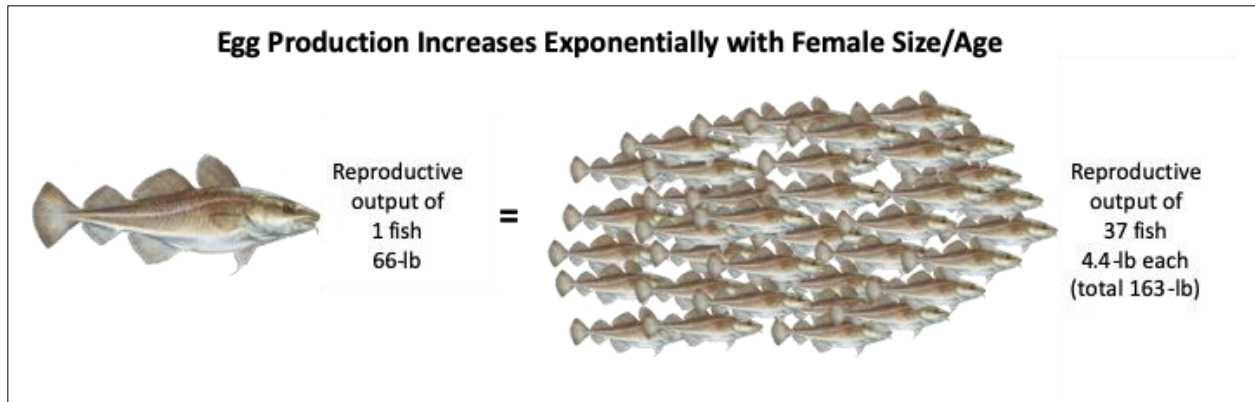


Figure 13: Schematic illustrating the exponential increase in egg production of larger, older female cod. The reproductive output (expressed in terms of energy) from a single 66-pound female cod equals that of 37 smaller fish each 4.4-pound in weight, totaling 163 pounds.²⁰⁸ Thus, the more that large fish comprise the stock biomass, the greater the potential reproductive output.

NMFS has repeatedly, and without any supporting rationale, approved management actions that wholly fail to address the concerns of stock assessment scientists who have consistently emphasized the importance of rebuilding the age structure of cod stocks as a key to restoring productivity. A truncated age structure is indicative of a population experiencing high mortality, but there has not been a single action approved by NMFS that was specifically designed to redress the severely truncated age structures of the cod populations highlighted as an issue by the agency’s scientists.

3. Failure to Consider Sub-Population Structure

The current management paradigm—managing Atlantic cod as two units—oversimplifies the stock structure and fails to consider the importance of sub-populations in cod recovery. The GOM and GB cod stocks are assumed to represent closed, homogeneous populations, which means each is assumed to be a single population with no exchange of fish across stock boundaries. However, based on recent genetic, tagging, and other studies, at least three distinct sub-populations of cod exist in the New England region. One exists on Georges Bank. At least two co-occur in the Gulf of Maine, one of which spans the GOM/GB cod stock boundary (Figure 14).²⁰⁹ Initial analyses indicate that the current two-stock approach could overestimate the total regional cod maximum sustainable yield by as much as 50 percent because aspects of the stocks’ true population dynamics are unaccounted for in the modeling.²¹⁰ Thus, current assessment model predictions of stock rebuilding rates are also likely overestimates.

²⁰⁸ Modified from Barneche *et al.* 2018.

²⁰⁹ Zemeckis *et al.* 2014.

²¹⁰ Kerr LA, Cadrin SX, and Kovach AI. 2014. “Consequences of a mismatch between biological and management units on our perception of Atlantic cod off New England.” *ICES Journal of Marine Science* 71:1366-1381.

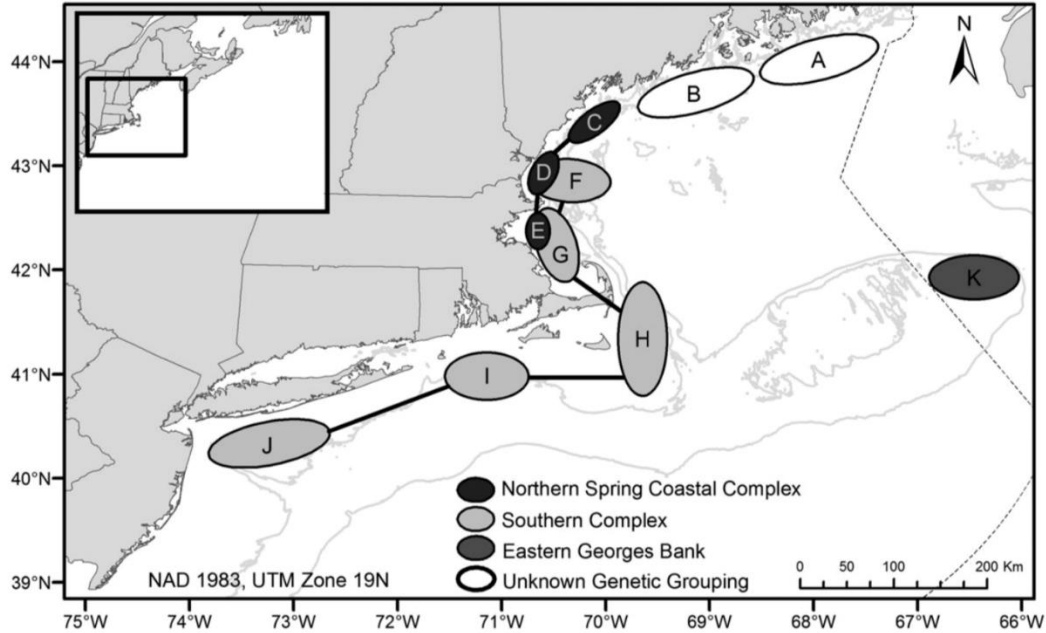


Figure 14: Schematic depicting the emerging understanding of cod population structure generated via interdisciplinary review of genetic, tagging, morphological, and other data. Cod on Georges Bank are distinct from the more inshore populations. The coastal Gulf of Maine contains two or more populations, including spring and winter spawning groups. The latter spans the boundary that presently divides the GOM and GB stocks, with spawning components in Massachusetts Bay (F-G) but also to the south on Nantucket Shoals (H), southern New England (I) and the middle Atlantic (J).²¹¹

Equally important for management purposes, the literature recognizes that distinct winter- and spring-spawning sub-populations of GOM cod exist and each contributes differently to overall GOM cod recruitment and catch, which is likely due to differences in closed area protections and vulnerability to changing ocean temperatures.²¹² In the words of one scientist who has examined this issue, “[a]n assessment model that does not adequately represent the aggregate dynamics of the population will yield inaccurate catch advice and lead to misguided management, perpetuating, and amplifying the problem. In short, it matters where, when, and which cod are harvested from the population.”²¹³

Ensuring the viability of sub-populations in a management system where catches are set based on the larger stock unit is difficult but imperative. Loss of historical sub-population structure, such as the spawning groups once distributed along the length of coastal Maine,²¹⁴ also contributes to current low recruitment rates relative to historic rates. Therefore, protection of the remaining sub-populations, such as through carefully designed spawning closures that include

²¹¹ Reproduced from Zemeckis DR, Martins D, Kerr LA, and Cadrin SX. 2014. “Stock identification of Atlantic cod (*Gadus morhua*) in US waters: an interdisciplinary approach.” *ICES Journal of Marine Science* 71:1490-1506.

²¹² Dean MJ, Elzey S, Hoffman, WS, and Buchan N. 2019. “The relative importance of sub-populations to the Gulf of Maine stock of Atlantic cod.” *ICES Journal of Marine Science* 76(6):1626-1640.

²¹³ *Id.* at 13.

²¹⁴ Ames. 2004.

consideration of displaced fishing effort, is of critical importance. Recent recreational landings data of Atlantic cod in New York—estimated in 2017 at 1,642,489 pounds which is 40 percent of the total regional cod catch²¹⁵—moreover, points to the specific importance of and need for intensive cod management measures south of Cape Cod.²¹⁶

The recently formed cod structure working group (2018)²¹⁷—the second attempt this decade after a previous workshop (2012) failed to lead to management changes—seeks to achieve scientific consensus on stock structure to develop management alternatives based on the best available science. Presumably, the working group’s outputs will figure prominently in the next research track assessments for Atlantic cod. In the meantime, NMFS must use the best scientific information available to identify and conserve all sub-populations through the protection of spawning grounds and other means, and account for the uncertainty introduced by stock structure issues when considering the assessment models to set catch limits.

4. Failure to Account for Climate Change Impacts

Future stock assessments and management actions for Atlantic cod, as well as other species, must account for vulnerability to climate change.²¹⁸ The Gulf of Maine is warming faster than 99 percent of the world’s oceans²¹⁹ and is likely more susceptible to ocean acidification than previously thought.²²⁰ Both New England cod stocks are known to be influenced by environmental conditions²²¹ and the ecological changes driven by excessive greenhouse gas emissions are already having impacts on distribution and productivity. Specifically, in addition to the effects of fishing and changing forage fish distributions, climate change is affecting spatial distributions as cod move towards deeper, colder waters in the Gulf of Maine and towards the north on Georges Bank, with a shrinking of the overall area occupied by remnant cod

²¹⁵ Data downloaded from NOAA Fisheries. “Landings.” Available at: <https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200:1416339190729::NO:::>

²¹⁶ It is not clear where these cod were caught, but it was most likely in the southwestern, coastal extent of the GB cod stock given their being landed in New York. These catches were thus presumably attributed to the GB stock, but in fact likely relate to the coastal population that straddles the GOM/GB boundary (Figure 14). Such large catches on a population not properly accounted for by current stock delineations undoubtedly confounds assessment and management.

²¹⁷ See NEFSC. “Atlantic Cod Stock Structure Working Group.” Available at: https://www.nefsc.noaa.gov/press_release/pr2018/other/cod-stock-structure/.

²¹⁸ Hare JA, Morrison WE, Nelson MW, Stachura MM, Teeters EJ, Griffis RB, Alexander MA, Scott JD, Alade L, Bell RJ, Chute AS, Curti KL, Curtis TH, Kircheis D, Kocik JF, Lucey SM, McCandless CT, Milke LM, Richardson DE, Robillard E, Walsh JF, McManus MC, Marancik KE, and Griswold CA. 2016. “A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf.” *PLOS ONE* 11(2):e0146756.

²¹⁹ Pershing *et al.* 2015.

²²⁰ Wang ZA, Wanninkhof R, Cai WJ, Byrne RH, HU Z, Peng TH, and Huang WJ. 2013. “The marine inorganic carbon system along the Gulf of Mexico and Atlantic coasts of the United States: insights from a transregional coastal carbon study.” *Limnology and Oceanography* 58:325-342.

²²¹ Serchuk FM, Grosslein MD, Lough RG, Mountain DG, and O’Brien L. 1994. “Fishery and environmental factors affecting trends and fluctuations in the Georges Bank and Gulf of Maine Atlantic cod stocks: an overview.” *ICES Mar. Sci. Symp.* 198:77-109.

populations.^{222, 223, 224} In the long-term, warming coastal waters are likely to further reduce the amount of habitat that is thermally optimal for cod.²²⁵

Warmer temperatures also negatively affect stock productivity,²²⁶ and levels of acidification expected by end-of-century may reduce the survival of cod larvae and hence impact recruitment.²²⁷ It appears inevitable that stock rebuilding will likely be slower and more difficult due to climate change. Such environmental and climate-related impacts on the stocks must be evaluated and addressed directly within the assessment models such that the conservation and management measures in rebuilding plans can effectively take them into account.

