4.0 DRAFT ALTERNATIVES UNDER CONSIDERATION

4.1 ACTION 1 – FORMAL REBUILDING PLAN FOR GULF OF MAINE COD

The rebuilding plan for Gulf of Maine (GOM) cod developed under Amendment 13 was revised in Framework Adjustment 61 due to inadequate progress. In an August 13, 2021, letter from GARFO to NEFMC, GOM cod was identified as making inadequate progress toward rebuilding following the 2019 stock assessment. The letter explains that the Council must implement a new rebuilding plan within two years of the date of notice (i.e., by August 13, 2023), as required by Section 304(e)(3) of the M-S Act. Furthermore, the cod rebuilding plans may need to be modified after the 2023 research track for Atlantic cod is completed. The most recent assessment of GOM cod was a management track assessment in September 2021, which indicated the stock is overfished and overfishing is occurring. National Standard 1 (NS1) guidelines and recommendations from the SSC (see Appendix ?) were considered when developing rebuilding strategies in this section.

The following NS1 guidelines shaped the development of rebuilding strategies for GOM cod – using the stock assessment projections.

Minimum time for rebuilding a stock (T_{min}): *Tmin means the amount of time the stock or stock complex is expected to take to rebuild to its MSY biomass level in the absence of any fishing mortality. In this context, the term "expected" means to have at least a 50 percent probability of attaining the* B_{MSY}*, where such probabilities can be calculated. The starting year for the Tmin calculation should be the first year that the rebuilding plan is expected to be implemented.*

Maximum time for rebuilding a stock to its B_{MSY} (T_{max}): *If* T_{min} *for the stock or stock complex is 10 years or less, then the maximum time allowable for rebuilding (*T_{max}*) that stock to its* B_{msy} *is 10 years.* Additional guidance is also provided when T_{max} exceeds 10 years. (See next page for details).

Target time for rebuilding a stock (T_{target}): T_{target} *is the specified time period for rebuilding a stock that is considered to be as short a time as possible, taking into account the factors described in paragraph (j)(3)(i) of this section.* T_{target} *shall not exceed* T_{max}*, and the fishing mortality associated with achieving* T_{target} *is referred to as* $F_{rebuild}$*.*

The factors include: *The status and biology of any overfished stock, the needs of fishing communities, recommendations by international organizations in which the U.S. participates, and interaction of the stock within the marine ecosystem. In addition, the time period shall not exceed 10 years, except where biology of the stock, other environmental conditions, or management measures under an international agreement to which the U.S. participates, dictate otherwise.*

The NS1 guidelines also explain: *(v) While a stock or stock complex is rebuilding, revising rebuilding timeframes (i.e., Ttarget and Tmax) or Frebuild is not necessary, unless the Secretary finds that adequate progress is not being made. (vi) A stock or stock complex has not rebuilt by Tmax, then the fishing mortality rate should be maintained at its current Frebuild or 75 percent of the MFMT, whichever is less, until the stock or stock complex is rebuilt or the fishing mortality rate is changed as a result of the Secretary finding that adequate progress is not being made.*

Prior recommendations from the SSC on rebuilding plans as well as GOM cod specifications (see Appendix ?) were considered when developing rebuilding strategies (see Appendix ?) in this section.

4.1.1 **Alternative 1 - No Action**

No Action. If this option is adopted, the current rebuilding plan as revised through FW61 for GOM cod would be maintained, which has a rebuild by date of 2024. F-rebuild at the plan start is = 0.161 (M=0.2 model) and 0.177 (M-ramp model). GOM cod was identified as making inadequate progress toward rebuilding following the 2019 stock assessment. The Council must implement a new rebuilding plan by August 13, 2023.

Rationale: This option would be inconsistent with Section 304(e)(3) of the M-S Act.

4.1.2 **Alternative 2 – Revised Rebuilding Strategy for Gulf of Maine Cod**

Based on the 2021 stock assessment, GOM cod is overfished and overfishing is occurring (NEFSC 2021). SSB_{2019} = 1,969 mt (M=0.2 model with retrospective adjustment) and 3,223 mt (M-ramp model) 5% and 5%, respectively of SSB^{MSY} proxy 39,912 mt (m=0.2 model) and 60,010 mt (m-ramp model).

