



Species Profile: Winter Flounder

Depleted SNE/MA Stock in Early Stages of Rebuilding

Introduction

In 2008, the Southern New England/Mid-Atlantic (SNE/MA) winter flounder stocks were at an all time low – 9% of the target biomass. To end overfishing and rebuild the stock, the Secretary of Commerce prohibited retention of SNE/MA winter flounder and the Atlantic States Marine Fisheries Commission (Commission) implemented bycatch limits in state waters. Since then, the New England Fishery Management Council (Council) established sector management for groundfish and a benchmark stock assessment was completed in 2011. Management efforts have been successful in increasing biomass but the stock is far from rebuilt.

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 along the Atlantic coast of North America.

The name ‘winter’ flounder refers to their annual spawning migrations into nearshore waters in 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 colder waters of 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 and although spawning periods overlap considerably, peak spawning times are 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 and juvenile growth and survival, including temperature, salinity, dissolved oxygen, and food availability. Nursery habitat for winter flounder larvae and juveniles is typically littoral 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 natal 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.

Winter flounder are an essential component of



Winter Flounder in Eelgrass, Dawn McReynolds, NYSDEC

Winter Flounder *Pseudopleuronectes americanus*

Common Names:

* **Blackback, lemon sole, flat fish, mud dab, black flounder**

Identification:

* **Dark coloring and eyes on right side of the body (termed “right-eyed”, “right-sided”, or “right handed” flounder.**

Interesting Facts:

* **Generally the darkest of all GOM flat fishes**
 * **Winter flounder grow largest in GBK and smallest in GOM**
 * **High site fidelity (attachment to specific sites) creates potential for local extinction**

Largest Recorded: 25”, 8 lbs., 2 oz.

Oldest Recorded: 14 years (www.fishbase.org)

Stock Status:

***GOM - overfished status unknown and overfishing is not occurring**
 ***SNE/MA - overfished and**

estuarine assemblages throughout most of their geographic range. Estuarine habitats provide spawning areas for adults, juvenile nursery habitat, and juvenile and adult foraging area. Young of the year (YOY) and juveniles reside permanently in the estuaries while adults may leave the estuary during warm summer months. While estuaries provide good habitat for spawning, predatory and competitive interactions may occur frequently in these areas due to the high number of organisms found there. 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. What this suggests is that sub-populations of winter flounder may be vulnerable to localized depletion.

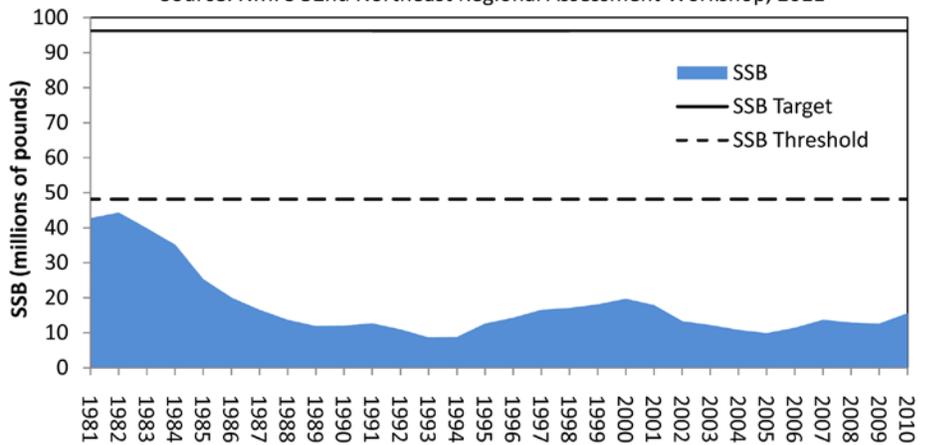
Sources of natural mortality for winter flounder include predation, parasites, disease, and competition. Predatory fish such as striped bass, bluefish, toadfish, and summer flounder, as well as birds, invertebrates, and marine mammals prey on larvae and juveniles. Atlantic cod, spiny dogfish, goosefish, and winter skate are the main predators of adult winter flounder. Little skate, smooth dogfish, hakes, sea raven, striped sea robin, striped bass, bluefish, and wrymouth also consume adult winter flounder in smaller amounts. Diet is limited by the winter flounder's small mouth size and reliance on sight to locate prey (called sight feeding). 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.

Stock Status

Winter flounder stocks were most recently assessed at the 52nd Northeast Regional Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC 52) in 2011. Consistent with previous assessments and management

Figure 1. Winter Flounder, SNE/MA Spawning Stock Biomass (SSB)

Source: NMFS 52nd Northeast Regional Assessment Workshop, 2011



Timeline of Management Actions: FMP & Addendum I (1992); Addendum II (1998); Amendment 1 (2005); Addendum I (2009)

delineations, three regional assessments were produced: Gulf of Maine (GOM), SNE/MA, and Georges Bank (GBK). The GOM stock occurs in the coastal waters north of Cape Cod, while the SNE/MA stock occurs in coastal waters south of Cape Cod. The offshore GBK stock does not fall under Commission management, and is managed solely by the Council and NMFS. The GBK stock is not overfished and not experiencing overfishing.