The importance of prioritizing the rebuilding of GOM and GB cod stocks now is hard to overstate in the context of the emergent and future ecological stresses associated with climate change. In addition to the recognition that healthy stocks are most likely to show resilience in the face of ecological change, recent studies suggest that the genetically different spawning groups in the New England region may differ in their adaptation to varying temperature regimes.²²⁸ The long-term future of the cod fishery in New England may depend on NMFS's ability and willingness to protect the genetic diversity of cod sub-populations that are locally adapted, or potentially capable of adapting, to warmer temperatures and other climate change-related stresses.

Climate change effects, however, are not an excuse for NMFS's historic and current ineffective management of Atlantic cod or for avoiding legal obligations. Despite the known impacts of climate change on cod biology, overfishing has played the dominant role in cod stock declines.^{229, 230} Furthermore, unlike environmental conditions and warming ocean temperatures, NMFS can directly control fishing pressure through management actions. The necessary management measures to end overfishing and rebuild New England cod stocks described below

²²² Adams CF, Alade LA, Legault CM, O'Brien L, Palmer LC, Sosebee KA, Traver ML. 2018. "Relative importance of population size, fishing pressure and temperature on the spatial distribution of nine Northwest Atlantic groundfish stocks." *PLOS ONE* 13(3):e0196583.

²²³ Richardson DE, Palmer MC, Smith BE, and Cooper A. 2014. "The influence of forage fish abundance on the aggregation of Gulf of Maine cod (*Gadus morhua*) and their catchability in the fishery." *Can J. Fish Aquat. Sci.* 71:1349-1362

²²⁴ Nye JA, Link JS, Hare HA, and Overholtz WJ. 2009. "Changing spatial distribution of fish stocks in relation to climate and population size on the Northeast United States continental shelf." *Marine Ecology Progress Series* 393:111-129.

²²⁵ Morley JW, Selden RL, Latour RJ, Frolicher TL, Seagraves RJ, and Pinsky ML. 2018. "Projecting shifts in thermal habitat for 686 species on the North American continental shelf." *PLOS ONE* 13(5):e0196127.

²²⁶ Pershing *et al.* 2015.

²²⁷ Stiasny MH, Mittermayer FH, Sswat M, Voss R, Jutfelt F, Chierici M, Puvanendran V, Mortensen A, Reusch TBH, and Clemmesen C. 2016. "Ocean Acidification Effects on Atlantic Cod Larval Survival and Recruitment to the Fished Population." *PLOS ONE* 11 (8):e0155448.

²²⁸ Clucas GV, Kerr LA, Cadrin SX, Zemeckis DR, Sherwood GD, Goethel D, Whitener Z, and Kovach AI. 2019. "Adaptive genetic variation underlies biocomplexity of Atlantic Cod in the Gulf of Maine and on Georges Bank." *PLOS ONE* 14(5):e0216992.

²²⁹ See, e.g., Hilborn R and Litzinger E. 2009. "Causes of Decline and Potential for Recovery of Atlantic Cod Populations." *The Open Fish Science Journal* 2:32-38.

²³⁰ Brander K. 2018. "Climate change not to blame for cod population decline." *Nature Sustainability* 1:262-264.

remain the same even with the compounding effects of climate change. Undertaking these measures will only increase the climate resilience of the populations.

* * *

In sum, the Secretarial Amendment must include conservation and management measures that protect cod spawning grounds and other essential cod habitat, rebuild age-structure, address stock structure, and address the effects of climate change. Together with the application of abundant caution in the face of uncertainty, these measures will serve as a means to engender higher recruitment and promote rebuilding as well as promote resilience in face of a changing climate.

E. Ineffective Fishery Management Has Caused Significant Economic Harm

The failure to prevent overfishing and the inability to rebuild Atlantic cod have taken a significant toll on New England fishing communities and U.S. taxpayers. In 1990, a report estimated that overfishing in the groundfish fishery led to at least \$350 million in lost revenue and 14,000 lost jobs.²³¹ A 2011 study concluded that New England commercial fishermen lost \$149 million in the 2009 fishing year alone due to the catch losses associated with overfishing.²³²

A recent CLF analysis (Appendix C) demonstrates that between 2010-2017, cumulative lost revenues totaled \$925 million, approximately \$115.6 million per year, as a result of U.S. fishermen landing Atlantic cod at levels significantly below the maximum sustainable yield estimated for the GOM and GB cod stocks. For example, under this analysis, in fishing year 2017 alone, U.S. fishermen landed an estimated 2.8 percent (867.9 mt) of the combined potential maximum sustainable yield for the GOM and GB cod stocks (as adjusted for the U.S. portion of GB cod landings).

Mismanagement has also cost the U.S. taxpayer. In 1994 and again in 1995, the U.S. Secretary of Commerce declared fishery disasters in New England's groundfish fishery, noting that "fishery management actions have not been sufficient to prevent stock collapse as hoped for strong year classes have failed to appear."²³³ In those two years, a combined \$55 million of taxpayer funding was provided as an emergency relief to support the fishing industry and affected communities.²³⁴ Nearly 20 years later in 2013, the Acting Secretary of Commerce declared another fishery disaster requiring another taxpayer-funded relief of \$32.8 million.²³⁵

²³¹ Massachusetts Offshore Groundfish Task Force. 1990. *New England Groundfish in Crisis – Again*. Publication No. 16, 551-42-200-1-91-CR, at 33.

²³² Hesselgrave T, Kruse S, and Sheeran KA. *The Hidden Cost of Overfishing to Commercial Fishermen: A 2009 Snapshot of Lost Revenues*, Final Report to the Pew Charitable Trusts dated July 25, 2011, at 22.

²³³ See NOAA Fisheries. "Fishery Disaster Determinations." Available at: <https://www.fisheries.noaa.gov/national/funding-and-financial-services/fishery-disaster-determinations>.

²³⁴ *Id.*

²³⁵ *Id.*

VI. A Secretarial Amendment is Required Under the Circumstances

The Council has repeatedly failed to submit an FMP or amendment that ends overfishing or that rebuilds Atlantic cod consistent with the mandates of the MSA. Consequently, NMFS must prepare a Secretarial Amendment and put this fishery on a path of recovery to optimum yield. *See, e.g.*, 16 U.S.C. § 1854(c), (e)(5). NMFS's repeated failure to end overfishing immediately using the best scientific advice available violates National Standards 1 and 2. NMFS is not only failing one of its most basic and black-letter statutory duties—ending overfishing immediately in an overfished stock—but it also bears full responsibility for the fact that there is virtually no likelihood that GOM cod will rebuild by the end of its second ten-year rebuilding period or produce optimum yields at any time in the foreseeable future. NMFS is ultimately responsible as well for the persistently depleted status of GB cod and its lack of recovery almost 16 years into its rebuilding plan. NMFS must take action to remedy these failures.

A. New Conservation and Management Measures Are Necessary and Appropriate to End Overfishing and Rebuild Atlantic Cod

An effective Secretarial Amendment, developed pursuant to 16 U.S.C. § 1854(e)(5), must be implemented as quickly as possible. *Id.* Given the history of persistently ineffective management measures and a failure to use the best available science, the following elements are the minimum necessary and appropriate conservation and management measures to manage this fishery and should be contained in the Secretarial Amendment.

1. 100 Percent At-Sea Monitoring on All Commercial Groundfish Trips

Chronically overfished cod stocks coupled with growing evidence of observer bias, illegal discarding, and misreporting, demand 100 percent at-sea monitoring by human observers or electronic monitoring on all vessels participating in New England's commercial groundfish fishery as quickly as technically feasible. Recent statements and analyses, in addition to those discussed above, validate the need for 100 percent monitoring. First, the Vice Chair of the SSC and one of its most experienced members, Dr. Patrick Sullivan, stated in relation to some of his previous work regarding observer coverage in Alaska, "We could see changes in behavior of how the fleet was fishing, where it was fishing, and so on and so forth. And so, if we are talking about expanding observer coverage [in New England] . . . trying to get 100 percent coverage is the better way to go from the analyst point of view."²³⁶ Second, as evidenced in the Amendment 23 Draft Environmental Impact Statement, "As coverage increases to 100%, the effective bias of unobserved trips reduces to zero"²³⁷ Additionally, 100 percent monitoring is expected to have positive biological impacts on regulated groundfish and other species compared to the current ASM program as well as to proposed 25 percent, 50 percent, and 75 percent fixed monitoring coverages (based on a percentage of trips).²³⁸

²³⁶ *See* Recording of the January 2019 Council Meeting, SSC Review of FDSA WG at 14:39. Available at https://s3.amazonaws.com/nefmc.org/11_SSC.Peer.Review-of-FDSA WG.mp3.

²³⁷ NEFMC. *Draft Amendment 23 to the NE Multispecies FMP including its Draft Environmental Impact Statement and Initial Regulatory Flexibility Analysis, Part 3a*. Draft for Committee Review dated Jan. 14, 2020, at 12. Available at: https://s3.amazonaws.com/nefmc.org/200116_Groundfish_A23_DEIS_Part-3a.pdf.

²³⁸ *Id.* at 46.

Management of the fishery is currently crippled by a lack of accurate and precise catch data. Increasing accountability through 100 percent at-sea monitoring is critical to understanding the fishing mortality of cod, ensuring adherence to catch limits, and, ultimately, rebuilding the stock. Furthermore, 100 percent monitoring would allow broader use of fishery dependent data. As detailed in the Fishery Data Dependent Working Group report,²³⁹ there are myriad beneficial applications of fishery-dependent data—provided, however, that these data are accurate and precise. As discussed above, the Pacific Fishery Management Council transitioned to 100 percent industry-funded monitoring for its multispecies groundfish fishery in 2010, after which fishermen adapted quickly to improve their fishing strategies through the development of bycatch risk pools,²⁴⁰ increased cooperation and communication, gear modifications,²⁴¹ and other innovations to avoid bycatch. Most of these overfished West Coast rockfish stocks rebuilt well ahead of scientific predictions.²⁴²

Accurate estimates of cod bycatch in other fisheries is also necessary.²⁴³ Any Secretarial Amendment should evaluate non-groundfish fisheries for cod bycatch potential and require sufficient monitoring coverage in these fisheries to produce accurate and precise estimates of cod bycatch and discards for use in stock assessments and potential future management actions.

2. A Prohibition on Directed Commercial and Recreational Fishing for Atlantic Cod

Given the ongoing failure to end overfishing and rebuild the two cod stocks, a prohibition on directed fishing for GOM cod and GB cod, coupled with an intensive program to reduce incidental catch, is warranted. In the case of GOM cod, this is simply what should have been done already to properly follow the approved ABC control rule and its hierarchy of increasingly stringent measures. Scientific studies show that most successful rebuilding plans “have incorporated substantial, measurable reductions in fishing mortality at the onset, rather than relying on incremental small reductions over time.”²⁴⁴ A prohibition on directed commercial and recreational fishing for cod with a companion incidental catch reduction program, as well as a mechanism for the immediate closure of stocks areas when incidental catch levels are reached, would achieve the necessary “substantial, measurable reductions.”²⁴⁵

²³⁹ See *Fishery Data for Stock Assessment Working Group Report*. SSC Review Draft dated Nov. 19, 2018. Available at: https://s3.amazonaws.com/nefmc.org/A1_181119_SSC-Review-Draft_Fishery-Data-for-Stock-Assessment-Working-Group-report-with-appendices.pdf.

