FMP	**NORTHEAST MULTISPECIES (GROUNDFISH)**
STOCK(S)	**Gulf of Maine Cod**
LAST ASSESSMENT	**Management Track, September 2021**

Assessment Model, Terminal Year	Description of Assessment Model	Overfishing?/ Overfished?	In Rebuilding Program?	OFL	ABC/ABC CR	ACL	ACT
ASAP, 2020	Statistical Age-Structured Model	Yes/Yes	Yes 2004-2024	724 mt in 2022; 853 mt in 2023; 980 mt in 2024	551 mt in 2022-2024	522 mt in 2022-2024	N/A for groundfish

	MSY/OY	AMs	Discards	State Waters
Iconic New England species. Multispecies groundfish fishery with commercial and recreational components. Overfished and overfishing occurring. Rebuilding stock challenging recently due to poor recruitment and environmental factors. Low catch limits and cod avoidance. Co-caught with other abundant species, such as haddock and pollock.	7,171 mt (M=0.2); 10,873 mt (M-ramp)	Accountability measures can be triggered if overages occur under certain conditions for components with sub-ACLs.	152 mt in 2020	15 mt in FY2020

Availability of Biological and Assessment Data	*Updated data since last assessment:* survey (NEFSC fall survey, NEFSC spring survey, and MADMF spring survey - no surveys in 2020) and fisheries (commercial and recreational catches) data
Recent Performance Against Harvest Control Rule	Percent of total ACL caught: 75.7% in FY2018, 59.6% in FY2019, and 81.5% in FY2020.
Current Management Program	Multispecies groundfish fishery with commercial and recreational components. The Total ACL is divided between several sub-ACLs and sub-components. The commercial sub-ACL is further divided between the sector sub-ACL and the common pool sub-ACL. The majority of commercial permits participate in sectors, fishing under quotas. The common pool operates under days-at-sea, with trip limits and trimester TACs controlling catch. The recreational fishery (private and for-hire) also has a sub-ACL. The recreational fishery is managed with bag limits, seasons, and fish size restrictions. State waters and the other sub-component round out the final components of the total ACL. Landings and discards from all fisheries count against the applicable sub-ACL and total ACL, which are monitored throughout the year. Accountability measures can be triggered if overages occur under certain conditions for components with sub-ACLs. Management includes year-round closures, seasonal GOM cod closures, and GOM cod spawning closures. Sectors have a target coverage rate of 99% at-sea monitoring in FY2022, with a 100% coverage target to be implemented under A23.
Variability in Catch/Revenues?	Gross Commercial (Sector and Common Pool) Groundfish Revenue for GOM cod: $1,500,000 in 2017, $1,700,000 in 2018, $1,600,000 in 2019, $1,100,000 in 2020. Commercial ex-vessel price/lb GOM cod (2020$/lb): $3.14/lb in 2017, $2.89/lb in 2018, $3.17/lb in 2019, $2.84/lb in 2020. Total groundfish landings: 44.28 million pounds in FY2018, 42.66 million pounds in FY2019, 50.66 million pounds in FY2020 . GOM Cod Catch (Landings + discards): 504.5mt in 2018, 396.8mt in 2019, 426.2mt in 2020 From 2018-2020, GOM cod catch was relatively consistent across quarters, with Q2 (Aug 1 - Oct 31) typically the lowest.
Data - Vessels, Permits, Dealers, Processors, Employment	FY 2020: 876 commercial groundfish permitted vessels, of those 590 vessels which received revenue from any species on a declared groundfish trip and 197 vessels with revenue from groundfish. 99 dealers reported buying groundfish. 79 for-hire recreational vessels catching cod or haddock from the GOM.
% Food, % Recreational	The recreational fishery sub-ACL = 37.5% of each years ABC reduced by a management uncertainty buffer. 62.5% of the ABC is allocated to the commercial fisheries. The commercial groundfish fishery ACLs (sectors and common pool) is reduced by commercial state waters and other commercial fisheries sub-components and management uncertainty buffers.
Fishing Communities	*Commercial* - The top 5 ports based on the Groundfish-Specific Commercial Engagement Indicator (2004-2020) are Gloucester, MA; New Bedford, MA; Boston, MA; Narragansett, RI; and Portland, ME. *Recreational* - When expanding out to the top 20 communities in recreational engagement in the Northeast (all recreational fishing) Recreational Engagement Indicators (2009-2018), New England communities include: Narragansett/Point Judith, RI, Newburyport, MA and Barnstable, MA. Other ports of interest with relatively high engagement (i.e., ranking somewhere outside the top 20) in the last five years include Gloucester, MA, Waterford, CT, East Lyme/Niantic, CT, and Old Saybrook, CT.
Other Economic/Social Factors	GOM cod is an important resource for the recreational fishing industry, an average of 85 for-hire recreational vessels targeted GOM cod or haddock from 2016-2020.
Major Sources of Scientific Uncertainty	In the current models - natural mortality and recruitment. Two models with different assumptions of natural mortality exist for GOM cod (M=0.2 and M-ramp). The different assumptions affect the scale of biomass, recruitment, fishing mortality estimates, and overfishing status. Other areas of uncertainty include the increasing amount of retrospective error in both models, stock structure, ecosystem effects, and the veracity of fishery catch data.
Major Sources of Management Uncertainty	The default management uncertainty buffer of 5 % is applied to the commercial fishery. A management uncertainty buffer of 7% is used for the recreational fishery. Observed commercial trips may not be representative, recent changes to monitoring. See above.
How is the probability of overfishing addressed?	Recently, the SSC applied 75%Fmsy and held constant for 3 years, averaged for the two models using only a single bridge year.
What is the consequence of overfishing?	Reduction in biomass, yield, and net economic benefits over long-term.

How are expected net benefits to the Nation currently measured/evaluated?	Yield (mt and $)
Interactions with Other Fisheries/Stocks, Bycatch Issues	Cod is frequently caught with other abundant groundfish stocks (e.g., haddock and pollock) in the multi-species fishery. The low catch limit on cod can lead to reduce catches of other stocks.
Ecosystem Considerations: Trophic Interactions	Cod are generalists. Fishermen have noted that the two groups of cod typically have different diets, with cod on Stellwagen Bank feeding primarily on sand lance, while those on Jeffreys Ledge mainly feed on herring and shrimp. There has been a decline in many cod predators (Atlantic halibut, large hakes, large cod) but it is unclear if the declines in predators are due to the decline in cod.
Ecosystem Considerations: Habitat	GOM cod habitat vulnerability was assessed in Omnibus Habitat Amendment 2. The current spatial distribution of the stock is considerably less than its historical range within the Gulf of Maine. Year-round and seasonal closures are in place in the GOM to protect cod and increase successful cod spawning.
Ecosystem Considerations: Climate	Atlantic cod is considered moderately vulnerable to climate change (high climate exposure risk and moderate biological sensitivity). Fishermen have commented that cod are sensitive to water temperatures and shifted to deeper waters to spawn. Others have noted the location of spawning will change from year-to-year depending on water temperature.
Other Important Considerations/Notes	Stock structure of Atlantic cod. The current GOM cod stock overlaps the new cod biological units of Western Gulf of Maine winter spawners, Western Gulf of Maine spring spawners, and Eastern Gulf of Maine. Research Track for Atlantic cod underway.