Projection assumptions and projections

- Calendar year catch in 2021 is assumed to be the FY2021 annual catch limit of 523 mt.
- Uses the current ABCs for FY2022-FY2024 (551 mt, held constant) in the rebuilding plan. The catches are fixed at the ACLs (522 mt) in those years for the projections.
- The 551 constant ABCs for FY2023 and FY2024 would be maintained for GOM cod and the fishing mortality would be 0.087 for FY2023 and 0.063 for FY2024.
- Year one: FY2024 is year one of the rebuilding plan.
- Recruitment: Rebuilding plans are based on projections used in the 2021 stock assessment.
- Fishing Mortality/ $F_{rebuild}$ – These fishing mortality rates were used to develop a range of options with some projection runs conducted for comparison purposes: F0, F50, F70, F75, and FMSY.

T_{min} = 7 years. When F=0, the stock is projected to rebuild in 7 years (by 2030), with a 67% probability of achieved B_{MSY}.

T_{max} = 10 years. T_{min} is less than 10 years, and therefore T_{max} is defined as 10 years (by 2033).

T_{target} = 10 years. The T_{target} was defined given other factors described under NS1 and discussed in the following section.

Projections under the M=0.2 model suggest that GOM cod can rebuild in 8 years (by 2031) at 50%F_{MSY} or 10 years (by 2033) at 75%F_{MSY}, with a 52 and 58 percent probability of achieving SSB_{MSY}, respectively. Additional factors were considered in determining T_{target}, which are discussed in the rationale. Rebuilding plan options between 50%F_{MSY} and 75%F_{MSY} were examined, such that in general, a lower F rate increases the probability of rebuilding. Projections examined under the M-ramp, M=0.4 model, which assumes natural mortality remains high, indicates the stock cannot rebuild even when F=0.

The Council may choose from the options below: Option A, Option B, or Option C.

The $F_{rebuild}$ would be in place for the 10 years of the plan, unless the Council was notified by NMFS that GOM cod is rebuilt, or the rebuilding plan was modified.

Options - *T_{target} = T_{max}, which is 10 years (2033).*

Option A. T_{target} of 10 years, rebuilding by 2033, at $F_{rebuild}$ of 50%F_{MSY} = 0.087, which results in a 77% probability of achieving B_{MSY},

Option B. T_{target} of 10 years, rebuilding by 2033, at $F_{rebuild}$ of 70%F_{MSY}= 0.121, which results in a 62% probability of achieving B_{MSY}, or

Option C. T_{target} of 10 years, rebuilding by 2033, at $F_{rebuild}$ of 75%F_{MSY} = 0.130, which results in a 58% probability of achieving B_{MSY}.

Rationale:

The SSC provides feedback supporting using current ABCs for fishing years 2022 to 2024 in the rebuilding plan. In 2021, the SSC set constant ABCs for GOM cod for fishing years 2022 to 2024 with an aim to reduce the likelihood of overfishing and promote rebuilding for the stock.

While projections under the M=0.2 model suggest the GOM cod stock could rebuild in less than ten years, additional factors were considered in determining T_{target}. Fishing mortality of zero for GOM cod is unrealistic given the multispecies nature of the commercial and recreational groundfish fishery. Therefore, consistent with NS1, additional factors - specifically biology and fishery needs - were included in the development of these options.

- First, this stock has exhibited below average recruitment in recent years, and recruitment may not increase as is assumed in the rebuilding projections.
- There exists uncertainty around this stock's natural mortality. The M-ramp, M=0.4 model assumes natural mortality remains high and the stock cannot rebuild.
- Based on experience with many groundfish projections, concerns remain that long term projections tend to be overly optimistic such that future levels of biomass are overestimated, and fishing mortality is underestimated.
- Recent commercial and recreational fishery utilization of the GOM cod ACL is high. This also shows that GOM cod is an important component in the sector system.

Therefore, the longer rebuilding period considers biology and the needs of fishing communities.

