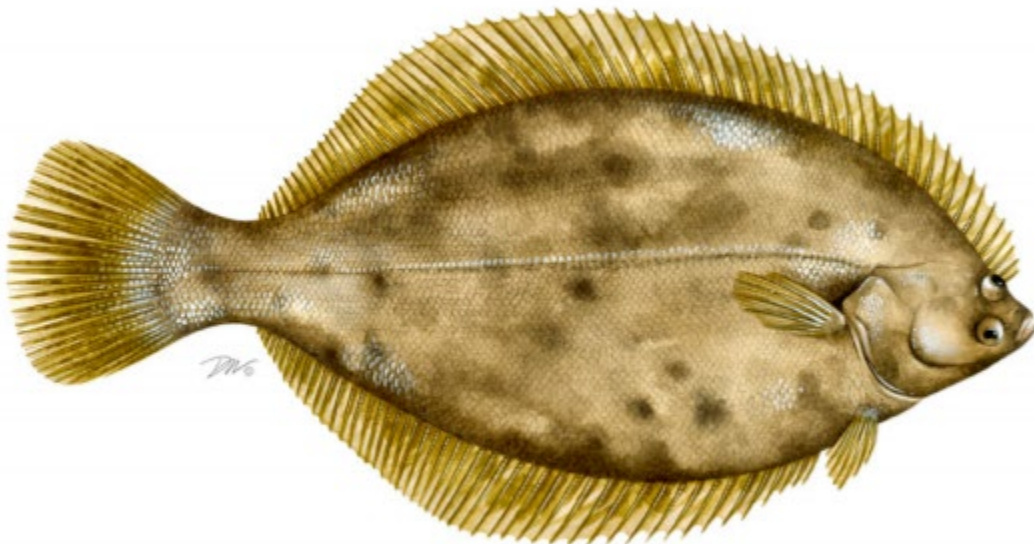


**ATLANTIC STATES MARINE FISHERIES COMMISSION**

**REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN**

**FOR WINTER FLOUNDER**  
*(Pseudopleuronectes americanus)*

**2011 FISHING YEAR**



Prepared by the Plan Review Team

Approved by the Winter Flounder Management  
Board February 2013

**Review of the Interstate Fishery Management Plan for Winter  
Flounder  
2011 Fishing Year**

## **Table of Contents**

I.	Status of Fishery Management Plan in Fishing Year 2011 .....	2
II.	Status of Stocks.....	5
III.	Status of Assessment Advice .....	6
IV.	Status of the Fishery .....	7
V.	Status of Research and Monitoring .....	8
VI.	Status of Management Measures and Issues .....	10
VII.	Implementation of FMP Compliance Requirements.....	12
VIII.	Research and Monitoring Recommendations .....	13
IX.	List of References.....	15
X.	Figures and Tables .....	16

# I. Status of Fishery Management Plan in Fishing Year 2011

<u>Date of FMP Approval</u>	Original FMP (October 1988)
<u>Amendments</u>	Amendment 1 (November 2005) <i>Completely replaced all previous management documents</i>
<u>Addenda</u>	Addendum I (May 1992) Addendum II (February 1998) Addendum I to Amendment 1 (May 2009)
<u>Management Units</u>	Atlantic States Marine Fisheries Commission: two inshore stocks in the Gulf of Maine (GOM) and Southern New England/ Mid-Atlantic (SNE-MA). New England Fisheries Management Council: one stock in offshore waters of Georges Bank (GBK)
<u>States with Declared Interest</u>	Maine New Hampshire Massachusetts Rhode Island Connecticut New York New Jersey Delaware
<u>Active Boards/Committees</u>	Winter Flounder Management Board Advisory Panel Technical Committee Plan Review Team

The Atlantic States Marine Fisheries Commission (Commission) authorized development of the first Fishery Management Plan (FMP) for Winter Flounder (*Pleuronectes americanus*) in October 1988. The purpose of the plan was to: 1) address management of inshore stocks of winter flounder; and 2) prominently consider habitat and environmental quality as factors affecting the condition of the resource. The FMP includes states from Maine through Delaware, although Delaware has been granted *de minimis* status (habitat regulations are applicable, but fishery management is not required).