Gulf of Maine

Overfishing was not occurring in 2010 and the overfished status is unknown for the GOM stock. The statistical catch-age model could not account for conflicting trends in the catch and survey information, and was not accepted by the review panel who determined the outputs were not reliable enough for stock status determination. Consequently, fishing mortality (F) and spawning stock biomass (SSB) reference points could not be generated. To determine overfishing status, a proxy $F_{\text{threshold}}$ was generated and the SAW/SARC 52 concluded that overfishing was not occurring in 2010 based on the proxy $F_{\text{threshold}}$.

Similar to the 2011 SAW/SARC, the GOM assessment failed review in 2008 at the GARM III. The most recent biological reference points for the stock were generated in 2003 at the SARC 36 but it is inappropriate to compare the 2010

exploitation rate and previously generated reference point values.

Southern New England/Mid-Atlantic

In 2010, the SNE/MA stock was overfished but not experiencing overfishing. SSB was estimated to be 15.6 million pounds in 2010, about 16% of the SSB_{target} (SSB_{MSY}) of 96.3 million pounds, an improvement from 9% of SSB_{target} in 2007 (see Figure 1). Fishing mortality in 2010 was estimated to be 0.051, well below the $F_{\text{threshold}}$ (F_{MSY}) of 0.29.

Atlantic Coastal Management

The Commission and 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 have migrated to inshore state waters spawning grounds because they are easy to locate and catch when congregated for spawning.



Photo: Kevin Sullivan, New Hampshire Fish & Game

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 the range of winter flounder into 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 waters and the EEZ. Of the three winter flounder management areas, only the GOM and SNE/MA fall within state jurisdiction.

The Commission significantly reduced fishing on state waters spawning grounds in 2005 when Amendment 1 to the Interstate FMP for Inshore Stocks of Winter Flounder (Amendment 1) replaced all previous winter flounder management documents. Amendment 1 established a minimum size limit, shortened seasons, and lowered trip/bag limits to reduce fishing pressure on spawning fish and rebuild the spawning stock biomass to target levels. Amendment 1 complemented Amendment 13 and Framework 42 to the Groundfish FMP, which focused on offshore commercial fisheries (3 – 200 miles). Its goal is to rebuild overfished stocks by reducing fishing mortality and minimizing adverse effects on all essential fish habitat with seasonal closures, gear restrictions, minimum size limits, trip

limits, limited access, and days-at-sea restrictions.

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. To rebuild the depleted stock, the Commission initiated Addendum I to Amendment 1 (Addendum I), the Secretary of Commerce prohibited retention of SNE/MA winter flounder through interim action, and the Council included measures to incorporate the assessment results

into Amendment 16 to the Groundfish FMP (Amendment 16).

Rather than prohibit possession of winter flounder, resulting in increased discard mortality and loss of fishery-dependent data, the Commission opted to establish bycatch-only possession limits for the SNE/MA stock. Addendum I limits recreational fishermen to 2 fish and commercial fishermen can land a maximum of 50 pounds (or 38 fish) in the SNE/MA. For the GOM, Addendum I required states to reduce recreational fishing mortality by 11% and established a 250 pound commercial trip limit.

The Council's Amendment 16, effective May 1, 2010, prohibits retention of SNE/MA winter flounder and established an annual catch limit (ACL) for the GOM stock based on the GARM III results. While these reductions were significant, their impact pales in comparison to the establishment of groundfish sectors in Amendment 16, which reinvented federal groundfish effort control. Prior to sectors, effort was controlled by restricting the number of days a vessel was allowed to fish each year by allocating them days-at-sea. 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 state-permitted fishermen. If the state sub-ACL is exceeded, other sub-ACL component may be reduced.

The Council's Framework 47 to the Groundfish FMP, currently in the draft stage of development, will establish ACLs for the 2012-2014 fishing years (May 1 – April 30) based on the results of the SAW/SARC 52 and revise status determination criteria for groundfish stocks. Its measures are not expected to impact winter flounder regulations, however, because retention of SNE/MA winter flounder will remain prohibited, and the GOM stock was not experiencing overfishing in 2010.

Commercial & Recreational Fisheries

Historically valuable to commercial and recreational fishermen throughout New England and the Mid-Atlantic, winter flounder fisheries are a mere fraction of what they once were. Total landings (commercial and recreational) in both areas peaked in the early 1980s at approximately 10 million pounds for GOM and 36 million pounds for SNE/MA. Today, as a result of stringent regulations, landings in both areas are significantly reduced, with total landings in 2010 in GOM and SNE/MA estimated at approximately 414,000 pounds and 445,000 pounds, respectively.

Over the last decade, commercial harvest has accounted for about 90% of total fishing mortality with half of the commercial landings occurring in state waters. Additionally, the vast majority of commercial harvest (~98%) has been taken by fishermen who possess a federal groundfish permit. The majority of the recreational harvest occurs in state waters.