4.2 ACTION 2 – REVISED SPECIFICATIONS

4.2.1 **Alternative 1 - No Action**

Under Alternative 1 (No Action), there would be no changes to the specifications for FY2023 (Table 2). Default specifications would be in effect for many stocks from May 1, 2022, to October 31, 2022, and would equal 75% of the FY2022 catch limits (unless adjusted downward based on the incoming values and provisions of the default specifications), after which no specifications would be in place. Both GB and GOM haddock would be based on incoming recommendations due to large reductions in the ABCs anticipates. Stocks subject to default specifications on May 1, 2023 include: GB cod, GB haddock, GOM haddock, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, white hake, and pollock. All other stocks have FY2022 specifications. There would not be new FY2023 quotas specified for the transboundary Georges Bank stocks (i.e. GB cod, GB haddock, GB yellowtail flounder), which are managed through the US/CA Resource Sharing Understanding (as provided in Table 3 and Table 4), and therefore updated Canadian quotas would not be accounted for under No Action. These quotas are specified annually.

***Rationale**:* The No Action alternative uses OFLs/ABCs/ACLs adopted in FW63. These values are based on previous assessments. However, more recent assessments for several of the groundfish stocks occurred in 2022.

Table 1 - Alternative 1/No Action - Northeast Multispecies OFLs, ABC, ACLs, and other ACL sub-components for FY2023 (metric tons, live weight), adjusted for final sector 2022 rosters following the final rule for FW63, published July 15, 2022. Stocks in gray do not have specifications for FY2023 and would be subject to default specifications. Values are rounded to the nearest metric ton or tenth. Underlined stocks are subject to adjustments in 2023 based on US/CA quotas, 2022 CA quotas were used to adjust in the interim. Includes adjustments for Canadian catches (*).... S

Stock	FY	OFL	US ABC	State-Waters Sub-Component	Other sub-component	Scallops	Groundfish Sub-ACL	Comm. Ground-fish Sub-ACL	Rec Ground-fish Sub-ACL	Preliminary Sectors Sub-ACL	Preliminary Non-sector Groundfish Sub-ACL	MWT or Small mesh Sub-ACL	Total ACL
GB Cod													
GOM Cod	2023	853	551	48	12		462	269.9	192	261	8.8		522
	2024	980	551	48	12		462	269.9	192	261	8.8		522
GB Haddock													
GOM Haddock													
GB Yellowtail Flounder	2023		122			19	97	97		94	3.0	2.3	118
SNE/MA Yellowtail Flounder													
CC/GOM Yellowtail Flounder													
American Plaice													
Witch Flounder													
GB Winter Flounder*	2023	1,431	608		27		563	563.2		551	12		591
GOM Winter Flounder	2023	662	497	194	7.5		281	280.9		259	22		482
SNE/MA Winter Flounder	2023	1,438	456	21	132		288	288.1		250	38		441
Redfish	2023	13,229	9,967				9,469	9,468.7		9,370	99		9,469
White Hake*													

Stock	FY	OFL	US ABC	State-Waters Sub-Component	Other sub-component	Scallops	Groundfish Sub-ACL	Comm. Ground-fish Sub-ACL	Rec Ground-fish Sub-ACL	Preliminary Sectors Sub-ACL	Preliminary Non-sector Groundfish Sub-ACL	MWT or Small mesh Sub-ACL	Total ACL
Pollock													
Northern Windowpane Flounder	2023		160	0.8	10	31	108	107.9			108		150
Southern Windowpane Flounder	2023	513	384	23	177	129	43	42.9			43		371
Ocean Pout	2023	125	87		33		50	49.8			50		83
Atlantic Halibut*	2023		101	20	3.5		73	73.4			73		97
Atlantic Wolffish	2023	122	92				86	85.6			86		86

4.2.2 **Alternative 2 – Revised Specifications**

Under Alternative 2, XXX

Option A – Georges Bank cod ABC for FY2024 and FY2024

Option A1- 754 mt

Option A2 – 954 mt

Option B– Remove the management uncertainty buffer for sectors when ASM target coverage rate is set at 99% or greater

Option B1- Gulf of Maine haddock

Option B2- White hake

U.S./Canada Total Allowable Catches

This alternative XX

Table 2 - Proposed FY2023 and FY2024 U.S./Canada TACs (mt).