²⁴⁰ Holland DS and Jannot JE. 2012. “Bycatch risk pools for the US West Coast Groundfish Fishery.” *Ecological Economics* 78:132-147.

²⁴¹ Shems J. “Gear Workshop Highlights Innovators in West Coast Fishery.” EDF dated Aug. 5, 2015. Available at: <http://blogs.edf.org/edfish/2016/08/05/gear-workshop-highlights-innovators-in-west-coast-fishery>.

²⁴² See NOAA Fisheries. 2015. *The West Coast Catch Shares Program: 2015 Update for the West Coast Catch Shares Program*. Available at: https://archive.fisheries.noaa.gov/wcr/publications/fishery_management/trawl_program/analytical_docs/final_2012-2013_summary_report.pdf.

²⁴³ National Standard 9 states: “Conservation and management measures shall to the extent practicable: (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.”

²⁴⁴ Murawski SA. 2010. “Rebuilding depleted fish stocks: the good, the bad, and, mostly, the ugly.” *ICES Journal of Marine Science* 67:1830-1840.

²⁴⁵ *Id.*

Further, prioritizing allocation of incidental catch to groundfish vessels as well as ensuring that catch history during the term of the Secretarial Amendment does not count towards future potential sector contributions may help mitigate the short-term economic impacts and prevent forfeiture of catch history if fishermen do not participate in the fishery during the early phases of rebuilding. As cod stocks start to demonstrate significant and reliable recovery, NMFS should prioritize quota allocation back to the groundfish fishery based on baseline potential sector contributions as of the date of the Secretarial Amendment, rather than to the bycatch fisheries, as a means of revitalizing the fishery and preserving historical participation.

3. Area Closures to Protect All Identified Atlantic Cod Spawning Locations and Favorable Habitat for Juvenile and Adult Cod

Time and area closures have proven effective to protect spawning aggregations²⁴⁶ and important habitats. Such closures have long been utilized in New England, but they have not always been adequate in size or duration to protect cod. Refuge areas free from the disturbances of fishing—including targeted fishing on cod and its associated impacts on habitat—must be established or in some cases re-established to facilitate rebuilding. This means closing critical spawning areas as well as areas favorable to juvenile and adult cod. All cod closures should be closed to all gears capable of catching groundfish, and NMFS should not authorize any sector exemptions in any closure.

For spawning protection in particular, these closures must:

... ensure that [the] low SSB of this stock has the opportunity for successful spawning events which is essential to prevent failures in future year classes through recruitment success. Spawning success from a low stock biomass [has] the potential for rapid stock rebuilding. . . .²⁴⁷

A PDT study conducted during the development of Framework 53 provided a comprehensive assessment of cod spawning times and locations in the Gulf of Maine and recommended a more extensive suite of seasonal closures than those adopted by the Council and approved by NMFS (Figure 15).²⁴⁸ Given the current dire circumstances, NMFS should implement these broader spawning closures. NMFS should also re-evaluate the current GOM

²⁴⁶ Armstrong MP, Dean MJ, Hoffman WS, Zemeckis DR, Nies TA, Pierce DE, Diodati PJ, McKiernan DJ. 2012. “The application of small scale fishery closures to protect Atlantic cod spawning aggregations in the inshore Gulf of Maine.” *Fisheries Research* 141:62-69.

²⁴⁷ Memorandum from Jamie M. Cournane to the Groundfish Committee regarding “Biological and Economic Impacts Analysis for Framework 53 to the Northeast Multispecies Fishery Management Plan” dated Nov. 10, 2014. Available at: http://s3.amazonaws.com/nefmc.org/5a_141110-Council-staff-memo-to-GF-Committee-re-FW-53-impacts-analysis-FINAL-with-attachments.pdf.

²⁴⁸ Sub-option C provided the most comprehensive set of possible closures and was recommended by the study authors but was not adopted. See NEFMC. *Framework Adjustment 53 to the NE Multispecies FMP, Appendix II: Analytic Techniques: GOM Cod and Other Groundfish Analysis*. Available at: https://s3.amazonaws.com/nefmc.org/150115_FW53_Appendix_II_Analytic_Techniques.pdf.

Cod Protection Closures,²⁴⁹ in particular the areas not encompassed by the broader Framework 53 closures, to determine if they need to be expanded in space and time.

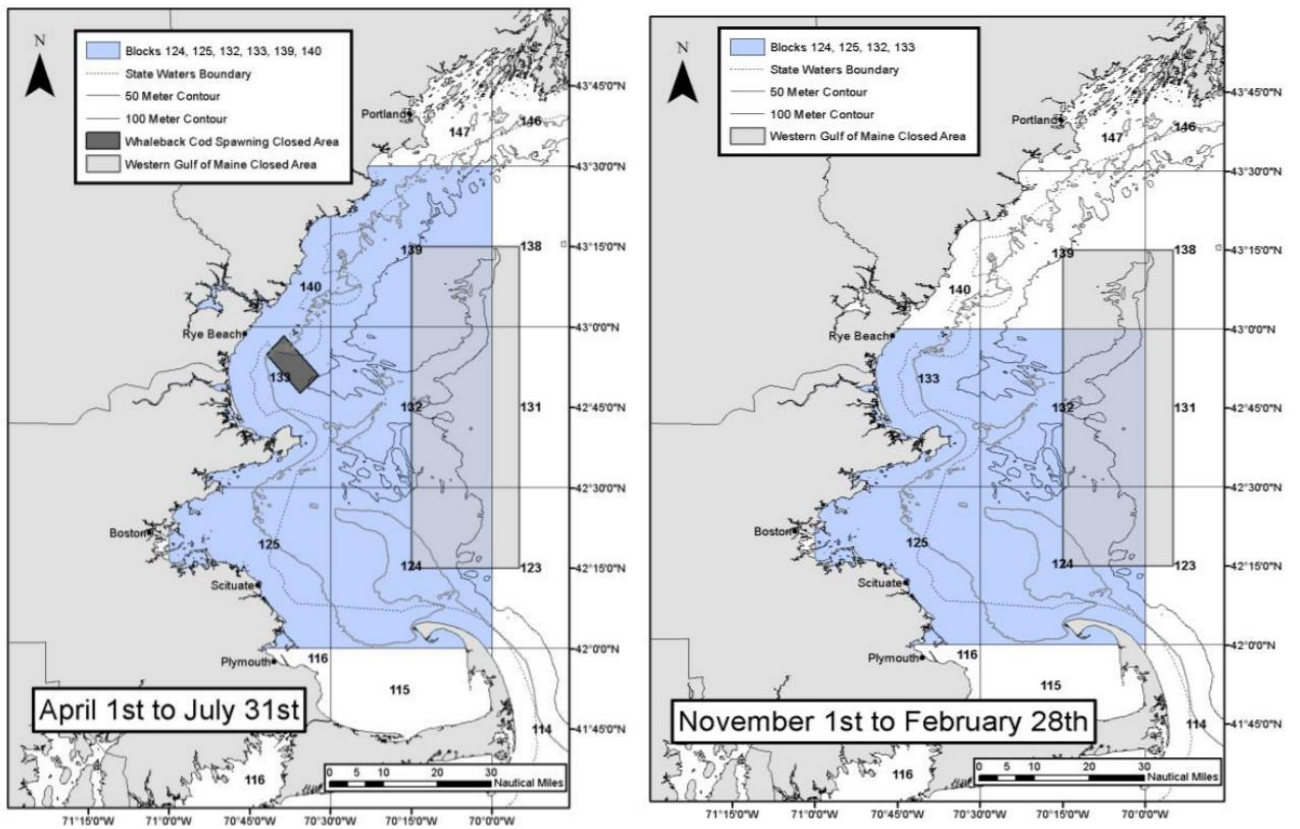


Figure 15: PDT Proposed Seasonal Spawning Closures for Gulf of Maine.²⁵⁰

NMFS must conduct a similar comprehensive data review of all relevant data sources to determine the locations, in time and space, of cod spawning on Georges Bank and in Southern New England in order to protect them. One such data source would be the spawning ground areas on Georges Bank identified by fishermen in the Decelles *et al.* paper (Figure 16).²⁵¹ NMFS should also use NEFOP observers, federal and state trawl surveys, and fishery dependent-data to identify the real or near real-time locations of cod exhibiting pre-spawning behavior and activity outside of closed areas and implement responsive measures to protect these fish.

²⁴⁹ See NOAA Fisheries. “Northeast Multispecies Information Sheet Closed Area Regulations,” at 9. Available at: <https://archive.fisheries.noaa.gov/garfo/regs/infodocs/multsclosedareas.pdf>.

²⁵⁰ Memorandum from Groundfish Plan Development Team Development to Groundfish Committee regarding “Development of Framework Adjustment 53 (FW 53) to the Multispecies (Groundfish) Fishery Management Plan” dated Nov. 5, 2014, at 17.

²⁵¹ DeCelles GR, Martins D, Zemeckis DR, and Cadrin SX. 2016. “Using Fishermen’s Ecological Knowledge to map Atlantic cod spawning grounds on Georges Bank.” *ICES Journal of Marine Science* doi:10.1093/icesjms/fsx031.

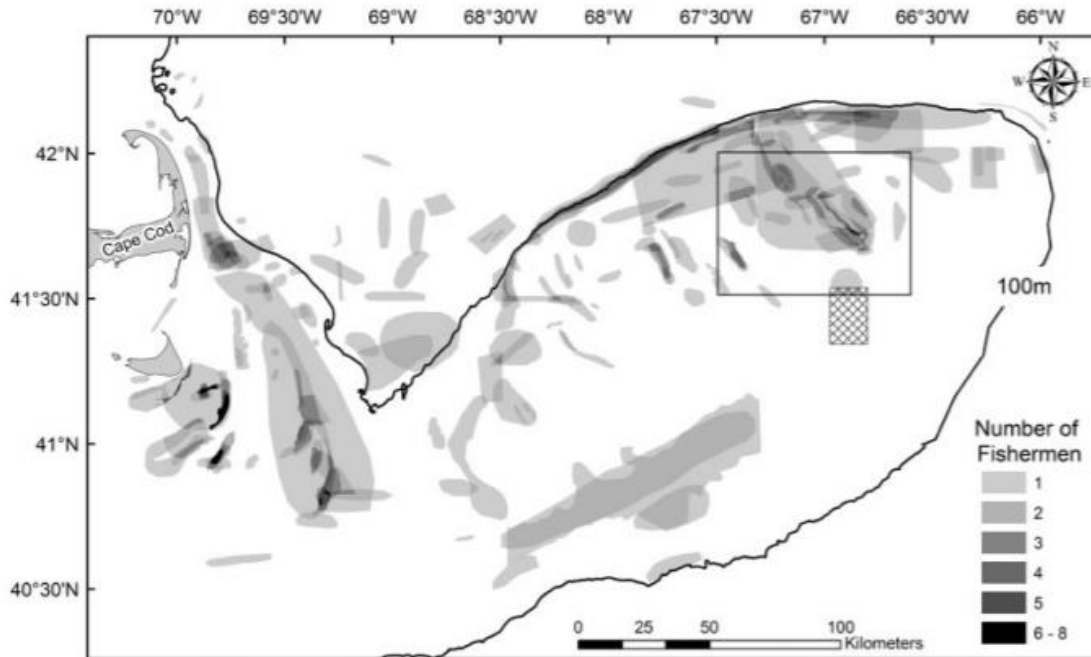


Figure 16: Cod spawning grounds that were identified by fishermen. Each shaded area represents a spawning ground that was identified by a single fisherman. The shading is used to identify areas where there is overlap in the spawning locations reported by multiple fishermen. The rectangle outlined in black depicts the “Winter Fishing Grounds” that were described by Goode (1884) and Rich (1929). The hashed rectangle represents the cod spawning grounds that were reported by Bigelow and Schroeder (1953).²⁵²

In addition to expanded spawning closures, NMFS should protect known nursery and juvenile habitats used by cod. Areas to initially protect include those identified by experts during the development of the Habitat Amendment.²⁵³ These areas, to the extent they are not already protected, must be closed year-round to all mobile-bottom tending gears to prevent habitat loss and degradation and cod bycatch.