The Commission manages inshore winter flounder as two stocks: the Gulf of Maine stock in waters north of Cape Cod, and the Southern New England/Mid-Atlantic stock in waters south of Cape Cod to the Delaware-Maryland border. The decision to consider only inshore stocks of winter flounder was based upon the Commission's focus on fisheries in state waters, and the differences in biological characteristics from the offshore stock in Georges Bank, which is managed by the New England Fisheries Management Council (Council). Although a large percentage of landings are presently taken from federal waters, this species migrates inshore every winter to spawn. Increased fishing mortality on spawning populations in state waters will have a direct impact on the entire GOM and SNE/MA stock complexes.

The original FMP and Addendum I called for reductions in fishing mortality on winter flounder. It allowed states the flexibility to achieve those reductions based on the life history characteristics of the particular stocks inhabiting each region. Implementation of the plan required the interaction and cooperation between state fishery management agencies, National Marine Fisheries Service, the Council, and the Commission.

Although all states submitted plans that were approved by the Winter Flounder Management Board (Board), results from a 1995 stock assessment concluded that none of the states achieved a fishing mortality rate corresponding to  $F_{30}$ . Subsequent analyses in early January 1997 indicated that fishing mortality on a coastwide basis was slightly higher than the  $F_{30}$  target for the SNE/MA stock complex. Fishing mortality in the GOM stock was presumed to be higher and the spawning stock biomass at a low level, indicating that the GOM unit might be in greater need of rebuilding than the SNE/MA unit.

In February 1998, the Board approved Addendum II to the FMP. Addendum II adjusted the implementation schedule for management measures by the participating states and called for plans to reach the target fishing mortality goal for rebuilding ( $F_{40}$ ).

### **Amendment 1 (2005)**

In May 1999, the Board acknowledged that it was necessary to update the Interstate FMP for Inshore Stocks of Winter Flounder through an amendment. The original plan and addenda did not prove successful in rebuilding inshore winter flounder populations. The FMP also needed an update to reflect the goals and objectives of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA), which was established in 1993, after the original FMP was approved. The ACFCMA governs preparation and adoption of interstate fishery management plans to provide for the conservation of coastal fishery resources, and requires states to implement and enforce FMPs. The Board further noted that an upcoming stock assessment would likely provide new information on the status of winter flounder stock complexes. After the assessment was completed in late 2002, the Commission began development of Amendment 1 in February 2003.

**Amendment 1 to the Interstate FMP for Inshore Stocks of Winter Flounder, approved in November 2005, completely replaced all previous Commission management plans for inshore stocks of winter flounder** (see Section V). It focused on joint management of winter flounder between the Commission and Council, and was designed to rebuild and maintain spawning stock biomass at or near target biomass levels. In addition, Amendment 1 prioritized

restoration and maintenance of essential winter flounder habitat. The new plan established the following goals and objectives:

#### *Goals*

- To promote stock rebuilding and management of the winter flounder fishery in a manner that is biologically, economically, socially, and ecologically sound.
- To promote rebuilding of the inshore and estuarine component of the winter flounder stock.

#### *Objectives*

- 1) Manage the fishing mortality rates for the Gulf of Maine and Southern New England/Mid-Atlantic Stocks to rebuild the stocks and provide adequate spawning potential to sustain long-term abundance of the winter flounder populations.
- 2) Manage the winter flounder stocks under an ASMFC rebuilding plan designed to rebuild and then maintain the spawning stock biomass at or near the target biomass levels and restrict fishing mortality to rates below the threshold.
- 3) Establish an interstate management program that complements the management system for federal waters.
- 4) Foster a management program for restoring and maintaining essential winter flounder habitat.
- 5) Establish research priorities that will further refine the winter flounder management program to maximize the biological, social, and economic benefits derived from the winter flounder population.
- 6) Restore the winter flounder fishery so that inshore recreational and commercial fishermen can access it throughout its historical range and at the historic age structure.