	Eastern GB Cod	Eastern GB Haddock	GB Yellowtail Flounder
Total Shared TAC			
U.S. TAC			
Canada TAC			

Table 3 - Comparison of the Proposed FY2023 U.S. TACs and the FY2022 U.S. TACs (mt).

Stock	U.S. TAC		Percent Change
	FY2022	FY2023	
Eastern GB cod			
Eastern GB haddock			
GB yellowtail flounder			

Table 4- Alternative 2 Revised Northeast Multispecies OFLs, ABC, ACLs for FY2023-FY2025 (metric tons, live weight), based on final 2021 sector rosters. Values are rounded to the nearest metric ton or tenth. Underlined stocks are subject to adjustments in 2024 based on US/CA quotas, 2023 CA quotas were used to adjust in the interim. Includes adjustments for Canadian catches (*), and state waters component and other sub-component for GB cod. Specifications in gray are unadjusted from FW63.

To be provided.

Rationale: This measure would XXX…

4.2.3 Alternative 3 – Recreational Catch Target for Georges Bank Cod

4.2.3.1 *Option 1* – No Action

Under No Action, there would be no recreational catch target for GB cod. The sub-component analysis of state waters and other fisheries catch components would be used on its own. These components would be combined 230.4 mt for FY2023 and FY2024, based on the recent 3-year average of state/other fisheries catch.

Rationale: Account for recreational fisheries catches within the state waters and other fisheries components based on recent catches.

4.2.3.2 *Option 2* – Maintain the Status Quo

The GB cod recreational catch target would be maintained from FY2022 to FY2023 and FY2024 as 75 mt. 75 mt represents a 54% reduction from the recent 3-year (CY2018-CY2020) average of recreational catch (163mt).

The catch target calculation uses the most recent MRIP data in the 2021 stock assessment of GB cod. As the catch target is not a sub-ACL, the catch target would be apportioned into the state waters and other sub-components for fishing years 2023 and 2024.

Rationale: Maintaining the catch target from FY2022 to FY20203 and FY2024 allows a portion of the total ACL to be set aside for recreational catch, while maximizing the quota available to the commercial fishery. If the recreational fishery catch exceeds the amount set aside and contributes to an overage of the ACL, the commercial groundfish fishery would be responsible for paying back the overage, based on evaluating a 3-year average of recreational catch. The data to evaluate a possible revised catch target comes from the recent 2021 stock assessment for GB cod and does not rely on information in year-end fishery catch reports. This is in part because the stock assessment includes the new Marine Recreational Information Program (MRIP) data for the entire time series. The 3-year average catch approach would consider more recent improvements in the MRIP data and more representative sample sizes than in the past.

4.2.3.3 Option 3 - Revised Recreational GB Cod Catch Target Based on Recent Catches

The GB cod recreational catch target would be set for fishing year 2022 using the method as follows:

- The 3-year (CY2019-CY2021) average of recreational catch (233mt), reduced by the percent change between FY2021 US ABC to the proposed FY2023 US ABC (40%).
- Under a 904 mt ABC, this results in a GB cod recreational catch target of 92 mt.

Decline in US ABC from FY2021 to FY2023:
Total ABC = 904 mt
Canadian TAC = 385 mt
US ABC 2022= 519mt
US ABC 2021 = 1,308 mt
60% decline

The catch target calculation uses the most recent MRIP data in the 2021 stock assessment of GB cod and updated through 2021. As the catch target is not a sub-ACL, the catch target is apportioned into the state waters and other sub-components for fishing years 2023 and 2024.

Rationale: Revising the catch target for FY2023 and FY2024 allows a portion of the total ACL to be set aside for recreational catch, while maximizing the quota available to the commercial fishery. If the recreational fishery catch exceeds the amount set aside and contributes to an overage of the ACL, the commercial groundfish fishery would be responsible for paying back the overage, based on evaluating a 3-year average of recreational catch. The data to evaluate a possible revised catch target comes from the recent 2021 stock assessment for GB cod and updated for 2021 and does not rely on information in year-end fishery catch reports. This is in part because the stock assessment includes the new Marine Recreational Information Program (MRIP) data for the entire time series. The 3-year average catch approach would consider more recent improvements in the MRIP data and more representative sample sizes than in the past.