Further, given the importance of larger, older females to successful reproduction and recruitment and the virtual extirpation of these cohorts from current populations, NMFS must work to identify and protect favorable habitat where adult fish aggregate. For example, it is likely that regions similar to the Cashes Ledge Closed Area provide similar value for the survival of larger, older females²⁵⁴ and may warrant protection. Platts Bank is one such area that shows signs of being a hotspot for the remnants of the GOM cod population (Figure 6). NMFS should conduct a comprehensive data review to determine the locations, in time and space, where adult cod aggregate in order to protect them. In doing so, NMFS should also re-evaluate its current cod mortality closures, such as the Cashes Ledge Closure Area and the Western Gulf of Maine

²⁵² Reproduced from Decelles *et al.* 2016.

²⁵³ See NEFMC. *Omnibus Essential Fish Habitat Amendment 2 and its Final Environmental Impact Statement, Appendix E: Synopsis of Closed Area Technical Team analysis of juvenile groundfish habitats and groundfish spawning areas.* Figures 14 and 15.

²⁵⁴ Sherwood and Grabowski. 2016.

Closure, and expand boundaries as necessary to provide maximum protection for vulnerable adult cod that are needed to restore a broad age structure of the stocks.



Figure 17: Photo of a young boy standing beside two large cod in Battle Harbor, Labrador in 1910. The larger of the two fished measure 5 feet, 5 inches and weighed 60 pounds.²⁵⁵

4. Use of Modified Fishing Gear Throughout the U.S. Range of Atlantic Cod to Reduce Incidental Catch

Courts have noted the importance of minimizing bycatch in a multispecies fishery taking steps to rebuild.²⁵⁶ Given that Atlantic cod is unintentionally caught when targeting other groundfish species and also unintentionally caught in other fisheries operating in New England, incidental catch will be inevitable even if the directed fishery for Atlantic cod is closed. To allow the groundfish fishery to operate while GOM and GB cod stocks rebuild, NMFS should

²⁵⁵ Holloway Studio, Library and Archives Canada, PA-076178.

²⁵⁶ See *NRDC. v. Evans*, 168 F. Supp. 2d 1149, 1152 (N.D. Cal. 2001), *order aff'd in part, vacated in part*, 316 F.3d 904 (9th Cir. 2003) (“An irony exists in that as fishing allowances are lowered to protect a species, the bycatch percentage increases. Fishing boats continue to catch multiple species of fish at the same time, but they are compelled by regulation to discard a greater percentage of the protected species... NMFS acknowledges that it does not have accurate data on bycatch, that the issue is of “serious concern,” but that it is “taking steps” to address this lack of information. Without such data, it is extremely difficult to assess the efficacy of NMFS’s conservation and management measures, which has resulted in the continued overfishing...”); see also *Oceana, Inc. v. Ross*, 363 F. Supp. 3d 67 (D.D.C. 2019) (holding NMFS violated the MSA by failing to establish management measures to constrain number of overfished dusky sharks and ignored best available science about prevalence of accidental bycatch of sharks),

implement gear modification requirements throughout the U.S. range of Atlantic cod to reduce the incidental catch of cod.

In this context, there is ample precedent and rationale for requiring haddock separator trawls or another selective fishing technology. For example, in Amendment 13, NMFS required “all groundfish vessels fishing in the Eastern U.S./Canada Area . . . to fish with, and have on board only, either a flatfish net and/or a haddock separator trawl” to reduce bycatch of cod and other species.²⁵⁷ Regulatory action, as opposed to voluntary action, is necessary now as well. As one recent scientific publication has stated, “widespread voluntary uptake of proven fishing gear by fishers is rare, and usually takes place over many years if at all. The uptake of this gear [is] more likely [to] occur in the face of . . . impending regulation[.]”²⁵⁸ Additional enforcement measures should also be in place to ensure that the gear is being used and stowed correctly. Again, it is instructive to consider the benefit of the fishing industry’s rapid technological responses when the West Coast groundfish fishery was restricted during rebuilding.

5. Additional Measures to Reduce the Mortality of Incidental Catch of Atlantic Cod in Recreational Fisheries

The most recent stock assessment updates for GOM cod and GB cod demonstrate that recreational fishing accounts for a large portion of reported cod catch.²⁵⁹ The estimated New York recreational landings of cod in 2017 exceeded the entire commercial cod fishery in Massachusetts.²⁶⁰ The same closed area restrictions that apply to commercial fishermen in groundfish mortality closures, habitat closures, and spawning closures should apply to recreational fishermen targeting groundfish in federal waters as well. Moreover, it is critical to reduce the mortality of cod brought on-board as incidental catch during recreational trips outside of the closed areas. NMFS has significant experience working with the recreational fishing community and has identified best practices for catch and release to improve chances of survival after release.²⁶¹ These practices should be requirements for all recreational fishing operations targeting groundfish in federal waters. In state waters, MA DMF has initiated a program providing maps of cod hotspots to avoid along with best practices on handling and releasing incidentally caught cod.²⁶² NMFS should work with MA DMF and all other states where cod are landed, notably including New York, to further develop and expand this program.

²⁵⁷ Amendment 13 Final Rule, 69 Fed. Reg. 22,906, 22,912, 22,913 (April 27, 2004).

²⁵⁸ Eayrs S and Pol M. 2019. “The myth of voluntary uptake of proven fishing gear: investigations into the challenges inspiring change in fisheries.” *ICES Journal of Marine Science* 76:392-401.

²⁵⁹ 2019 Groundfish Operational Assessment at 26 and 28.

²⁶⁰ Data downloaded from NOAA Fisheries. “Landings.” Available at: <https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200:1416339190729::NO::>.

²⁶¹ See NOAA Fisheries. “Catch and Release Best Practices.” Available at: <https://www.fisheries.noaa.gov/national/resources-fishing/catch-and-release-best-practices>.

²⁶² MA DMF. “Helping Recreational Anglers Catch Haddock...and Avoid Cod.” *DMF News 1st and 2nd Quarters 2019*. Available at: <https://www.mass.gov/info-details/dmf-news-1st-and-2nd-quarters-2019#helping-recreational-anglers-catch-haddock%E2%80%A6and-avoid-cod>.

VII. The Secretary Must Take Emergency Action to End Overfishing of Gulf of Maine Cod Immediately

There are three predicates for emergency or interim management action by the Secretary: (1) the action must be driven by recent, unforeseen events; (2) a failure to act through emergency action must present serious conservation and management problems; and (3) the immediate benefits of the emergency rulemaking must outweigh those that would otherwise be provided by public notice, comment, and deliberation.²⁶³ Present circumstances meet these criteria.

Accordingly, CLF hereby petitions the Secretary to promulgate emergency regulations and interim measures to close all commercial and recreational directed fishing on GOM cod and mandate the use of fishing gears in the GOM cod stock area that minimize the risks of incidental cod catch.

A. Recent Unforeseen Events Require Emergency Action

The most recent survey and assessment results show the GOM cod situation is further deteriorating, constituting two unforeseen, and very troubling, events. First, the 2019 federal fall trawl survey results show that *biomass index fell to a new historic low*, over 2.5 times lower than the previous low points in 1993 and 2012 and 65 times lower than the historic high (Figure 7).²⁶⁴ Second, the PDT estimates based on 2019 operational assessment demonstrates that GOM cod has the lowest rebuilding probability on record.²⁶⁵ GOM cod now has *a zero to a one percent chance of rebuilding* on schedule by 2024, which is a 26-fold decline in the rebuilding probability in just the two years between the 2017 and 2019 stock assessments. When NMFS denied the Conservation Groups' 2015 petition, it assured the public that it would take action if future circumstances dictated a need. There can be no confusion about that need now.

B. Failure to Act Presents Serious Conservation and Management Problems

Given the most recent survey and assessment results, the current ACLs are set too high. Further declines in a stock that now has a zero to one percent chance of rebuilding during its *second* rebuilding period is by its very nature and circumstance a “serious conservation and management problem.”²⁶⁶ The longer NMFS waits to take effective action, the greater the risk of a complete stock collapse with long-term consequences for coastal fishing communities and the marine ecosystem.

²⁶³ See NMFS Policy Guidelines for the use of Emergency Rules, 62 Fed. Reg. 44,421 (Aug. 21, 1997).

²⁶⁴ C. Perretti (NEFSC) pers. comm.; NEFSC. 2019. *Gulf of Maine Atlantic Cod 2019 Assessment Update Report Supplemental Tables* (Draft), at 24.

²⁶⁵ Memorandum from Groundfish Plan Development Team Development to Scientific and Statistical Committee regarding “Candidate Groundfish OFLs and ABCs for fishing years 2020 to 2022” dated Oct. 10, 2019 & revised Oct. 15, 2019, at 7.

²⁶⁶ 62 Fed. Reg. at 44,422.

C. Immediate Benefits Outweigh Those Provided by Public Notice, Comment, and Deliberation

Under the circumstances here, given that it will take the Secretary time to develop a management action to end overfishing, the immediate benefits of emergency action outweigh those provided by public notice, comment, and deliberation. Immediate benefits include basing catch limits for fishing year 2020 on incidental catch only, consistent with the ABC control rule. This is consistent with NMFS's legal requirements and the long-term needs of fishing communities that depend upon abundant cod stocks.

As provided in 16 U.S.C. § 1855(c), the Secretary is authorized to “promulgate emergency regulations or interim measures necessary to address . . . overfishing.” The Secretary should use this authority to promulgate regulations closing all directed commercial and recreational fisheries on GOM cod pending the development of an MSA-compliant FMP that ends overfishing. The Secretary should also require that all groundfish fisheries employ the use of fishing gear determined by the Secretary to reduce the risk of incidental cod catch throughout the GOM cod stock area. Further, the Secretary should direct staff to develop a strategy to extend the emergency regulations before the end of the first six-month period, allowing continued coverage until a full Secretarial Amendment can be developed and implemented.

VIII. The Science Center Must Improve Scientific Assessments of Atlantic Cod

Confidence in the value of the cod assessments for management purposes has waned significantly in New England, a situation that presents a strategic challenge to NMFS and the credibility of and need for appropriate and necessary management. The Science Center is central to solving this problem. It is a fundamental priority that the cod assessment models address longstanding sources of scientific uncertainty, reflect the true population structure of Atlantic cod in U.S. waters, and adequately recognize and adjust for the productivity changes apparent to fishermen and scientists alike, including accounting for climate change considerations.

As described above, multiple sources of scientific uncertainty have been identified in stock assessment models, notably including the dramatically increasing number and severity of retrospective patterns in the region's groundfish models, including GOM and GB cod. For the GOM stock, addressing the retrospective patterns will provide increased and necessary confidence in estimates of stock size, fishing mortality, and the short-term projections used to set catch limits and assess rebuilding progress. Corrections for retrospective patterns are applied to the GOM stock's $M=0.2$ model as a sensitivity, but these corrected values have generally not been used in setting catch advice²⁶⁷ despite the fact that the severity of the $M=0.2$ model's retrospective pattern meets the requirements for correction and despite other stocks with similar patterns receiving adjustments.