#### ***Addendum I to Amendment 1 (2009)***

Addendum I was approved in May 2009, following the 2008 GARM III stock assessment. GARM III indicated that the SNE/MA spawning stock biomass was only 9% of the target and the GOM stock was likely to be overfished and experiencing overfishing at the time. For the GOM, Addendum I required an 11% reduction in fishing mortality for the recreational sector and a 250 pound possession limit for non-federally permitted commercial fishermen (estimated 31% reduction in harvest). Recreational reductions may be achieved by using possession limits, seasons, or other measures. Commercial measures under the final interim rule were intended to achieve at least an 11% reduction in fishing mortality. For the SNE/MA stock, Addendum I established a two fish recreational bag limit with current size limits and seasons maintained and a 50-pound possession limit for non-federally permitted commercial fishermen. Both measures allow for the consistent application of management measures in state water fisheries and are intended to complement the federal interim rule which prohibits any take of SNE/MA winter flounder from offshore waters (an estimated 62% reduction in fishing mortality). The Board set bag and possession limits that are low enough to discourage directed fishing, but allow fishermen to keep their winter flounder bycatch. The two fish recreational bag limit was estimated to achieve approximately a 50% reduction in harvest, while the 50-pound commercial possession limit is estimated to achieve approximately a 65% reduction in harvest.

## II. Status of Stocks

The most recent benchmark stock assessment for all three winter flounder stocks was the 52nd Northeast Regional Stock Assessment Workshop (SAW52), which convened in Woods Hole, MA in June 2011. It included data through 2010. The Stock Assessment Review Committee (SARC) determined that the SNE/MA stock, with a scientifically sound assessment, was overfished and not experiencing overfishing in 2010. The GOM stock did not appear to have experienced overfishing in 2010; however, the overfished status remained unknown. Following a scientifically credible approach, the offshore Georges Bank (GBK) stock was found to be not overfished and not undergoing overfishing in 2010. The previous stock assessment for winter flounder was the Groundfish Assessment Review Meeting (GARM) III in 2008, which was not accepted.

### Gulf of Maine

SAW52 concluded that **GOM winter flounder was likely not experiencing overfishing, while the overfished status remained unknown.** The overfishing definition was determined by comparing the 2010 catch (195 mt) to a survey-based swept area estimate of biomass for winter flounder larger than 30 cm in length (6,341 mt). The exploitation rate was estimated to be 0.03 in 2010, which is lower than the threshold exploitation rate of 0.23. This  $F_{\text{Threshold}}$  was derived by using  $F_{40\%}$  (0.31) as a proxy for  $F_{\text{MSY}}$ .

It was not possible to estimate the stock biomass and overfished status for GOM winter flounder. Since GARM III was not accepted, the most recent biological reference points came from the SARC36 stock assessment in 2003. It was not appropriate to compare the 2010 exploitation rate and stock size estimates to these biological reference points. The 2011 stock assessment used new population models developed in ADAPT VPA, SCALE, and Age-structured Assessment Program (ASAP). These models had difficulty with the conflicting data trends within the assessment, specifically, the large decrease in catch over the time series with very little change in the indices or age structure in catch and surveys. Consequently, an analytical assessment model was not accepted, and biomass-based reference points or proxies could not be estimated.

### Southern New England/Mid-Atlantic

SAW52 determined that the **SNE/MA winter flounder stock was overfished, but not experiencing overfishing.** Biological reference points were estimated from an external stock-recruitment model and proxy BRPs are based on 40% MSY.

$SSB_{\text{Target}} = B_{\text{MSY}}$	43,661 mt	96,256,028 lbs
$SSB_{\text{Threshold}} = \frac{1}{2} SSB_{\text{MSY}}$	21,831 mt	48,129,116 lbs
MSY	11,728 mt	25,855,814 lbs
$MSY_{40\%}$	8,903 mt	19,628,000 lbs
$F_{\text{MSY}} = F_{\text{Threshold}}$	0.290	

The 2010 spawning stock biomass was estimated to be 15,599,891 lbs (7,076 mt), which equates to 16% of  $B_{\text{Target}}$  and 32% of  $B_{\text{Threshold}}$ . Fishing mortality (F) for fully recruited fish at ages 4-5 was estimated to be 0.051, or 18% of  $F_{\text{Threshold}}$ . The SARC predicted that even with a fishing mortality of 0.000 from 2012-2014, there is less than 1% chance for SSB to rebuild to  $SSB_{\text{MSY}}$  of 96.26 million pounds (43,661 mt).