4.2.3.4 *Option 4*– Revised Recreational GB Cod Catch Target Based on Recent Percentage of US Fisheries Catches

The GB cod recreational catch target would be set for fishing years 2023 and 2024 using the method as follows:

- The 3-year (CY2019-CY2021) average percentage of recreational catches relative to US fisheries total catches (30.7%) applied to the proposed FY2023 US ABC (519mt).
- Under a 904 mt ABC, this results in a GB cod recreational catch target of 159 mt.

The catch target calculation uses the most recent MRIP data in the 2021 stock assessment of GB cod and updated for 2021. As the catch target is not a sub-ACL, the catch target is apportioned into the state waters and other sub-components for fishing years 2023 and 2024.

Rationale: Revising the catch target for FY2023 and FY2024 allows a portion of the total ACL to be set aside for recreational catch, while maximizing the quota available to the commercial fishery. If the recreational fishery catch exceeds the amount set aside and contributes to an overage of the ACL, the commercial groundfish fishery would be responsible for paying back the overage, based on evaluating a 3-year average of recreational catch. The data to evaluate a possible revised catch target comes from the recent 2021 stock assessment for GB cod and updated 2021 and does not rely on information in year-end fishery catch reports. This is in part because the stock assessment includes the new Marine Recreational Information Program (MRIP) data for the entire time series. The 3-year average catch approach would consider more recent improvements in the MRIP data and more representative sample sizes than in the past.

4.2.3.5 *Option 5* – Revised Recreational GB Cod Catch Target Based on a Reduction from Recent Catches

The GB cod recreational catch target would be set for fishing years 2023 and 2024 using the method as follows:

The FY2022 catch target (75 mt) adjusted based on the change in the proposed US ABC from FY2022 to FY2023 (151%) results in a GB cod recreational catch target of 113 mt.

The catch target calculation uses the most recent MRIP data in the 2021 stock assessment of GB cod and updated for 2021 As the catch target is not a sub-ACL, the catch target is apportioned into the state waters and other sub-components for fishing years 2023 and 2024.

Rationale: Revising the catch target for FY2023 and FY2024 allows a portion of the total ACL to be set aside for recreational catch, while maximizing the quota available to the commercial fishery. If the recreational fishery catch exceeds the amount set aside and contributes to an overage of the ACL, the commercial groundfish fishery would be responsible for paying back the overage, based on evaluating a 3-year average of recreational catch. The data to evaluate a possible revised catch target comes from the recent 2021 stock assessment for GB cod and updated 2021 and does not rely on information in year-end fishery catch reports. This is in part because the stock assessment includes the new Marine Recreational Information Program (MRIP) data for the entire time series. The 3-year average catch approach would consider more recent improvements in the MRIP data and more representative sample sizes than in the past.

4.3 Action 3 – Acceptable Biological Catch Control Rules

4.3.1 Alternative 1 – No Action

No Action XXX

Rationale: XXX

4.3.2 Alternative 2 – Revised Acceptable Biological Catch Control Rules

Under Alternative 2, XXX

Rationale: XXX

4.4 Action 4 – Commercial and Recreational Fishery Management Measures – Gulf of Maine Cod

4.4.1 Alternative 1 – No Action

No Action XXX

Rationale: XXX

4.4.2 Alternative 2 – Additional Measures to Promote Gulf of Maine Cod Stock Rebuilding

Under Alternative 2, XXX

Rationale: XXX

4.5 Action 5 – Commercial and Recreational Fishery Management Measures – Georges Bank Cod

4.5.1 Alternative 1 – No Action

No Action XXX

Rationale: XXX

4.5.2 Alternative 2 – Additional Measures to Promote Georges Bank Cod Stock Rebuilding

Under Alternative 2, XXX

Rationale: XXX