For the GB stock, the lack of an accepted analytical model for management purposes due to concerns over the strength of the retrospective pattern precludes quantitative assessment of the stock status and rebuilding timeline progress. The impending deadline for rebuilding (2026) makes addressing the retrospective pattern for this stock of the utmost importance.

²⁶⁷ Corrected values were used in the development of Framework 59, which is currently awaiting approval.

Two candidate sources of the retrospective pattern that should be addressed are accuracy of catch data and natural mortality. First, to address accuracy of catch data, the Science Center must account for missing catch associated with illegal discards and unreported catch of cod in the groundfish fishery and other fisheries. Second, the Science Center must reassess estimates of natural mortality, including examining evidence for shifts and the potential influences of climate change and large-scale changes in ecosystem dynamics on natural mortality. Of the two accepted GOM cod assessment models, the M-ramp model was intended in part to address the possibility of natural mortality being the source of the retrospective pattern in the M=0.2 model. However, this model itself now suffers from a growing retrospective pattern.²⁶⁸ The possibility of changing natural mortality for the GB cod stock has also been raised.²⁶⁹ Overall, the Science Center must immediately identify and prioritize the research, data, and analyses it needs to rehabilitate the performance and confidence in its cod assessment models and give NMFS recommendations on how those needs can be sourced.²⁷⁰

The impacts of climate change, including linkages between impaired recruitment and climate change,²⁷¹ particularly ocean warming, must be explored and addressed directly within the assessment models themselves.²⁷² Continued low recruitment and potential linkages between low productivity and climate change factors also need to be confronted. At present, the rebuilding projections, as well as those used to determine biological reference points, do not address these key issues but rather are based on the historic dynamics and productivity of the stocks, which may likely no longer be realistic references.

These concerns are not new and have been raised in the assessments: “The causes of low productivity, relative to historical productivity should be considered in the next benchmark assessment, including the investigation of ecosystem effects. In particular, information on natural mortality should be investigated. The implicit assumption that natural mortality will return to M=0.2 in the reference points associated with the Mramp model should be examined in the next benchmark assessment.”²⁷³ The Science Center is critical in ensuring that NMFS and the Council operate with a *realistic and credible range of rebuilding targets for both cod stocks* that account for potential productivity losses associated with climate change.

²⁶⁸ 2019 Groundfish Operational Assessment at 28.

²⁶⁹ 55th SAW Assessment Report.

²⁷⁰ Unfortunately, this analytical problem is not unique to cod and the growing presence of retrospective patterns in the models substantially complicates management of the groundfish fishery as a whole. During the 2019 operational assessments, it was determined that eight models required adjustments due to significant retrospective patterns, up from seven at the previous assessment. The assessment models themselves reflect state-of-the-art modeling sophistication, but this problem with retrospective patterns is a longstanding flaw that the Science Center must address.

²⁷¹ Pershing *et al.* 2015.

²⁷² Palmer MC, Deroba JJ, Legault CM, and Brooks EN. 2016. Comment on “Slow adaptation in the face of rapid warming leads to collapse of the Gulf of Maine cod fishery.” *Science* 352:423-a; Pershing *et al.* 2016. Response to Comments on “Slow adaptation in the face of rapid warming leads to collapse of the Gulf of Maine cod fishery.” *Science* 352:423-e.

²⁷³ NEFSC. 2015. *Operational Assessment of 20 Northeast Groundfish Stocks Updated Through 2014*. NEFSC Ref. Doc. 15-24, at 29.

Finally, outputs from the Atlantic cod stock structure working group confirm that the true population structure of Atlantic cod in New England is more complex than the present simplistic two-stock assumption. Currently that working group is scheduled to release its report in early 2020 only after which assessment-related research will commence. The next research track assessments for GOM and GB cod when stock structure issues will be addressed are not scheduled until 2023. As a reminder, the current rebuilding deadlines for GOM cod and GB cod are 2024 and 2026, respectively.

Given the proximate end dates for rebuilding plans and the dire circumstances of the two cod stocks, it is irresponsible to delay the next benchmark assessments for these stocks until 2023. **NMFS should direct the Science Center to prioritize work on GOM cod and GB cod stock assessment modeling to resolve these recurring assessment issues. Both cod assessment research track assessments should be completed no later than fall of 2021.**

CONCLUSION

The numerous stocks in the New England groundfish fishery that are overfished and/or subject to overfishing are a persistent and undeniable stain on the hard-earned reputation of NMFS and the regional fishery management councils for developing well-managed and healthy fisheries in most regions of the United States. Atlantic cod is among the worst of these persistent management failures. The mismanagement of the Atlantic cod fishery is a direct result of NMFS approving risk-prone actions year after year that elevated short-term economic interests over long-term conservation benefits for the fishery and fishing communities. The consequences of that ultimately bankrupt strategy have been severe for Atlantic cod, which is reduced to a distant memory of its former glory; the commercial fishing industry, which has lost hundreds of jobs and fishing operations; recreational fisheries that are continually denied fishing opportunities; and the diminished health of the marine ecosystem. By means of this Petition, CLF calls on NMFS to step up to its responsibilities and put this fishery on a path to recovery and restoration.

APPENDIX A: STOCK ASSESSMENT TABLE

YEAR	MEETING	GOM COD STATUS	GB COD STATUS	ASSESSMENT CONCLUSIONS & MANAGEMENT RECOMMENDATIONS
1986	SAW 3 ⁱ	Overfishing *	Overfishing	GOM Cod: "...short- term annual yields at the 1985 level (12,000 mt) do not appear to be sustainable. Presently, potential yield and stock reproductive potential can be enhanced by reducing F towards F _{max} ." GB Cod: "No rebuilding of total biomass can be expected during 1987 unless F in 1987 is reduced below F=0.58 and towards F _{max} ."
1988	SAW 7 ⁱⁱ	Overfishing	Overfishing	GB Cod: "The updated assessment described herein indicates that stock conditions have deteriorated further. Fishing mortality in 1987 (F=0.95) is the highest ever recorded for Georges Bank stock...The SAW expressed concern that the SSB may be approaching a level where the probability of future strong recruitment to the stock is low."
1990	SAW 11 ⁱⁱⁱ	N/A	Over-exploited, not depleted	
1991	SAW 12 ^{iv}	Over-exploited, medium stock level	N/A	"Fishing mortality rates need to be reduced to rebuild stock and widen the number of age groups in the spawning stock biomass. Reducing the rate of fishing mortality to the reference level (20% MSP) which defines overfishing would result in a 24% increase in yield per recruit and a 100% increase in spawning biomass per recruit."
1991	SAW 13 ^v	N/A	Over-exploited, medium stock level	"The fishing mortality rate needs to be reduced to increase yield per recruit and at least maintain the stock at its present level. Reducing F to the overfishing definition would increase yield per recruit by 10% and spawning biomass per recruit by 90%. This would also increase catch rates...sharply. If the 1990 year-class is as strong as presently estimated, it may be vulnerable to the fishing gear in 1992 and result in high rates of discards of small fish. Management action may be warranted to forestall excessive discards in 1992."

ⁱ NEFC. 1986. *Report of the Third NEFC Stock Assessment Workshop (Third SAW)*. NEFC Ref. Doc. 86-14.

ⁱⁱ NEFC. 1989. *Report of the Seventh NEFC Stock Assessment Workshop (Seventh SAW)*. NEFC Ref. Doc. 89-04.

ⁱⁱⁱ NEFC. 1990. *Report of the Eleventh NEFC Stock Assessment Workshop*. NEFC Ref. Doc. 90-09.

^{iv} NEFSC. 1991. *Report of the Twelfth Northeast Regional Stock Assessment Workshop (12th SAW)*. NEFSC Ref. Doc. 91-03.

^v NEFSC. 1992. *Report of the Thirteenth Northeast Regional Stock Assessment Workshop (13th SAW)*. NEFSC Ref. Doc. 92-02.

1993	SAW 15 ^{vi}	Over-exploited, low biomass level	Over-exploited, low biomass level	<p>GOM Cod: “Continued fishing at current levels of fishing mortality (i.e., $F = 1.14$) will lead to catches in 1993 declining to their lowest level since 1973. At a minimum, fishing mortality should be reduced to avoid further declines in stock size. A 10% reduction in fishing mortality in 1993 would not result in any appreciable short-term increase in SSB between 1993 and 1994. Recovery of the stock will require a marked reduction in fishing mortality.”</p> <p>GB Cod: “Continued fishing at current levels of fishing mortality will result in further declines in SSB to all-time low levels. At a minimum, fishing mortality should be reduced to avoid further declines in stock size. A 10% reduction in fishing mortality in 1993 would not result in any appreciable short-term increase in SSB. Recovery of the stock will require a marked reduction in fishing mortality.”</p>
1994	SAW 18 ^{vii}	N/A	Over-exploited, low biomass level	“Fishing mortality on this stock should be reduced to levels approaching zero. Continued fishing under Amendment 5 scenarios will result in further declines in SSB...Without substantial reductions in fishing mortality, there is the possibility of stock collapse.”
1995	SAW 19 ^{viii}	Over-exploited, low biomass level	N/A	“The decline in spawning stock biomass should be halted and reversed immediately. To achieve this, fishing mortality should be reduced immediately to $F_{20\%}$ or lower to eliminate overfishing... Rebuilding of spawning stock biomass to previously observed higher levels is necessary to reduce the risk of recruitment failure.”
1997	SAW 24 ^{ix}	Over-exploited, low biomass level	Over-exploited, low biomass level	GOM Cod: “The combined effects of low spawning stock biomass, high fishing mortality, record low incoming recruitment, and record low survival of pre-recruit fish indicate that the stock is on the verge of collapse...An immediate reduction in fishing mortality to levels approaching zero is required to halt the declining trend in spawning stock biomass and to rebuild at the maximum rate possible. Measures should be enacted immediately to minimize all directed fishing and bycatch on this stock.”

^{vi} NEFSC. 1993. *Report of the 15th Northeast Regional Stock Assessment Workshop (15th SAW) The Plenary*. NEFSC Ref. Doc. 93-07.

^{vii} NEFSC. 1994. *Report of the 18th Northeast Regional Stock Assessment Workshop (18th SAW) The Plenary*. NEFSC Ref. Doc. 94-23.

^{viii} NEFSC. 1995. *Report of the 19th Northeast Regional Stock Assessment Workshop (19th SAW) The Plenary*. NEFSC Ref. Doc. 95-09.

^{ix} NEFSC. 1997. *Report of the 24th Northeast Regional Stock Assessment Workshop (24th SAW) Public Review Workshop*. NEFSC Ref. Doc. 97-11.