The SNE/MA stock's spawning stock biomass peaked in recent history at 44.3 million lbs (20,108 mt) in 1982. Since then, SSB declined to a record low of 8.7 million lbs (3,941 mt) in 1993, but increased to 19.7 million lbs (8,941 mt) in 2000. SSB dropped again in 2005 to 9.9 million lbs (4,505 mt). That year, Amendment 1 was approved. SSB has increased to nearly 15.6 million lbs (7,076 mt) in 2010 (Figure 1).

Recruitment and low reproductive rate are key sources of vulnerability for winter flounder in the SNE/MA complex. Stock-recruit modeling suggests that warm winter temperatures can negatively impact recruitment of SNE/MA winter flounder. Since 1981, the estimated number of age-1 fish has declined from 71.6 million in the 1980 year class to a record low of 7.5 million in the 2001 year class. Estimates for the last decade have been lower than predicted, averaging at 10.6 million fish each year from 2001-2010. Recruitment for the 2009 year class was estimated to be 8.7 million (Figure 2).

### **III. Status of Assessment Advice**

The stock assessment completed at SAW52 for the SNE/MA stock complex was accepted as scientifically sound. For the GOM stock unit, however, biological reference points or proxies could not be estimated by SAW52 or the previous stock assessment at GARM III.

## IV. Status of the Fishery

### Gulf of Maine

**Commercial landings** of Gulf of Maine winter flounder have substantially declined since the early 1980s, with recent landings being roughly 5% of harvest levels in the 1980s. From 1964 through the mid-1970s, commercial landings were near 2.2 million lbs (1,000 mt). Productivity peaked at nearly 6.2 million lbs (2,793 mt) in 1982, and has steadily decreased to a record low of 308,647 lbs (140 mt) in 2010 (Figure 3).

The primary **commercial gear** used to harvest GOM winter flounder is the otter trawl. From 1964 to 1985, otter trawls accounted for an average of 95% of the landings. From 1986 to 2001, an average of 26% of landings were taken by gillnets, while otter trawl catches reduced to an average of 74% of landings. A majority of the landings, averaging 93.5% for the past three years, have been taken in Massachusetts waters (Tables 1 and 4). Although taken year-round, winter flounder are more commonly landed during the third quarter of each year for the past decade. **Commercial discards** generally made up a small percentage of the total catch, about 5%. The largest annual total amount of commercial discard was 771,617 lbs (350 mt) in 1982. Similar to the landings, discards have decreased over the time series, reaching the lowest level in 2010 with 8,818 lbs (4 mt). Discard mortality from gillnet, large mesh, and the northern shrimp fishery was estimated to be 50%.

**Recreational landings** also peaked in 1982, at 6.7 million lbs (3,024 mt). Landings have generally declined; since 1994, annual totals are typically less than 220,462 lbs (100mt) (Figure 4). **Recreational releases** make up a small portion of catch. Over the time series, about 3% of GOM winter flounder have been released by anglers. The discard mortality from recreational fishing for winter flounder was estimated to be 15%. New York and Massachusetts account for a majority of the coastwide recreational winter flounder landings (Tables 2 and 3).

### Southern New England/Mid-Atlantic

**Commercial landings** of SNE/MA winter flounder generally declined throughout the time series from 1964 to 2010, with periodic peaks and dips. After reaching a historical peak of 26.4 million pounds (11,977 mt) in 1966 and then declining through the 1970s, total U.S. commercial landings again peaked at 24.6 million pounds (11,176 mt) in 1981. After 1981, SNE/MA commercial landings declined to 4.7 million pounds (2,159 mt) in 1994 and then increased to 10.3 million pounds (4,672 mt) in 2001. Commercial landings have generally decreased since the 2001 peak, never exceeding 7 million pounds. Harvest levels fell to the lowest ever in 2010 with 383,604 pounds (174 mt) (Figure 4).

The primary **commercial gear** is the otter trawl that accounts for an average of 98% of landings since 1989. Scallop dredges, handlines, pound nets, fyke nets, and gill nets account for the remaining 2% of total landings. **Commercial discards** peaked in 1985 with 3.3 million pounds (1,534 mt). With the exception of 1997, discards from the commercial fishery have decreased to less than 408,000 pounds (185 mt) each year since 1995. Discard mortality was estimated to be 50%.



