

Gulf of Maine Research Institute
Responsibly Harvested Seafood from the Gulf of Maine Region

Report on
Atlantic Mackerel (US)

- ☒ The fishery is managed by a competent authority and has a management plan in place that incorporates a science-based approach to ensure sustainability.
 - *Atlantic mackerel is managed by the National Marine Fisheries Service (NMFS) and Mid-Atlantic Fishery Management Council (MAFMC), under the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan, which utilizes the best available science to determine sustainable harvest limits.*

- ☒ If stock sizes are below management target levels, whether due to natural or man-made causes, management plans are established that enable rebuilding within a specified timeframe.
 - *According to the 2005 42nd Stock Assessment Workshop (42nd SAW), Atlantic mackerel is not overfished ($SSB > \frac{1}{2} SSB_{MSY}$) and overfishing is not occurring ($F < F_{MSY}$). The 2010 Transboundary Resource Assessment Committee (TRAC) stock assessment was uncertain, and listed the status of the Atlantic mackerel stock as unknown.*

- ☒ Sufficient data exists to determine harvest levels.
 - *The 2005 42nd SAW determined biological reference points for the management of the Atlantic mackerel stock. The 2010 TRAC report was unable to conclude biological reference points, but was able to set harvest recommendations based on the outcomes of the assessment. Ultimately, the Council and/or the Regional Administrator sets the harvest levels (Annual Catch Limits) based on this data and information, which incorporate uncertainty.*

- ☒ Monitoring and compliance measures are in place to ensure acceptable harvest levels.
 - *In the US, Atlantic mackerel catch is monitored through vessel trip reports (VTRs), observers, and dealer reports. Compliance is assessed through consistency throughout these reports as well as enforcement in the field.*

- ☒ Enforcement exists to ensure that harvesters follow regulations, and to prevent illegal practices and unreported harvest.
 - *U.S. Coast Guard, NMFS Office of Law Enforcement agents, and state marine patrol agents enforce the laws and regulations governing the harvest of mackerel.*

I. Definition of Atlantic Mackerel

Atlantic mackerel (*Scomber scombrus*) is harvested in US waters from the coast of Maine, south to North Carolina (see Figure 1). While the stock unit extends into mid-Atlantic waters, this report focuses on the US's management and harvesting of mackerel in the area outlined by Gulf of Maine Responsibly Harvested Standard¹. All management of mackerel in the US waters fall under federal regulations, as there are no state management regulations of mackerel. The primary gear utilized to target mackerel is mid-water trawl, and a minimal amount of mackerel is harvested using bottom trawls and fish weirs.

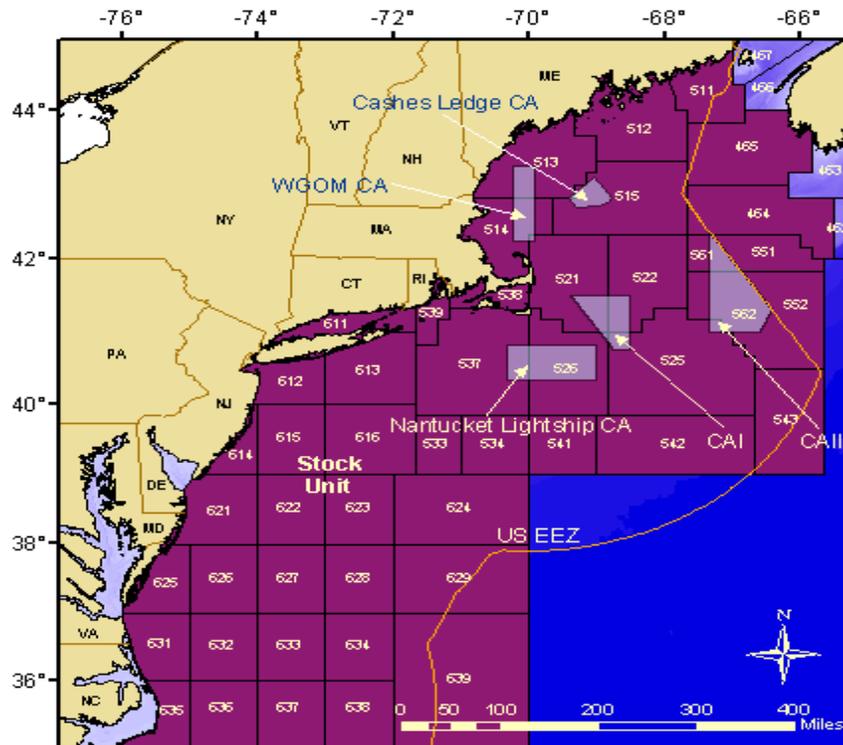


Figure 1. Statistical areas that define the Atlantic mackerel stock. The dashed line represents the United States Exclusive Economic Zone (NEFSC 2006).