1998	SAW 27 ^x	Over-exploited, low biomass level	Over-exploited, low biomass level	<p>GOM Cod: “The SARC recommends an immediate reduction in fishing mortality to near zero. Measures should be implemented immediately to cease all directed fishing and minimize bycatch on this stock. Measures implemented in 1998 were only intended to achieve F_{max}. Reductions to F_{max} will be insufficient to promote rebuilding from record low spawning stock biomass. The combined effects of low spawning stock biomass, high fishing mortality, record low recruitment, and record low survival of pre-recruit fish indicate that the stock is collapsing.”</p> <p>GB Cod: “Fishing mortality should be reduced from the current level ($F=0.26$, 21% exploitation) to substantially less than $F_{0.1}=0.18$ (Amendment 7 rebuilding target). Poor recruitment coupled with a truncated age structure from years of overfishing has decreased the potential for stock rebuilding at the current fishing mortality rate. Reducing fishing mortality will avoid declines in SSB and enhance the probability of long-term building. Low fishing mortalities will eventually lead to an expansion of the age distribution of the population and increase the likelihood of improved future recruitment.”</p>
2000	TRAC 3 ^{xi}	N/A	Overfishing not occurring, not overfished	
2001	SAW 33 ^{xii}	Overfishing occurring, not overfished	N/A	“Fishing mortality has remained high despite recent trip limit and area closure management actions to reduce fishing mortality on Gulf of Maine cod. To meet the Amendment 7 fishing mortality target ($F_{max}=0.27$), fully recruited F must be markedly reduced. The above average 1998 year class, which will become full recruited in 2002, should be protected to enhance the spawning potential and rate of recovery of the stock.”
2001	TRAC 4 ^{xiii}	N/A	Overfishing not occurring, not overfished	“The Georges Bank cod stock remains at a low biomass level. Biomass indices derived from research surveys indicate that the stock remains below the long term average of the 37 year time series...As fishing mortality has declined, the SSB has gradually increased, primarily due to somatic growth, but was still near record-low size (29,000

^x NEFSC. 1998. *Report of the 27th Northeast Regional Stock Assessment Workshop (27th SAW) Public Review Workshop*. NEFSC Ref. Doc. 98-14.

^{xi} NEFSC. 2000. *TRAC Advisory Report on Stock Status - A Report of the Third Meeting of the Transboundary Resources Assessment Committee (TRAC)*. NEFSC Ref. Doc. 00-08.

^{xii} NEFSC. 2001. *33rd Northeast Regional Stock Assessment Workshop (33rd SAW) Public Review Workshop*. NEFSC Ref. Doc. 01-19.

^{xiii} NEFSC. 2001. *TRAC Advisory Report on Stock Status- A Report of the Fourth Meeting of the Transboundary Resources Assessment Committee (TRAC)*. NEFSC Ref. Doc. 01-08.

				mt) in 2000...Recovery of the stock will depend on further reductions in fishing mortality as well as improved recruitment.” ^{xiv}
2002	GARM I ^{xv}	Overfishing occurring, overfished	Overfishing occurring, overfished	GOM Cod: “Overall, there is accumulating evidence that the biomass of Gulf of Maine cod has been increasing in 2001 and 2002. Further increases in biomass may occur if fishing mortality is reduced to maximize the contribution of the 1998 year class to the spawning stock...However, given the expected relatively poor strength of the 1999 and 2000 year classes, rebuilding of the stock may plateau unless additional average or above average year classes recruit in the next several years.” GB Cod: “The lack of strong recruitment in the last decade suggests that recovery of this stock will be largely dependent on reducing fishing mortality.”
2005	GARM II ^{xvi}	Overfishing occurring, overfished	Overfishing occurring, overfished	GB Cod: “The lack of strong recruitment in the last decade suggests that recovery of this stock will be largely dependent on reducing fishing mortality in the near term and husbanding the strong 2003 year class, and potentially the 2004 year class, to increase SSB.”
2008	GARM III ^{xvii}	Overfishing occurring, not overfished **	Overfishing occurring, overfished	GB Cod: “Continued exploration of retrospective pattern and methods to account for it are critical for this stock.”
2011	SAW 53 ^{xviii}	Overfishing occurring, overfished	N/A	“Under all projection scenarios, the stock does not rebuild by the current rebuilding date of 2014.” ^{xix} “...studies indicate strong site fidelity to the spawning grounds, and the almost immediate disruption of spawning activity when those areas are opened. This would suggest that area closures to protect spawning grounds is beneficial and could reduce vulnerability. Additional considerations of vulnerability and productivity are the implications of shifts in distribution, recruitment dynamics and increased natural mortality...A considerable source of additional vulnerability is the continued weak recruitment and low reproductive rate (e.g., recruits per spawner) of Gulf of Maine cod. If weak recruitment and low reproductive rate

^{xiv} O’Brien and Munroe. 2001. *Assessment of the Georges Bank Atlantic Cod Stock for 2001*. NEFSC Ref. Doc. 01-10.

^{xv} NEFSC. 2002. *Assessment of 20 Northeast Groundfish Stocks through 2001*. NEFSC Ref. Doc. 02-16.

^{xvi} Mayo et al. 2005. *Assessment of 19 Northeast Groundfish Stocks through 2004*. NEFSC Ref. Doc. 05-13.

^{xvii} NEFSC. 2008. *Assessment of 19 Northeast Groundfish Stocks through 2007*. NEFSC Ref. Doc. 08-15.

^{xviii} NEFSC. 2012. *53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Summary Report*. NEFSC 12-03.

^{xix} NEFSC. 2012. *53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Summary Report*. NEFSC 12-03.

				continues, productivity and rebuilding of the stock will be less than projected.” ^{xx}
2012	Update ^{xxi}	N/A	Overfishing occurring, overfished	“Current low productivity is related to current age structure, which is truncated compared to age structure in the late 1980’s. The last year SSB was above the 50,000 mt threshold was 1991 and the 1990 yearclass [sic] was the last above average yearclass [sic]. Population recovery will be more likely if the age structure is expanded due to lower fishing mortality, however, achieving rebuilding will be very slow even under a range of low fishing mortality rates if current productivity continues.”
2012	SAW 55 ^{xxii}	Overfishing occurring, overfished	Overfishing occurring, overfished	GOM COD: “High mortality, both fishing and natural will lead to a truncated age structure, implying that spawning success is increasing dependent upon younger individuals. Murawski et al. (2001) suggest that reproduction by older females is more successful than by young females...If weak recruitment and low reproductive rates of Gulf of Maine cod continue, productivity and rebuilding of the stock will be less than projected.” ^{xxiii} “The available information points to a stock at a low level and with a concentration of the remaining stock into a relatively small region of the western Gulf, the vulnerability of the stock is likely to be increased.” ^{xxiv} “A concentration of the fishery on the areas where the remaining population is concentrated may result in the maintenance of fishery catch rates, make the stock more vulnerable to fishing and give the perception that the stock is in a healthier state than it really is.” ^{xxv} GB Cod: “The last above average year class was 1991. Until spawning stock biomass gets above about 50,000 mt, recruitment is likely to remain low and rebuilding will be slow...Given the uncertainty in the retrospective adjustment, downward trends in mean weight at age, and a potential recent increase in natural mortality (the key

^{xx} NEFSC. 2012. *53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Report*. NEFSC 12-05.

^{xxi} NEFSC. 2012. *Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010*. NEFSC Ref. Doc. 12-06.

^{xxii} NEFSC. 2013. *55th Northeast Regional Stock Assessment Workshop (55th SAW) Assessment Summary Report*. NEFSC 13-01.

^{xxiii} NEFSC. 2013. *55th Northeast Regional Stock Assessment Workshop (55th SAW) Assessment Report*. NEFSC 13-11.

^{xxiv} SARC. 2012. *55th Northeast Regional Stock Assessment Review Committee Summary Report*.

<https://www.nefsc.noaa.gov/saw/saw55/SARC55%20Panel%20Summary%20Report-2013-01-02.pdf>.

^{xxv} Casey. 2012. *Independent Peer Review Report on the 55th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC): Benchmark stock assessments for Georges Bank cod and Gulf of Maine cod*.

https://www.nefsc.noaa.gov/saw/saw55/2012_01_02%20Casey%20SARC%2055%20review%20report.pdf.

				elements of the productivity processes), the projections may be optimistic.” ^{xxvi} “...an age structure of older repeat spawners would likely be more productive, under favorable environmental conditions. Given the uncertainty in the magnitude of M and the overfished state of the stock, at 7% of SSBMSY the stock is vulnerable to an allowable biological catch (ABC) quota that is too high.” ^{xxvii}
2014	Update ^{xxviii}	Overfishing occurring, overfished	N/A	“Declining spawning stock biomass and truncation of the age-structure...could compromise the future recruitment success of this stock. Recruitment over the last 5 years (2009-2013) has been well below the long-term recruitment levels...If recent weak recruitment of Gulf of Maine cod continues, productivity and rebuilding of the stock will be less than projected.”
2015	Operational Assessment ^{xxix}	Overfishing occurring, overfished	Overfishing occurring, ^{***} overfished	GOM Cod: “When setting catch advice, careful attention should be given to the retrospective error present in both models, particularly given the poor performance of previous stock projections.” GB Cod: “The Panel concluded that the updated assessment model (i.e., the SAW55 benchmark configuration) was not acceptable as a scientific basis for management advice...When the retrospective adjustment was attempted in the update assessment for projections, a substantial number (24.2%) of the projected realizations were not feasible, because they could not support the preliminary estimate of 2015 catch... Recent catches have not allowed the stock to rebuild. Mean length at age, the proportion of old fish in the fishery and surveys, and recruitment indices all remain relatively low. None of these indicate stock recovery. Therefore, the Operational Assessment Panel recommends that the overfishing limit (OFL) should be a proportion of the most recent 3-year average catch, and that proportion should be determined by recent survey trends.”
2017	Operational Assessment ^{xxx}	Overfishing occurring, overfished	Overfishing occurring, ^{***} overfished	GOM Cod: “The Gulf of Maine Atlantic cod stock shows a truncated size and age structure, consistent with a population experiencing high mortality. Additionally, there are no positive signs of incoming recruitment, continued

^{xxvi} NEFSC. 2012. *55th Northeast Regional Stock Assessment Workshop (55th SAW) Assessment Summary Report*. NEFSC 13-01.

^{xxvii} NEFSC. 2012. *55th Northeast Regional Stock Assessment Workshop (55th SAW) Assessment Report*. NEFSC 13-11.

^{xxviii} Palmer. 2014. *2014 Assessment Update Report of the Gulf of Maine Atlantic Cod Stock*. NEFSC Ref. Doc. 14-14.

^{xxix} NEFSC. 2015. *Operational Assessment of 20 Northeast Groundfish Stocks Updated Through 2014*. NEFSC Ref. Doc. 15-24.

^{xxx} NEFSC. 2017. *Operational Assessment of 19 Northeast Groundfish Stocks, Updated Through 2016*. NEFSC Ref. Doc. 17-17.

				<p>low survey indices, and the current spatial distribution of the stock is considerably less than its historical range within the Gulf of Maine... When setting catch advice, careful attention should be given to the retrospective error present in both models, particularly given the poor performance of previous stock projections.”</p> <p>GB Cod: “The panel concluded that the operational assessment was acceptable as a scientific basis for management advice. However, a relatively large increase in catch advice results from this approach, and this should be approached with caution, because previous recruitment events were not always realized in the fishery. The Scientific and Statistical Committees (SSCs) approach to buffering catch advice in determining an acceptable biological catch should consider this uncertainty.”</p>
2019	Operational Assessment xxxi	Overfishing occurring, overfished	Overfishing occurring,*** overfished	<p>GOM Cod: “Should the retrospective patterns continue then the models may have overestimated spawning stock size and underestimated fishing mortality... The Gulf of Maine Atlantic cod shows a truncated size and age structure, consistent with a population experiencing high mortality. Additionally, there are only limited signs of incoming recruitment, continued low survey indices, and the current spatial distribution of the stock is considerably less than its historical range within the Gulf of Maine...Recent low recruitment compromises the rebuilding potential of the stock.”</p> <p>GB Cod: “The smoothed survey biomass is decreasing, but without a biomass reference point it is not known if rebuilding is on schedule...The Georges Bank Atlantic cod continues to show a truncated age structure. The most recent survey values remain below the mean of their time series. The 2013 year class was larger than recent year classes, but has not continued to be large as it ages and is below the average from the 1970s at every age in both surveys.”</p>

* The 1986 assessment of GOM cod (SAW 3) was based on analysis of empirical data rather than an analytical model. The 1986 GB cod assessment, as well as the majority of subsequent assessments for both stocks, were model-based.

