

Species Profile: Winter Flounder

While Harvest Has Declined, Assessments Shows Little Improvement in Biomass

Introduction

Stock assessments for the Southern New England/Mid-Atlantic (SNE/MA) and Gulf of Maine (GOM) winter flounder stocks were conducted by the Northeast Fisheries Science Center as a part of a series of operational assessments which reviewed 19 Northeast groundfish stocks. Results of the assessments show the SNE/MA stock continues to be overfished, with low biomass since the 1990s. The biomass status of the GOM stock could not be determined due to model limitations, however, overfishing is not occurring. While management has responded to previous, yet similar, assessment results with trip limits and size restrictions in state waters, as well as quotas in federal waters, trends in these winter flounder stocks do not show clear responses to declines in fishing mortality.

Life History

Winter flounder is an estuarine flatfish found in almost all shoal water habitats along the Northwest Atlantic coast. The geographic distribution ranges from nearshore habitats to offshore fishing banks. The name ‘winter’ flounder refers to the species’ annual spawning migrations into nearshore waters in the winter. Adults migrate in two phases: an autumn estuarine immigration prior to spawning, and a late spring/summer movement to either deeper, cooler portions of estuaries or to offshore areas after spawning. This pattern of seasonal distribution may change in the northern extent of the range where they migrate to shallow water in the summer and deeper waters in the winter.

The annual spawning period varies geographically, with peak spawning times generally occurring earlier in southern locations. During spawning, females release demersal (negatively or neutrally buoyant) adhesive eggs whose properties facilitate retention within spawning grounds. Many factors influence larval growth and survival, including temperature, salinity, dissolved oxygen, and food availability. Nursery habitat for larvae and juveniles is typically littoral (along the shore) and sublittoral saltwater coves, coastal salt ponds, estuaries, and protected embayments; although larvae and juveniles have also been found in open ocean areas such as Georges Bank and Nantucket shoals. Larvae are predominantly found in the upper reaches of estuaries in early spring, moving into the lower estuary later in the season.

Adult growth rates vary between stock units. Fish from the offshore Georges Bank stock typically grow faster and larger than fish from the inshore areas. Maximum age appears to decrease from north to south over the winter flounder’s range as well.

Estuarine habitat plays an essential role in all stages of winter flounder life history. Specifically, it provides spawning and foraging areas for adults, and nursery habitat and food sources for juveniles. Young-of-the-year (YOY) winter flounder and juveniles reside permanently in the estuaries while adults may leave estuaries during warm summer months. While estuaries provide good habitat for spawning, predatory and competitive interactions may occur frequently due to the high number of organisms found in these areas. Additionally, the nearshore grounds are vulnerable to water pollution and habitat loss.

Tagging studies have shown spawning-site fidelity in winter flounder, meaning that individuals will often return to the location where they were hatched, or close by. This suggests that sub-populations of winter flounder may be vulnerable to localized depletion.

Species Snapshot



Winter Flounder
Pseudopleuronectes americanus

Common Names: blackback, lemon sole, flat fish, mud dab, black flounder

Management Unit: Maine to Delaware

Family: Pleuronectidae are also known as righteye flounders because most species lie on the sea bottom on their left sides, with both eyes on their right sides. Winter flounder is one of 60 species in this family.

Interesting Facts

- Generally, the darkest of all Gulf of Maine flat fishes.
- Winter flounder grow largest in Georges Bank and smallest in the Gulf of Maine.
- High site fidelity (attachment to specific sites) creates potential for local extinction.
- Winter flounder are born with an eye on each side of its head; as it develops, the left eye migrates across its head to the right side of the body.

Maximum Size: Adult winter flounder may grow as large as 70 cm (27.6 inches) and reach ages of 15+ years

Stock Status:

- *Gulf of Maine* - Overfished status unknown and overfishing is not occurring
- *Southern New England/Mid-Atlantic* - Overfished and overfishing is not occurring



Photo (c) Cornell Cooperative Extension Eelgrass Program, www.SeagrassLI.org

Sources of natural mortality for winter flounder include predation, parasites, disease, and competition. Predatory fish such as striped bass, bluefish, and summer flounder, as well as birds, invertebrates, and marine mammals prey on larvae and juveniles. Atlantic cod, spiny dogfish, goosefish, and winter skate are the main predators of adult winter flounder.