II. Description of the Management Authority and Regulatory Process

Responsibility of Atlantic mackerel management lies within the [National Marine Fisheries Service \(NMFS\)](#), which is a part of the [National Oceanic and Atmospheric Administration \(NOAA\)](#). The [Mid-Atlantic Fishery Management Council \(MAFMC\)](#) facilitates the development of Atlantic mackerel regulations and manages the mackerel under the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. The MAFMC consists of 21 voting members, including the Regional Administrator for

¹ This excludes mackerel harvested south of statistical areas 521, 522, 561 and mackerel harvested beyond the US's EEZ.

NMFS, state fisheries officials from each of the Mid-Atlantic States, and governor nominated public representatives who are eventually appointed by the Secretary of Commerce.

For Atlantic mackerel management, the MAFMC is advised by a species committee that currently consists of representatives from state and federal management agencies, the fishing industry, and environmental groups. This committee is responsible for the development of the fishery management plan and regulations that are consistent with the ten national standards outlined in the [Magnuson Stevens Act \(MSA\)](#), which dictate that conservation and management measures shall:

1. Prevent overfishing while achieving optimum yield.
2. Be based upon the best scientific information available.
3. Manage individual stocks as a unit throughout their range, to the extent practicable; interrelated stocks shall be managed as a unit or in close coordination.
4. Not discriminate between residents of different states; any allocation of privileges must be fair and equitable.
5. Where practicable, promote efficiency, except that no such measure shall have economic allocation as its sole purpose.
6. Take into account and allow for variations among and contingencies in fisheries, fishery resources, and catches.
7. Minimize costs and avoid duplications, where practicable.
8. Take into account the importance of fishery resources to fishing communities to provide for the sustained participation of, and minimize adverse impacts to, such communities (consistent with conservation requirements).
9. Minimize bycatch or mortality from bycatch.
10. Promote safety of human life at sea.

To help the species committee meet these requirements, an Advisory Panel made up of representatives from the fishing industry, scientists, and conservation organizations provides input to management measures. A Plan Development Team (PDT), which consists of scientists, managers and other experts on biology and/or management of Atlantic mackerel, provides guidance and terms of reference during the development of mackerel regulations. Then the PDT provides reports to the oversight committee in response to the terms of reference. The PDT meets regularly to provide analysis of species-related information and to develop issue papers, alternatives, and other documents as appropriate.

III. Atlantic Mackerel Data

In the US, the Atlantic mackerel stock was last assessed by the 42nd Stock Assessment Workshop (42nd SAW) in 2005, and the Assessment Summary Report was published in 2006 (NEFSC 2006a).

The 2005 stock assessment utilized a model known as an aged structured assessment program (ASAP) to determine the stock status of Atlantic mackerel. This model incorporates age structure, recruitment rates, surveys data, changes in selectivity, and uncertainty in the input data. In addition, the ASAP model applied data from US and Canadian landings, and NEFSC spring surveys to assess the stock. Applying the ASAP model to assess spawning stock biomass and fishing mortality determined that the Atlantic mackerel stock is not overfished and overfishing was not occurring.

As determined in the 42nd SAW, the biological reference point (BRP) used to determine if Atlantic mackerel is overfished is $SSB_{MSY} = 644,000$ metric tons (mt). In 2004, spawning stock biomass (SSB) was estimated to be 2,300,000 mt, and thus above the SSB_{MSY} threshold (644,000 mt).

The 2005 assessment also determined that the BRP for assessing if overfishing of the Atlantic mackerel stock is occurring is when the fishing mortality (F) exceeds 0.16. In 2004, $F=0.05$ and thus overfishing of the stock was not occurring (Table 1).

Table 1. Biological Reference Points Used to Determine Overfished and Overfishing Statuses of Atlantic Mackerel	
SSB_{MSY} (Overfished threshold)	644,000 mt
2004 SSB	2,300,000 mt
F_{MSY} (Overfishing threshold)	0.16
2004 F	0.05

The following excerpt is from the 42nd SAW Report summarizes trends in Atlantic mackerel landings since 1960, which are depicted in Figure 3:

Commercial mackerel landings by the United States averaged 2,368 mt from 1960-1983, peaked at 31,261 mt in 1990, and declined to 4,666 mt in 1993. USA landings increased to 16,137 mt in 1996, declined to 5,646 mt in 2000 and steadily increased to 53,724 mt in 2004. Recreational landings in the USA have generally declined during 1979-2004. Landings averaged 2,945 mt during 1979-1988 and declined to a low of 344 mt in 1992. Landings in the US sport fishery peaked at 1,735 mt in 1997, declining slightly thereafter, but remaining relatively steady until declining to 724 mt in 2003 and 467 mt in 2004 (NEFSC 2006a).