**Recreational landings** of SNE/MA winter flounder peaked in 1984 with 12.1 million pounds (5,510 mt) and substantially declined until reaching an all-time low of 61,729 pounds (28 mt) in 2010 (Figure 4). The principal mode of fishing is private/rental boats, with most recreational landings occurring during January to June. **Discard** from the recreational fishery peaked in 1985 with 507,063 pounds (230 mt), or 718,000 fish. Since 2000, discards have been below 44,000 pounds (20 mt), or less than 100,000 fish. A discard mortality rate of 15% was applied to live discard estimates.

## V. Status of Research and Monitoring

Under Amendment 1 to the Interstate Fishery Management Plan for Winter Flounder, Massachusetts, Rhode Island, New York, and Delaware are required to continue annual surveys of juvenile recruitment to develop an annual juvenile abundance index. Massachusetts, Rhode Island, Connecticut, and New Jersey are required to continue annual surveys to develop an index of spawning stock biomass. These states have conducted the appropriate surveys to meet the research and monitoring needs as required by Amendment 1 (Table 4). State research and monitoring programs are summarized below.

### Maine

The MEDMR conducts spring and fall bottom trawl surveys in cooperation with the New Hampshire Fish and Game Division. The Maine-New Hampshire (MENH) Inshore Trawl Survey collects length, weight, maturity stage, and age samples for winter flounder.

Maine does not conduct fishery-dependent monitoring for winter flounder, but monitors the recreational fishery via MRIP and commercial fishery via NMFS commercial landings data.

### New Hampshire

The New Hampshire Fish and Game Department (NHFG) conducts an annual seine survey of juvenile fish in its estuaries from June through November. The survey produces an index of relative abundance for each species encountered using a geometric mean catch per seine haul. The index value (0.20) is a slight increase from 2010 and the second lowest value in the time series (presented below) for winter flounder, but the index has been highly variable. In addition, NHFG has worked with Maine Department of Marine Resources (MEDMR) since the fall of 2000 to conduct an inshore trawl survey off of Maine and New Hampshire. Winter flounder are regularly caught in this survey.

NHFG monitors the recreational fishery via MRIP and the commercial fishery via NMFS commercial landings data.

## **Massachusetts**

The Massachusetts Division of Marine Fisheries (MADMF) completed spring and fall bottom trawl surveys covering its state waters through 2012. It also completed its annual young of the year (YOY) winter flounder survey in June 2012 to provide an index for recruitment of the SNE/MA stock.

MADMF monitors the recreational fishery via MRIP. Commercial vessels without federal permits for groundfish are required to report all landings at trip level.

## **Rhode Island**

Except for the ichthyoplankton survey, which was discontinued in July of 2008, Rhode Island's Division of Fish & Wildlife continued four ongoing studies to monitor juvenile and adult winter flounder in its state waters. The trawl survey has been undergoing a calibration study since 2011, after new doors were purchased for the RIDFW trawl. The Narragansett Bay Juvenile Finfish Survey, which proceeded without any changes in protocol from previous years, sampled 18 stations once a month from June through October. The coastal pond survey added 7 permanent stations for a total of 24 stations in 8 coastal ponds. The new stations provide more comprehensive coverage of the RI south coast. The original survey protocols are still in place. During 2011, RIDFW partnered with staff from the EPA Atlantic Ecology Division in Narragansett, RI to sample an additional pond, Charlestown Pond. Winter flounder were collected and tagged with fyke nets of similar dimensions to those used in Point Judith Pond. Sampling took place concurrently with the sampling in Point Judith Pond.

RIDWF monitors the recreational fishery via MRIP and the commercial fishery is monitored via NOAA Fisheries port sampling program.

## **Connecticut**

Winter flounder have been monitored through the Long Island Sound Trawl Survey since 1984. Spring (April, May, and June) and Fall surveys (September and October) are conducted each year. The overall spring index for winter flounder (April-June) for 2011 was 16.68 fish/tow (geometric mean). This makes the spring index for 2011 the thirteenth consecutive annual index below the time series average of 57.67 fish/tow. The lowest value in the 26-year time-series was the 2006 spring index of 7.50 fish/tow. The April-May index used to develop abundance indices at age was 27.95 fish/tow while the average for the time series was 69.03 fish/tow.