The diet of winter flounder is limited by their small mouth size and reliance on sight to locate prey. Feeding occurs solely during the day but intensifies during ebbing and flooding tides. Adults feed mostly on small invertebrates, shrimp, clams, and worms. At night, winter flounder lie flat with their eye turrets retracted until sunrise.

Commercial & Recreational Fisheries

Historically valuable to commercial and recreational fishermen throughout New England and the Mid-Atlantic, winter flounder fisheries are a fraction of what they once were. Total landings (commercial and recreational) in both areas peaked in the early 1980s at approximately 10 million pounds in the GOM and 36 million pounds in SNE/MA. Today, as a result of stringent regulations, landings in both areas are significantly reduced. In 2016, total landings in the GOM stock were 467,000 pounds while total landings in the SNE/MA stock were approximately 1.2 million pounds. Over the past five years, commercial harvest has accounted for about 90% of total fishing mortality.

Gulf of Maine

Otter trawls and gillnets are the primary commercial gear types in GOM winter flounder fishery. Throughout the 1960s and 1970s, commercial landings fluctuated around 2.2 million pounds. In 1982, commercial landings peaked at just over 6 million pounds and then declined steadily to approximately 770,000 pounds in 1999. This decline may be attributed to extended spring closures in the GOM. Commercial landings have been below 1 million pounds since 2005, and were 414,000 pounds in 2016.

Recreational landings represent a significantly smaller portion of total harvest on the GOM stock. GOM recreational landings fluctuated between 1 and 3.5 million pounds in the early 1980s before declining below 200,000 pounds in 1991. From 1997 to 2007, recreational landings further dropped to below 100,000 pounds. An almost four-fold increase in recreational landings occurred from 2007 to 2008 when landings increased from approximately 57,300 to 227,000 pounds. 2016 GOM recreational landings were roughly 53,000 pounds.

Southern New England/Mid-Atlantic

Otter trawls are the primary gear type used by commercial fishermen to catch winter flounder in the SNE/MA area. Commercial landings from the SNE/MA stock averaged 18.7 million pounds from 1964 to 1972 before declining to around 10.6 million pounds throughout the mid- to late 1970s. Landings increased in the early 1980s to a record high of 24.6 million pounds and then rapidly declined to

4.7 million pounds in 1994. For the next seven years, landings increased steadily and exceeded 10 million pounds in 2001. Commercial landings decreased for the next few years until settling between 2 and 3 million pounds from 2004 to 2008. In response to the poor condition of the stock, a moratorium in the SNE/MA fishery was implemented in federal waters between May 2009 and April 2013. Concurrently, a 50 pound commercial bycatch limit was implemented in state waters, and remains in place today. Following the federal moratorium, 2016 commercial landings in SNE/MA were 1.14 million pounds.

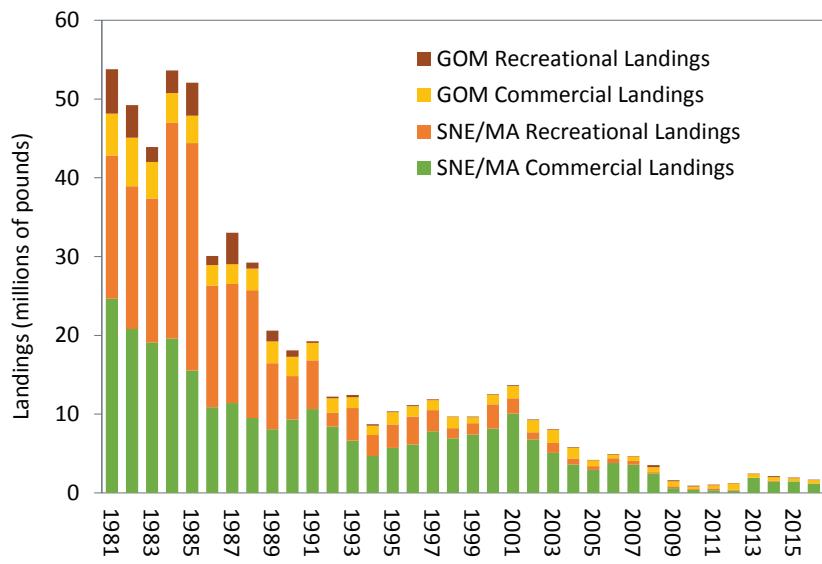
Most recreational landings in the SNE/MA stock occur between January and June. They were around 6 million pounds in the early 1980s, increasing to 12 million pounds in 1985, and then steadily declined to between 1-2 million pounds (with the exception of a couple years) from 1992 to 2001. Landings further decreased to less than 500,000 pounds in 2002 and below 300,000 in 2005; by 2010, landings fell to a historical low of roughly 62,000 pounds. Similar to the commercial SNE/MA landings, this decline is likely due to the retention prohibition in federal waters and 2 fish bag limit in state waters. In 2016, recreational landings were 73,000 pounds.