Historically, the distant water fleet (DWF), or vessels harvesting under foreign country flags, harvested the majority of the Atlantic mackerel catch in US waters, peaking at 385,000 mt. With the implementation of the Magnuson-Stevens Act and the establishment of the Exclusive Economic Zone (EEZ), DWF landings fell to 400 mt. The original Atlantic Mackerel Fishery Management Plan of 1978 permitted the DWF to harvest mackerel within the EEZ and allowed a gradual increase in landings until the 1990s, when new policies were implemented to eliminate the DWF mackerel fishery within the EEZ.

A.

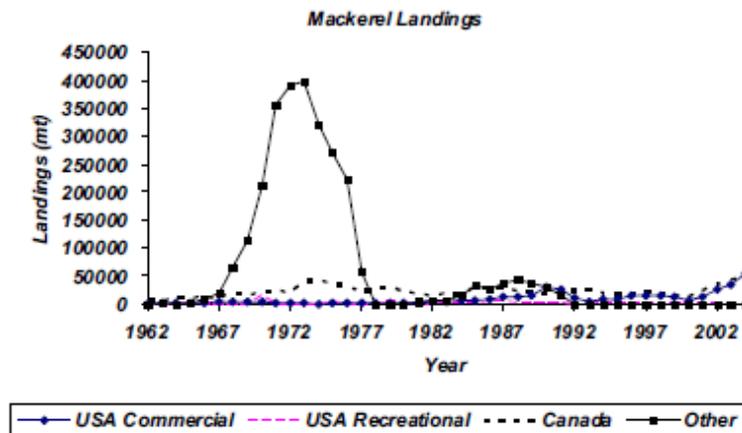


Figure 2. Total Atlantic Mackerel Catch, from 1962 to 2004 (NEFSC 2006a)

Transboundary Resources Assessment Committee Stock Assessment

Because Atlantic mackerel are a migratory species and the stock straddles US and Canadian waters, the first ever joint US/Canada Atlantic mackerel assessment was conducted in 2010 by the Transboundary Resources Assessment Committee (TRAC). Since 1998, the TRAC has “reviewed stock assessments and projections necessary to support management activities for shared resources across the US-Canada boundary in the Gulf of Maine-Georges Bank region” (NEFSC 2012). Prior to the 2010 TRAC assessment, each country assessed the stock individually while peer reviewing each other’s assessments.

The TRAC agreed to use NEFSC spring survey data, as well as bottom-trawl and mid-water catch per unit of effort (CPUE) indices in the Atlantic mackerel assessment (TRAC 2010). The assessment utilized a VPA-ADAPT model to reconcile discrepancies between the survey data and CPUE indices.

Utilizing additional data and alternative model that was not included in the 42nd SAW, the 2010 TRAC assessment produced results that vary from that of the 2005 42nd SAW findings. The TRAC assessment suggested that F increased from 0.17 in 2000 to 0.51 in 2008, while $SSB = 96,968$ mt in 2008 (TRAC 2010). The TRAC assessment recommends using “deterministic per recruit reference points as proxies for F_{MSY} and these were $F_{0.1}=0.29$ and $F_{40\%}=0.25$ ” (TRAC 2010), but the assessment’s estimates for SSB and MSY were considered highly uncertain. Based on the uncertainty around the reference points, the TRAC assessment recommended that the regulatory body implement a short-term, precautionary strategy where catch levels not exceed the average annual landings from 2006-2008, or 80,000 mt (TRAC 2010). Total landings between the US and Canada in 2008 were 50,685 mt, and have remained below 80,000 mt since 2006.

IV. Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan

The Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (FMP) was implemented in 1983 to reduce fishing mortality of heavily fished stocks, promote rebuilding to sustainable biomass levels, and address impacts on stocks by foreign fleets. Prior to the FMP, the mackerel, squid, and butterfish fisheries were managed separately, under individual management plans. The 1983 merger of the plans sought to synthesize regulatory similarities of the three fisheries (MAFMC 1981). Atlantic mackerel is managed in federal waters and there are no state management measures for Atlantic mackerel.