Connecticut DEEP monitors the recreational fishery via MRIP and the commercial fishery is monitored via NOAA Fisheries port sampling program.

## **New York**

The NYSDEC has been conducting a small mesh trawl survey targeting juvenile finfish since 1985. The survey runs from May through October in Peconic Bay. Using a small mesh sixteen foot semi-balloon shrimp trawl, a total of 136 randomly chosen stations were sampled during June and July 2011 (time series average = 139 tows). Environmental data - (temperature,

salinity, dissolved oxygen) was recorded at each station at both the surface and bottom. In addition, turbidity and the depth were also recorded at each station sampled. A total of 659 winter flounder were caught in June and July of 2011, up from the survey's low in 2002 when only 83 winter flounder were captured, but considerably lower than the survey max (25,782) in 1992 and the survey average of 3,541 fish. The lengths ranged from a minimum of 25 mm to a maximum of 304 mm for 2011 and the length-frequency distribution indicates several year classes are present in the bay at the time of sampling. The winter flounder catch per tow (CPUE, expressed as an arithmetic mean) in June & July 2011 was 4.8, down slightly from 5.0 in 2010.

New York does not conduct fishery-dependent monitoring.

### **New Jersey**

The Bureau of Marine Fisheries has conducted an Ocean Trawl program in nearshore ocean waters since 1988. Winter flounder are most abundant during April, and data from this cruise have been used to develop an index of abundance for winter flounder in New Jersey waters. For each tow, information is collected on total number, total weight, and individual lengths. Catch per tow (numbers) in 2011 was 8.67, approximately 50% lower than the time series average of 17.42. Biomass in 2011 was 4.91 kg/tow, approximately 13% lower than the time series average of 5.64. Beginning in 1993 for the Ocean Trawl survey and in 1995 for the Spawning Survey, scales or otoliths have been collected in order to develop annual age-length keys and catch at age estimates.

New Jersey does not conduct fishery-dependent monitoring.

### **Delaware**

Delaware was approved for *de minimis* status for 2011 and does not conduct biological monitoring of winter flounder. Amendment 1 provides that states that are granted *de minimis* status are exempted from biological monitoring/sub-sampling activities for the sector for which *de minimis* has been granted.

## **VI. Status of Management Measures and Issues**

### **Amendment 1**

Winter flounder is managed under Amendment I to the Interstate Fishery Management Plan for Inshore Stocks of Winter Flounder, implemented in November 2005 to completely replace all previous management plans for winter flounder in state waters. Amendment I required a minimum size limit of 12 inches for commercial and recreational fisheries for both GOM and SNE/MA stock units. Recreational creel limits were ten (10) fish in the SNE/MA stock area and eight (8) fish in the GOM. There are no required closed recreational seasons in the GOM, while there must be a closed season of 20 days during March and April in SNE/MA. The 60-day open season for recreational winter flounder fishing can be split into no more than 2

blocks. States must implement a minimum size of 6.5 inches square or diamond mesh for the cod-end in both GOM and SNE/MA inshore waters. Additionally, a 100-pound trip limit is required if smaller mesh is being used in the SNE/MA. This “mesh trigger” is intended for the landing of a small amount of winter flounder as bycatch in small-mesh fisheries.

### **Addendum I to Amendment 1**

Implemented in June 2009, Addendum I aimed to reduce fishing mortality and rebuild the GOM and SNE/MA stocks. This addendum does not rescind the management required by Amendment 1, and states are required to continue implementing all measures in Addendum I and Amendment 1. These regulations only applied to non-federally permitted vessels that fish for winter flounder in state waters.

***Gulf of Maine:*** For the GOM commercial fishery, the maximum possession limit is 250 pounds per vessel. This limit was estimated to reduce 2006-2007 harvest levels by 31% for state water fishing vessels. For the GOM recreational fishery, Addendum I required states to implement regulations to reduce fishing mortality by 11% from the average of 2006-2007 levels. This 11% reduction was estimated to reach  $F_{MSY}$ . States were allowed to achieve reductions through possession limits, seasons, or a combination of both, and also had the option to submit conservation equivalency proposals to achieve the necessary reductions through alternative management measures, subject to approval by the Board.