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, landings peaked at just over six million pounds and then declined steadily to approximately 770,000 pounds in 1999 (see Figure 2). This decline may be attributed to extended spring closures in the GOM. From 2000 to 2004, landings were around 1.5 million pounds. Landings have been below one million pounds since 2005, and reached a record low of 308,000 pounds in 2010. The commercial fishery accounted for over 90% of total harvest from 1995 to 2007, but has dropped to between 73 and 80% of total harvest over the last three years.

GOM recreational landings fluctuated between one and 3.5 million pounds in the early 1980s before declining below 200,000 pounds in 1991 and remaining between 150,000 and 200,000 pounds through 1996 (see Figure 3). From 1997 to 2007, recreational landings dropped 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. 2010 recreational landings were around 106,000 pounds.

Southern New England/Mid-Atlantic

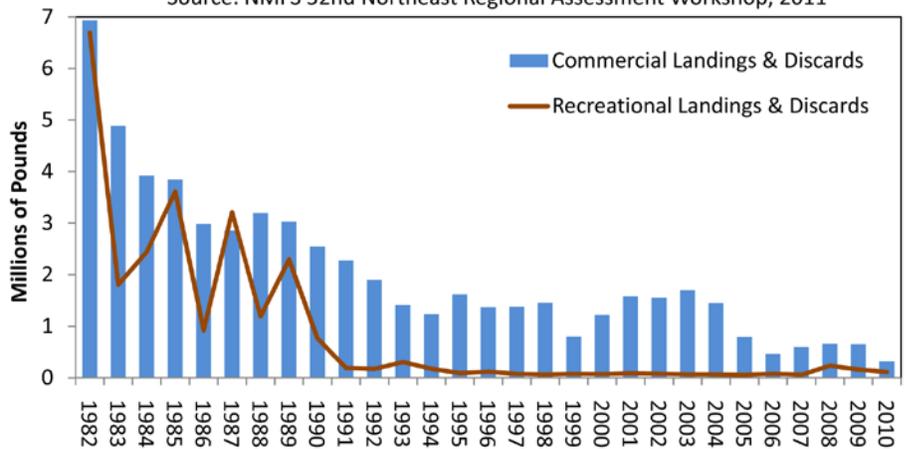
Prior to the 2009 federal waters retention prohibition, otter trawls were the primary gear type used by commercial fishermen to catch winter flounder in the SNE/MA area. Commercial landings from the SNE/MA stock averaged 18.7 million pounds from 1964 to 1972 before declining to around 10.6 million pounds throughout the mid- to late 1970s. Landings increased in the early 1980s to a record high of 24.6 million pounds and then declined to 20 year low of 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 two and three million pounds from 2004 to 2008. Time series low landings occurred in 2009 and 2010 (-597,400 and 383,600 pounds) as a result of the federal waters retention prohibition and state waters 50 pound commercial bycatch limit. The commercial fishery accounts for roughly 90% of total harvest in the SNE/MA since 1998.

Most recreational landings in the SNE/MA stock occur from January to June. They were around six million pounds in the early 1980s, increasing to 12 million pounds in 1985, and then steadily declined to between one to two 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 an historical low of ~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.

For more information, please contact Christopher Vonderweidt, Fishery Management Plan Coordinator, at 703.842.0740 or cvonderweidt@asmfc.org.

Figure 2. Winter Flounder Gulf of Maine Landings and Discards

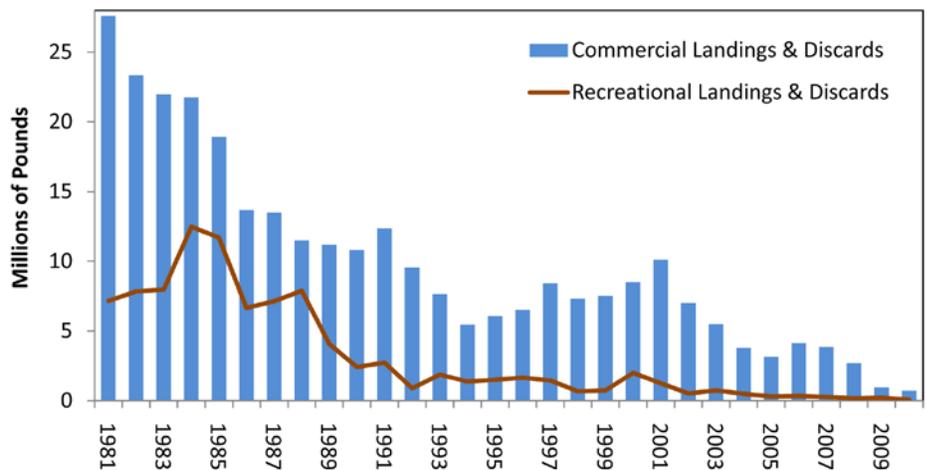
Source: NMFS 52nd Northeast Regional Assessment Workshop, 2011



Note: The 52nd Northeast Regional Workshop did not accept the analytical assessment model used to evaluate the status of the Gulf of Maine stock of winter flounder; therefore, landings are being provided as a proxy for stock status.

Figure 3. Winter Flounder SNE/MA Landings and Discards

Source: NMFS 52nd Northeast Regional Assessment Workshop, 2011



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