The FMP utilizes seasonal and year-round area closures (i.e., no fishing in certain areas), gear restrictions (i.e., specified mesh size, number of nets/hooks, etc.), minimum fish size limits, trip limits (i.e., limiting fishermen to a certain poundage of fish per trip), limited access (i.e., limiting the number of participants in the fishery) and annual catch limits (ACLs) as management measures (CFR 2012). In 2010, Amendment 13 to the FMP was implemented in an effort to address the requirements of the Magnuson-Stevens Reauthorization Act (MSRA) of 2006. The MSRA requires the MAFMC to determine Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all managed stocks, including mackerel. This action implements a process for calculating an ACL in addition to the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) for each stock. The MAFMC Science and Statistics Committee recommends the ABC to the MAFMC, and the ABC must be equal to or less than the OFL. The ACL, or US harvest level, is determined by estimating the Canadian harvest for the upcoming year and subtracting that from that from the ABC. The MAFMC approves final ACLs, but the ACL cannot exceed the SCC's recommended levels. The mackerel fishery operates on a calendar year, from January 1st to December 31st. The Atlantic Mackerel, Squid and Butterfish Monitoring Committee (MC) reviews the ACL and determines how the quota will be broken into subcomponents and allocated to the commercial and recreational segments of the fishery. The ACL for mackerel is reviewed by the MC at a minimum of every five years.

Amendment 11 is the most recent modification to the FMP and new management measures were implemented on March 1, 2012. The amendment establishes a tiered limited access program for Atlantic mackerel in an effort to manage the mackerel stock sustainably without impeding utilization of the resource (MAFMC 2011). The three tiered permit system aims to reduce the capacity of the mackerel fishery, while enabling qualified harvesters to continue fishing for mackerel at a level that is comparable to their historic participation in the fishery (NOAA 2012). Table 2 depicts a breakdown of each tier.

Table 2. Atlantic Mackerel Limited Access Permits and Possession Limits (NOAA 2012)			
Permit	For vessels with...	Possession limit when fishery is open	Possession limit when 90% of quota is taken
Tier 1,	The highest level of participation	No possession limit	20,000 lb
Tier 2	A moderate level of historic participation	135,000 lb	20,000 lb
Tier 3	A low level of historic participation	100,000 lb	20,000 lb
Open Access	Any vessel that does not qualify for above, or new participants	20,000 lb	20,000 lb

The Atlantic mackerel fishing year extends from January 1 to December 31, and possession of mackerel is prohibited by all permit holders when 100% of the quota has been harvested.

V. Monitoring

Monitoring of the Atlantic mackerel fishery is carried out through several different programs. When fishing in certain areas, such as the Eastern U.S./Canada Area, vessels are required to submit daily vessel trip reports (VTRs), which provide details on type of gear fished, area fished, species caught (and discarded), dealer information, and port of landing information, in addition to other details. The Northeast Fisheries Observer Program employs at-sea observer coverage and port sampling for the groundfish fleet. The final rule for Standardized Bycatch Reporting Methodology (SBRM) states that the Regional Administrator and the Science and Research Director will allocate at-sea observer coverage to the applicable fisheries of the Northeast Region sufficient to achieve a level of precision (measured as the coefficient of variation [CV]) no greater than 30% for each (73 FR 4736; January 28, 2008). In addition, vessels fishing in Special Access Programs (SAPs) are required to contact NEFOP prior to their trip to determine if they will have observer coverage.

There are also shore-side port samplers who periodically work at fish auctions and exchanges taking biological samples. This program ensures compliance with the MSA in addition to the Endangered Species Act and the Marine Mammal Protection Act. Shore-side, there is 100% electronic dealer reporting on a weekly basis, which includes, but is not limited to, unique trip identifier, quantity of species landed, price per unit by species, and port and state landed. Weekly dealer reports are collected and analyzed by the NMFS Northeast Regional Office and are assessed against the annual quota on a weekly basis.

VI. Enforcement

In general, enforcement of the Atlantic Mackerel, Squid and Butterfish FMP is coordinated through NOAA's Office of Law Enforcement (OLE). OLE Special Agents and Enforcement conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, and conduct patrols on land, in the air and at sea. In addition to this enforcement work, the OLE administers the Cooperative Enforcement Program, which authorizes certain coastal state and territorial marine conservation law enforcement agencies to enforce federal laws and regulations in the EEZ. OLE also partners with the U.S. Coast Guard and various other federal agencies, fishery management councils, and non-governmental organizations. Enforcement for vessels in the mackerel fishery primarily rely on monitoring harvest levels through dealer reporting and VTRs.

VII. References

- “Magnuson-Stevens Fishery Conservation and Management Act Provisions; Fisheries of the Northeastern United States; Northeast Region Standardized Bycatch Reporting Methodology Omnibus Amendment.” *Federal Register* 73 (28 January 2008): 4736-4758.
- “Management Measures for the Atlantic Mackerel, Squid, and Butterfish Fisheries.” Title 50 *Code of Federal Regulations*. 2012 ed. Text found: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=2201fca1685b1ec5470d4c103babc18b&rgn=div6&view=text&node=50:10.0.1.1.6.2&idno=50>
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