***Southern New England/ Mid-Atlantic:*** Addendum I’s management measures were designed to reach the lowest F rate possible with minimal economic and social impacts and dead discards, and to prevent an influx of effort into state waters. Non-federally permitted commercial vessels may possess a maximum of 50 pounds of winter flounder. This level was estimated to reduce harvest by 65%, and was intended solely to allow for bycatch. Recreational fishermen may possess a maximum of two (2) winter flounder from inshore waters of the SNE/MA stock area. All winter flounder must be at least 12 inches in length (Section 4.1 of Amendment 1). This bag limit was estimated to reduce harvest by 46%.

***De Minimis:*** Amendment I allowed a state to be granted *de minimis* status if their fishery constitutes less than 1% of the coastwide commercial or recreational landings for the preceding three years for which data are available. A state that qualifies for *de minimis* status based on their commercial landings will qualify for exemptions in the commercial fishery only, and a state that qualifies for *de minimis* based on their recreational landings will qualify for exemptions in their recreational fishery only. States that apply for and are granted *de minimis* status are exempted from biological monitoring/sub-sampling activities for the sector for which *de minimis* has been granted.

### **Northeast Multispecies Fishery; Gulf of Maine Winter Flounder Catch Limit Revisions**

NOAA Fisheries doubled the catch limit for GOM flounder for the remainder of the 2011 fishing year, which ended April 30, 2012. This emergency action<sup>1</sup>, which raised the state waters sub-component from 132,277 pounds (60 mt) to 359,353 pounds (163 mt), would

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<sup>1</sup> Federal Register 50 CFR Part 648

eventually be increased again for the 2012 fishing year and lead to the development of Addendum II to Amendment 1 in late 2012.

## **VII. Implementation of FMP Compliance Requirements**

### **State Compliance**

All of the states with a declared interest in the management of winter flounder have commercial and recreational regulations in place that are compliant with ASMFC regulations (Tables 6 and 7).

### **De minimis Status**

Delaware was the only state that requested *de minimis* status. Harvest levels averaged less than 1% of coastwide landings of winter flounder in both the commercial and recreational fishery for the last three years (2009-2011). It is the recommendation of the PRT to grant Delaware *de minimis* status for their recreational and commercial fisheries (Tables 1 - 5).

## **VIII. Research and Monitoring Recommendations**

SAW52 produced new research recommendations based upon reviewed assessments and review panel reports for 2011 SAW52, 2008 GARM III, 2002 SARC 36, and prior assessments.

### **Coastwide (from 2008 GARM III)**

1. Assessment approaches needs to be explored that consider all three Winter Flounder stocks as a stock complex within which there is significant interaction amongst the individual stock components. The Panel also had concerns about the unit stock, not only for this stock, but for all of the Winter Flounder stocks assessed. It recommended an analysis of Winter Flounder as a stock complex, rather than as individual stocks, be undertaken.

### **Southern New England - Mid-Atlantic**

- 1) Update and investigate migration rates between stock and movement patterns. The most recent comprehensive tagging study was completed in the 1960s (Howe and Coates), and a new large scale effort is warranted. Further investigate localized structure/genetics within the stocks.
- 2) Investigate the feasibility of port samplers collecting otoliths from large and lemon sole instead of scales because of problems under-ageing larger fish.
- 3) Investigate use of periodic gonad histology studies as a check to make ensure maturity estimates are accurate, with particular attention to obtaining sufficient samples from the Georges Bank stock. Explore options to conduct periodic maturity staging workshops involving State and NEFSC trawl survey staff.
- 4) Investigate the skipped spawning percentage for each stock, and estimate interannual variation when sufficient data have been collected.
- 5) Investigate ways to improve compliance to help VTR reporting. Currently about 300 of the 1,500 permitted vessels consistently under-report the number of statistical area fished.
- 6) Encourage support for Industry Based Surveys, which can provide valuable information on stock abundance, distribution, and catchability in research surveys that is independent of and supplemental to NMFS efforts.
- 7) Explore use of a more complex Stock Synthesis model with small rates of migration between stocks.
- 8) Develop time series of winter flounder consumption by the major fish predators of winter flounder.
- 9) Conduct studies to better understand recruitment processes of winter flounder, particularly in the GOM and on GBK.
- 10) Revise the NEFSC assessment software to include the ability to model S-R functions including environmental factors with errors/probabilities.