** This “not overfished” determination was based on unusually high uncertainty associated with the 2007 federal survey data and subsequent assessments found that the stock was in fact overfished at the time of the 2008 assessment: “In particular, the [SAW 53] Panel agrees that the 2005 cod year class in the Gulf of Maine was less strong than suggested by analyses conducted for a prior assessment...The addition of three years of catch and survey data since the last assessment has altered the perception of the 2005 year class. Two anomalously large tows in the spring survey (2007 and 2008) produced an estimate of this year class of 23.9 million fish in the previous assessment. The additional recent observations of this year class in the surveys, and

xxxi NEFSC. 2019. *Operational Assessment of 14 Northeast Groundfish Stocks, Updated Through 2018*. Prepublication copy.

now in the catch, have revised this estimate downwards to 8.9 million fish. This has reduced estimates of stock biomass substantially...Based on the previous assessment...the stock was predicted to be rebuilt by 2009-2010. The current re-evaluation of the stock indicates that this expectation was incorrect.”^{xxxii}

*** Recent GB assessments have recommended that overfishing status was unknown, given the lack of an accepted assessment model. As explained above, however, NMFS policy properly holds that “where a known determination had previously been provided and a new assessment is rejected or the results are inconclusive, the [last] known status will continue to be the official stock status” hence the GB stock status continues to be overfishing occurring.

For the 1986 and 1988 assessments, no formal determinations of stock status were made but growth overfishing was shown to be occurring based on estimates of fishing mortality rates exceeding the reference point threshold of F_{MAX} .

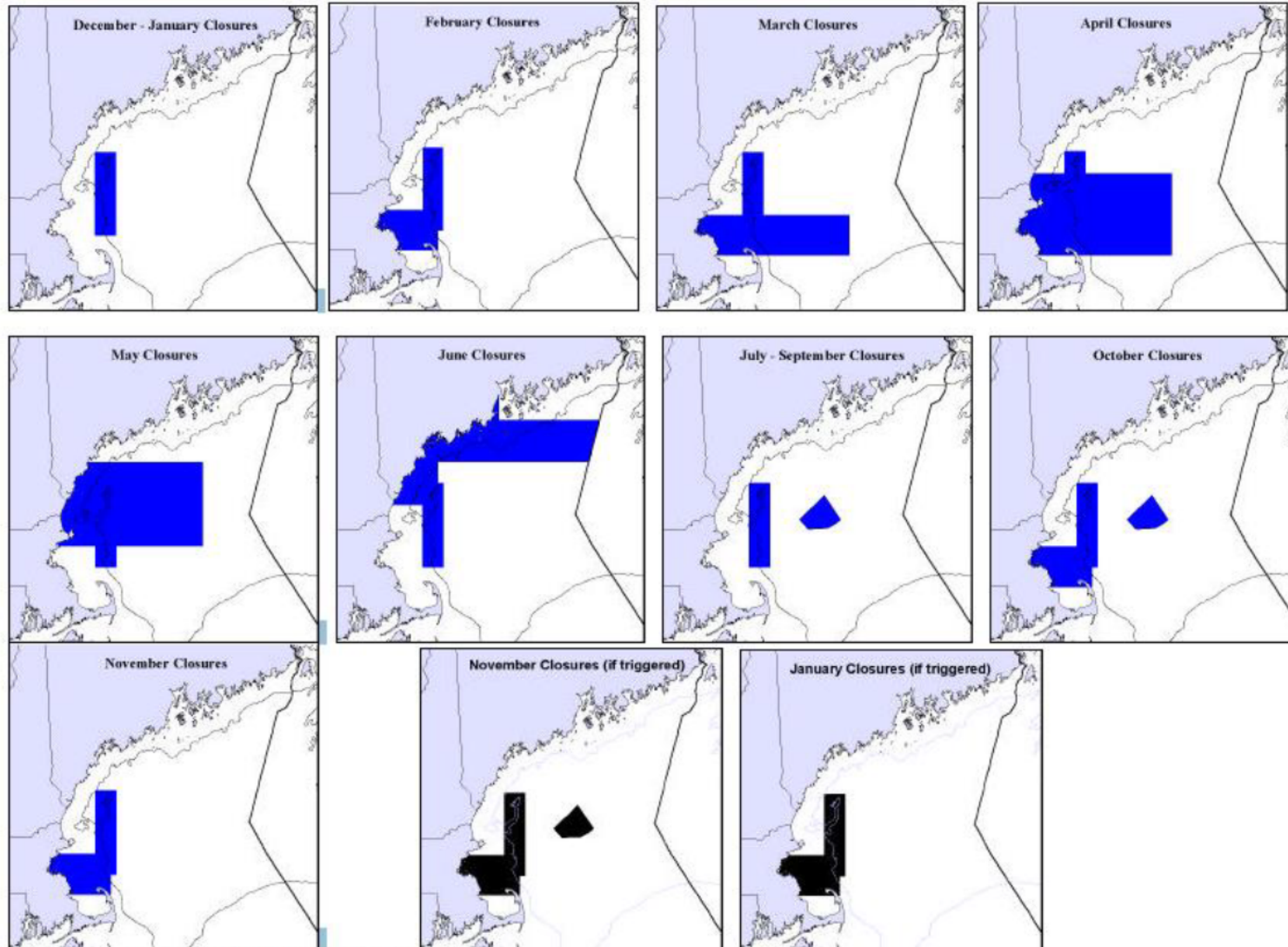
For the 1990-1998 assessments, formal determinations of stock status were made. Exploitation status was determined based on comparisons of estimated fishing mortality rates to threshold reference points and designated as over-, fully, or under-exploited. Stock level was assessed by comparing biomass to historical levels. For the 1990 assessment, stock level was classified as depleted or not seriously depleted compared to historic levels. The 1991-1998 assessments classified stock level as high, medium, or low biomass compared to historic levels.

For later assessments, stock status was formally determined with overfishing defined as occurring when fishing mortality rate exceeded threshold reference points and overfished defined as biomass below threshold reference points. Currently the reference points are the fishing mortality rate and one half the stock spawning biomass at maximum sustainable yield.

^{xxxii} NEFSC. 2012. *53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Summary Report*. NEFSC 12-03.

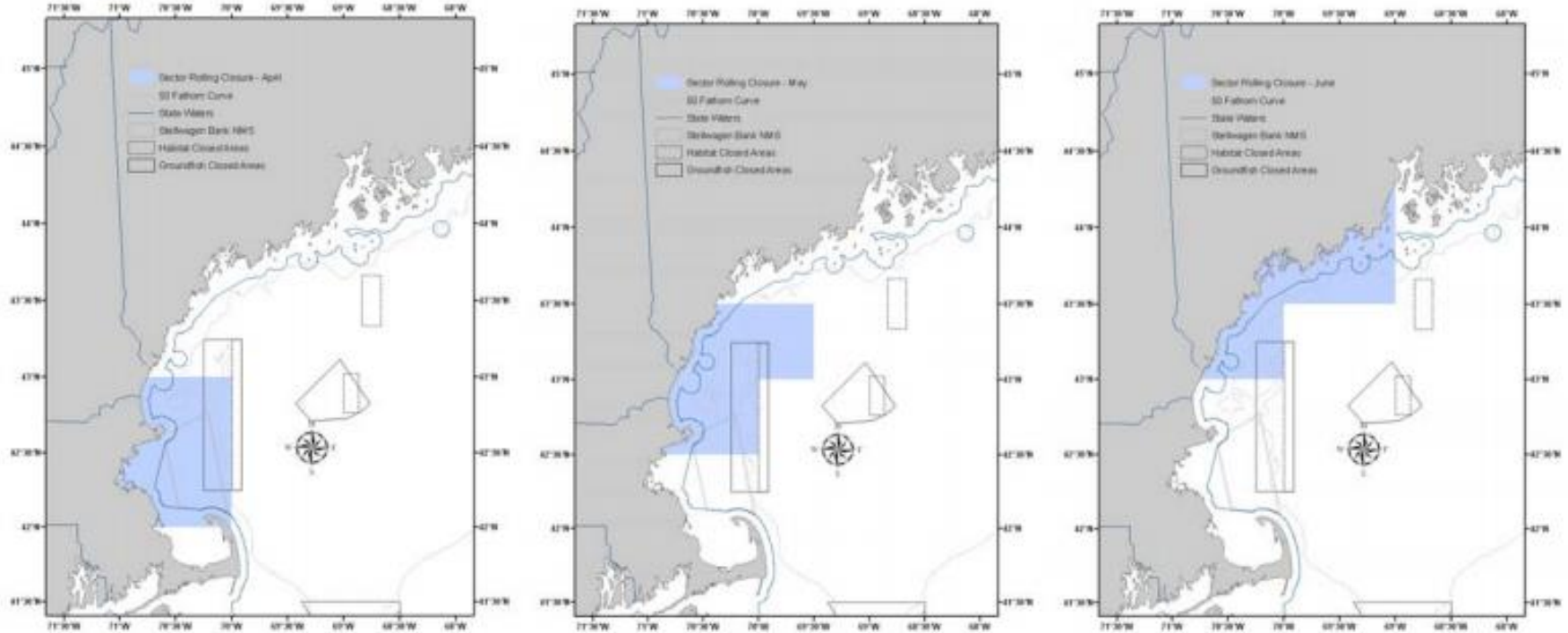
APPENDIX B: GULF OF MAINE CLOSURES (2003-2019)

“No action GOM rolling closures” as proposed in Amendment 13 (December 2003)