Stock Status

Gulf of Maine

The 2017 GOM operational stock assessment indicates overfishing is not occurring and the stock biomass is unknown. The assessment uses area swept biomass from three different trawl surveys (Northeast Fisheries Science Center, Maine-New Hampshire, and Massachusetts Division of Marine Fisheries) to determine the exploitation rate and overfishing status; however, biomass reference points remain unknown and the overfished

Winter Flounder Commercial & Recreational Landings by Stock Unit
NEFSC Operational Assessment of 19 Groundfish Stocks, 2017



status cannot be determined. One of the largest sources of uncertainty in the stock assessment is the survey gear catchability, which influences biomass and exploitation rate estimates.

A persistent challenge in assessing the GOM winter flounder stock is the apparent lack of response in survey abundance indices to significant declines in fishery removals. While recreational and commercial harvest has declined, survey indices have been relatively flat and there has been little change in the size structure of winter flounder caught.

Southern New England/Mid-Atlantic

The 2017 SNE/MA operational stock assessment indicates the stock is overfished, but overfishing is not occurring. Spawning stock biomass (SSB) in 2016 was estimated to be 4,360 mt, which is 18% of the biomass target and 36% of the biomass threshold. The 2016 fishing mortality was estimated to be 0.21 which is 62% of the overfished threshold. A large source of uncertainty in the stock assessment is the estimate of natural mortality, which affects the scale of the biomass and fishery removal estimates.

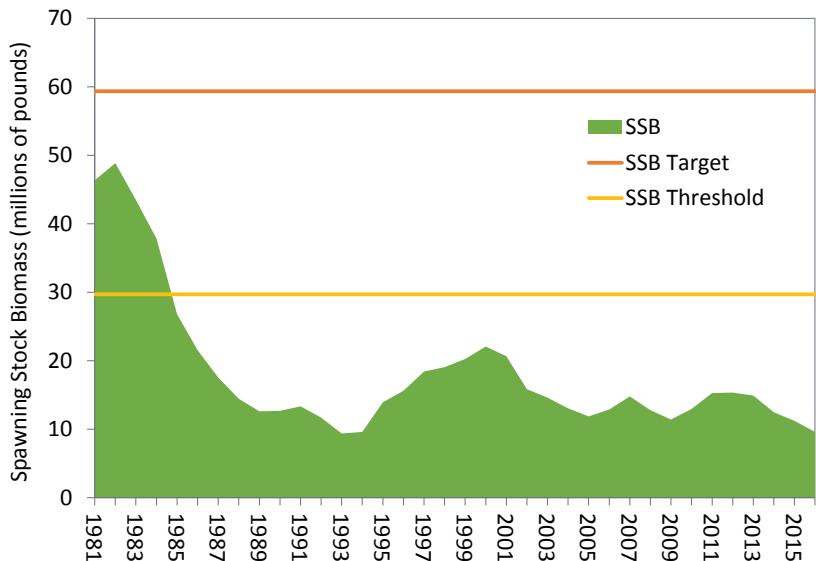
An interesting result of the 2017 stock assessment is that while SNE/MA SSB has generally decreased over the time series, recruitment has steadily increased since historic low levels in 2013. In fact, current recruitment estimates are above the 10 year average. Continued surveys and assessments will be needed to monitor this trend and determine its impact on the population.

Atlantic Coastal Management

The Commission and the New England Fishery Management Council manage winter flounder with complementary management plans that regulate state and federal waters based on fisheries and the biology of winter flounder. The Council includes winter flounder as part of the Northeast Multispecies Fishery Management Plan (Groundfish FMP), which includes several highly valuable commercial species, such as cod and yellowtail flounder. Federal management focuses on the commercial fishery because the bulk of harvest in federal waters is from that sector. The Commission's FMP is designed to protect spawning females (the most productive part of the population) when they migrate inshore because they are particularly vulnerable to harvest when congregated for spawning.

The Commission and Council use stock area-specific management measures for both the recreational and commercial sectors of the fishery. The variability in biology, as well as current and historical exploitation patterns, necessitate the delineation of stock units where growth, seasonal movement, and female maturity schedules are similar enough to be modeled as one group. Within these stock groups, winter flounder move across state boundaries, and between state and federal waters. Of the three winter flounder management areas, the Commission

Winter Flounder Southern New England/Mid-Atlantic Spawning Stock Biomass
NEFSC Operational Assessment of 19 Groundfish Stocks, 2017



Timeline of Management Actions: FMP & Addendum I ('92); Addendum II ('98); Amendment 1 ('05); Addendum I ('09); Addendum II ('12); Addendum III ('13)

participates in the management of the GOM and SNE/MA stocks.

The Commission significantly reduced fishing on state waters spawning grounds in 2005 when Amendment 1 was adopted. Amendment 1 established a minimum size limit, shortened seasons, and lowered trip/bag limits to reduce fishing pressure on spawning fish and rebuild spawning stock biomass. Amendment 1 complemented Amendment 13 and Framework 42 to the Groundfish FMP, which focused on offshore commercial fisheries (3 – 200 miles).

Considerable management changes occurred in 2009 following the 2008 peer-reviewed benchmark assessment, which estimated the SNE/MA stock at 9% of the target biomass. In federal waters, the Secretary of Commerce prohibited the retention of SNE/MA winter flounder through interim action. This moratorium was extended through the Council's Amendment 16 to the Groundfish FMP. In state waters, the Commission approved Addendum I, which reduced the SNE/MA commercial possession limit to 50 pounds and implemented a 2 fish bag limit in the recreational fishery. The Commission opted to establish a bycatch-only possession limit, rather than prohibit the possession of winter flounder in state waters, due to concerns about increased discard mortality and loss of fishery-dependent data. Addendum I also specified management changes for the GOM stock, requiring states to reduce recreational fishing mortality by 11% and established a 250 pound commercial trip limit.

While the Council's Amendment 16 prohibited retention of SNE/MA winter flounder, it also drastically changed federal groundfish

management by establishing sectors. Prior to sectors, effort was controlled by restricting the number of days a vessel was allowed to fish each year. Sectors are a catch share program where limited access permit holders formed “sectors” that receive an annual groundfish allocation based on the landings history of its members. Each sector creates its own rules to allocate catch to its members, avoid exceeding catch limits, and minimize discards which are counted against their allocation. A common pool sub-ACL was created for vessels that did not join a sector and their effort is controlled through days-at-sea allocations. A state sub-ACL accounts for catch in state waters by estimating expected catch by state-permitted fishermen. There are no accountability measures tied to the state sub-ACL, so if it is exceeded, other sub-ACL components may be reduced.

In 2011, an updated stock assessment concluded that the GOM winter flounder stock was no longer experiencing overfishing. In response, federal action was taken to significantly increase the GOM stock ACL. As a result, the Commission implemented Addendum II, increasing the commercial trip limit to 500 pounds and removing the requirement that states reduce their GOM recreational catch by 11%. In 2013, the federal moratorium on SNE/MA winter flounder was lifted and the stock was allocated and ACL. In contrast, the 50 pounds commercial possession limit remained in state waters due to the Commission’s concern about the continued low abundance of SNE/MA winter flounder.

Specifications for the 2018-2020 GOM and SNE/MA winter flounder fisheries were set via the Council’s Framework 57 action. The annual total ACL for the GOM stock was set at 428 mt, a 348 mt decrease from 2017. Likewise, the GOM state waters sub-component was decreased from 122 mt to 67 mt. For the SNE/MA stock, the total annual ACL was set at 700 mt, a 49 mt decrease from 2017. The state waters sub-component slightly increased from 70 mt to 73 mt.

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