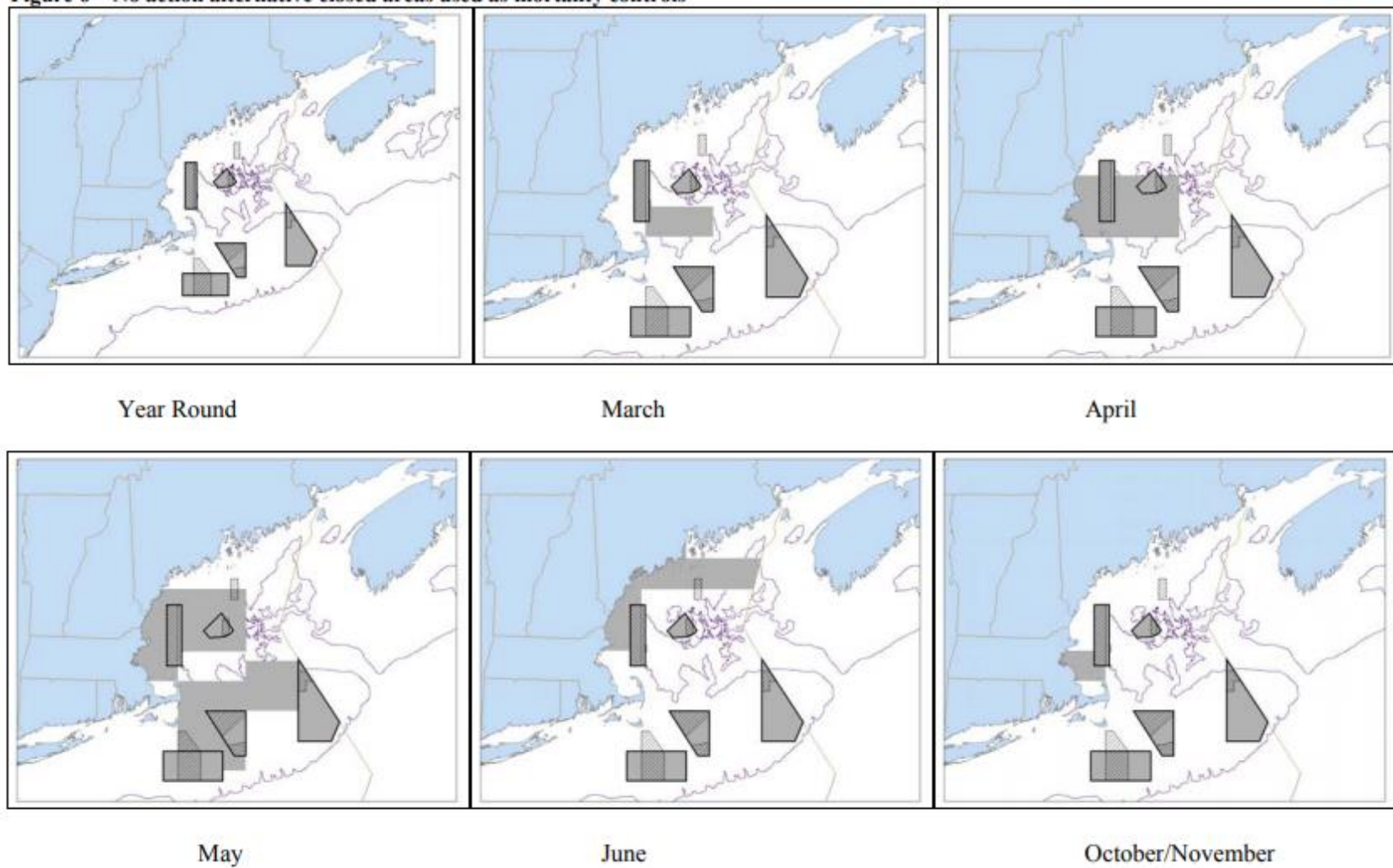
“GOM rolling closure for which sectors to do not receive an automatic exemption” as proposed in Amendment 16 (October 2009)

Figure 1 – GOM rolling closures for which sectors do not receive an automatic exemption



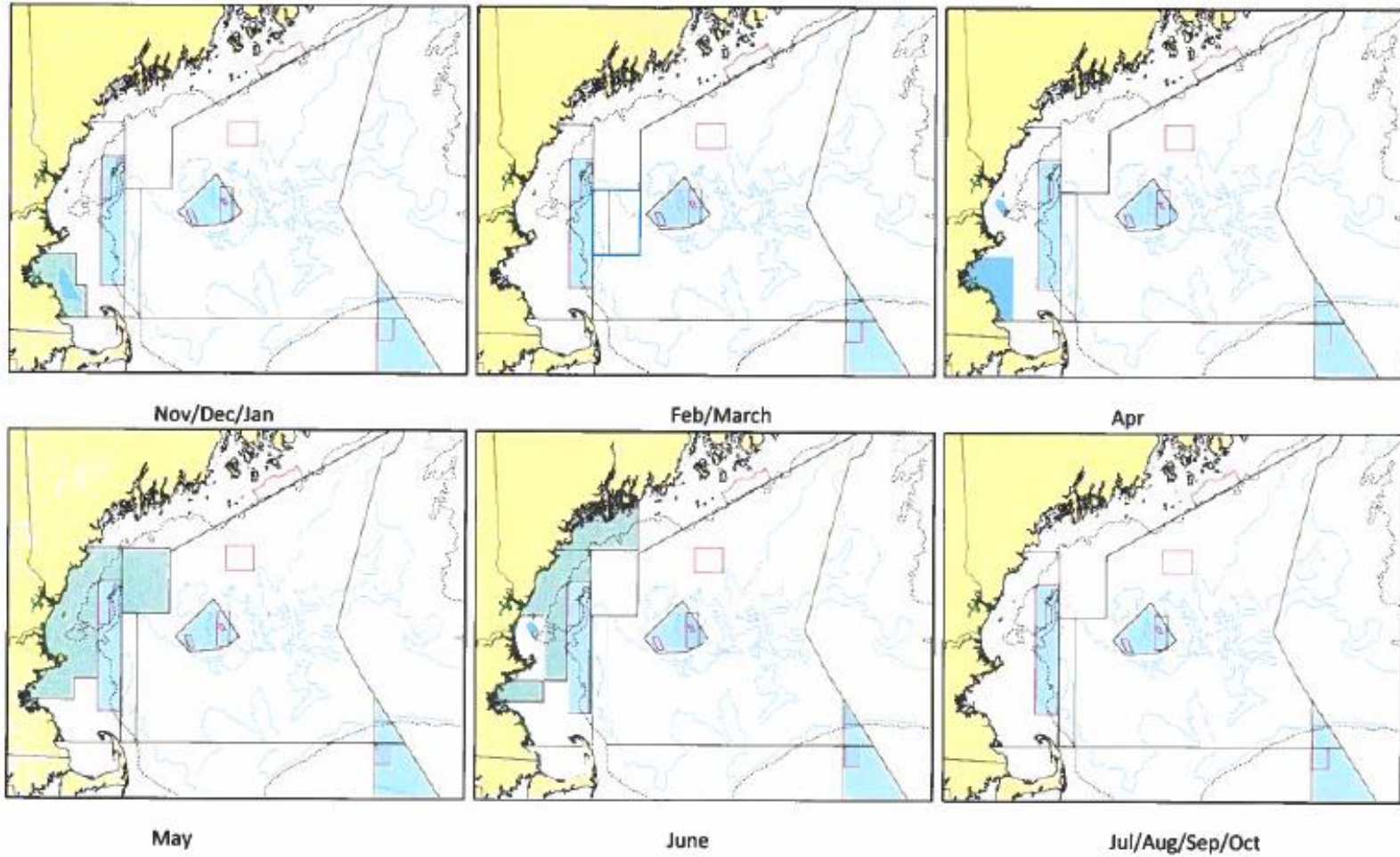
“No action alternative closed areas used as mortality controls” as proposed in Amendment 16 (October 2009)

Figure 6 – No action alternative closed areas used as mortality controls



Current Groundfish Closures

2019 Groundfish Closures



1. Does not include common pool only closures.
2. Pink lines: habitat. Green line: Roller gear area. Black line: redfish exemption. Feb/March Blue Line: redfish exemption adjustment to protect cod.

APPENDIX C: ECONOMIC ANALYSIS

U.S Landings of Atlantic Cod: Lost Harvest and Revenues FY 2010-2017									
Stock: Region	Total US Landings ⁱ (mt)	Canadian Landings (Eastern GB) ⁱⁱ (mt)	Total US and Canadian Landings (mt)	Maximum Sustainable Yield ⁱⁱⁱ (mt)	Adjusted Maximum Sustainable Yield ^{iv} (mt)	Lost Harvest ^v (mt)	Lost Harvest (lbs.)	Average Price per Pound ^{vi} (USD, 2010-2017)	Estimated Lost Revenues (USD)
2017									
GB Cod	499.6	474	973.6	30,622	23,000	22,501	49,604,788	\$ 2.39	\$ 118,555,443
GOM Cod	368.3	n/a	368.3	7,580	7,580	7,212	15,898,914	\$ 2.39	\$ 37,998,404
									Total = \$ 156,553,847
2016									
GB Cod	1,065.2	428	1,493.2	30,622	23,000	21,935	48,357,866	\$ 1.91	\$ 92,363,524
GOM Cod	433.4	n/a	433.4	7,580	7,580	7,147	15,755,394	\$ 1.91	\$ 30,092,803
									Total = \$ 122,456,328
2015									
GB Cod	1,790.3	472	2,262.3	30,622	23,000	21,210	46,759,311	\$ 1.91	\$ 89,310,283
GOM Cod	229.3	n/a	229.3	7,580	7,580	7,351	16,205,353	\$ 1.91	\$ 30,952,225
									Total = \$ 120,262,508
2014									
GB Cod	1,467.3	430	1,897.3	30,622	23,000	21,533	47,471,397	\$ 1.81	\$ 85,923,228
GOM Cod	1,144.1	n/a	1,144.1	7,580	7,580	6,436	14,188,585	\$ 1.81	\$ 25,681,339
									Total = \$ 111,604,567
2013									
GB Cod	1,554	385	1,939.0	30,622	23,000	21,446	47,280,258	\$ 2.10	\$ 99,288,541
GOM Cod	1,294.7	n/a	1,294.7	7,580	7,580	6,285	13,856,572	\$ 2.10	\$ 29,098,802
									Total = \$ 128,387,343

2012									
GB Cod	1,578.8	395	1,973.8	30,622	23,000	21,421	47,225,584	\$ 2.11	\$ 99,645,981
GOM Cod	2,761.9	n/a	2,761.9	7,580	7,580	4,818	10,621,983	\$ 2.11	\$ 22,412,385
									Total = \$ 122,058,366
2011									
GB Cod	3,250.5	702	3,952.5	30,622	23,000	19,750	43,540,154	\$ 1.85	\$ 80,549,285
GOM Cod	6,158.2	n/a	6,158.2	7,580	7,580	1,422	3,134,500	\$ 1.85	\$ 5,798,826
									Total = \$ 86,348,110
2010									
GB Cod	2,881.6	748	3,629.6	30,622	23,000	20,119	44,353,431	\$ 1.59	\$ 70,521,955
GOM Cod	5,625.6	n/a	5,625.6	7,580	7,580	1,954	4,308,670	\$ 1.59	\$ 6,850,786
									Total = \$ 77,372,741

2010-2017 Total Lost Revenues:	\$ 925,043,809
Average Lost Revenue/Year 2010-2017	\$ 115,630,476

ⁱU.S. Landings reported in the table above are for the fishing year (FY) and include commercial (sector, common pool, scallop fishery, state waters fishery and other) and recreational landings as reported by GARFO at: https://www.greateratlanticfisheries.noaa.gov/ro/fso/reports/h/groundfish_catch_accounting.

ⁱⁱ Canadian landings of Georges Bank cod from the *Transboundary Resources Assessment Committee: Assessment of Eastern Georges Bank Atlantic Cod for 2018* (Andrushchenko I, et. Al. 2018).

ⁱⁱⁱ Maximum Sustainable Yield (MSY) is defined as the largest average catch that can be taken from a stock under existing environmental conditions (*NOAA Fisheries Glossary* (NOAA TECHNICAL MEMORANDUM NMFS-F/SPO-69, June 2006)). MSY for GOM cod is that calculated in the *Operational Assessment of 14 Northeast Groundfish Stocks, Updated Through 2018* (Northeast Fisheries Science Center, prepublication copy of the September 2019 Operational Stock Assessment Report, in press). MSY for GB cod is that calculated in the *55th Northeast Regional Stock Assessment Workshop* (Northeast Science Center, January 2013).

^{iv} For transboundary stocks (shared by the US and Canada) including Georges Bank cod, the US portion of the MSY (Adjusted MSY) was calculated as the total stock MSY times the average ratio of the US catch to total catch of the stock over the 2010-2018 period.

^v Lost harvest is calculated as the adjustment MSY minus total U.S. landings.

^{vi} Average value per pound is based on annual landings and revenues data reported on the NMFS Commercial Fisheries Statistics webpage found at <https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings>. Note that landings statistics for the calendar year are close to that reported for the fishing year.