- 11) Further explore the relationship between large scale environmental forcing (e.g., temperature, circulation, and climate) for effects on life history, reproduction, and recruitment in the Georges Bank stock.
- 12) Explore development of an index of winter flounder larval abundance based on MARMAP, GLOBEC, etc., time series.

### **Gulf of Maine**

- 1) Update and investigate migration rates between stock and movement patterns. The most recent comprehensive tagging study was completed in the 1960s (Howe and Coates), and a new large scale effort is warranted. Further investigate localized structure/genetics within the stocks.
- 2) Investigate the feasibility of port samplers collecting otoliths from large and lemon sole instead of scales because of problems under-ageing larger fish.
- 3) Investigate use of periodic gonad histology studies as a check to make ensure maturity estimates are accurate, with particular attention to obtaining sufficient samples from the Georges Bank stock.
- 4) Investigate the skipped spawning percentage for each stock, and estimate interannual variation when sufficient data have been collected.
- 5) Investigate ways to improve compliance to help VTR reporting. Currently about 300 of the 1,500 permitted vessels consistently under-report the number of statistical area fished.
- 6) Encourage support for Industry Based Surveys, which can provide valuable information on stock abundance, distribution, and catchability in research surveys that is independent of and supplemental to NMFS efforts.
- 7) Explore use of a more complex Stock Synthesis model with small rates of migration between stocks.
- 8) Develop time series of winter flounder consumption by the major fish predators of winter flounder.
- 9) Conduct studies to better understand recruitment processes of winter flounder, particularly in the GOM and on GBK.
- 10) Revise the NEFSC assessment software to include the ability to model S-R functions including environmental factors with errors/probabilities.
- 11) Further explore the relationship between large scale environmental forcing (e.g., temperature, circulation, climate) for effects on life history, reproduction, and recruitment in the Georges Bank stock.
- 12) Explore development of an index of winter flounder larval abundance based on MARMAP, GLOBEC, etc. time series.

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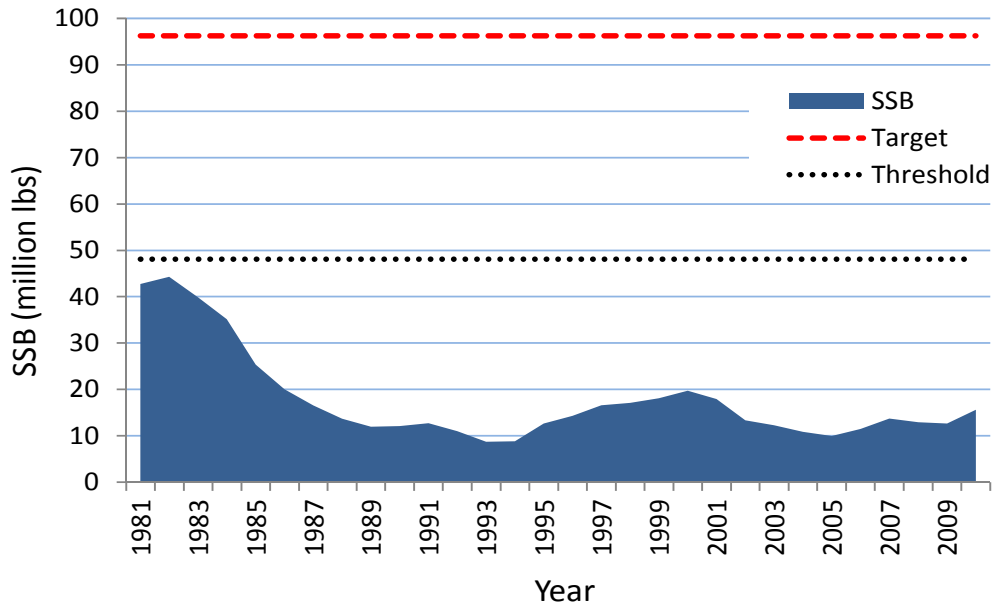
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## X. Figures and Tables

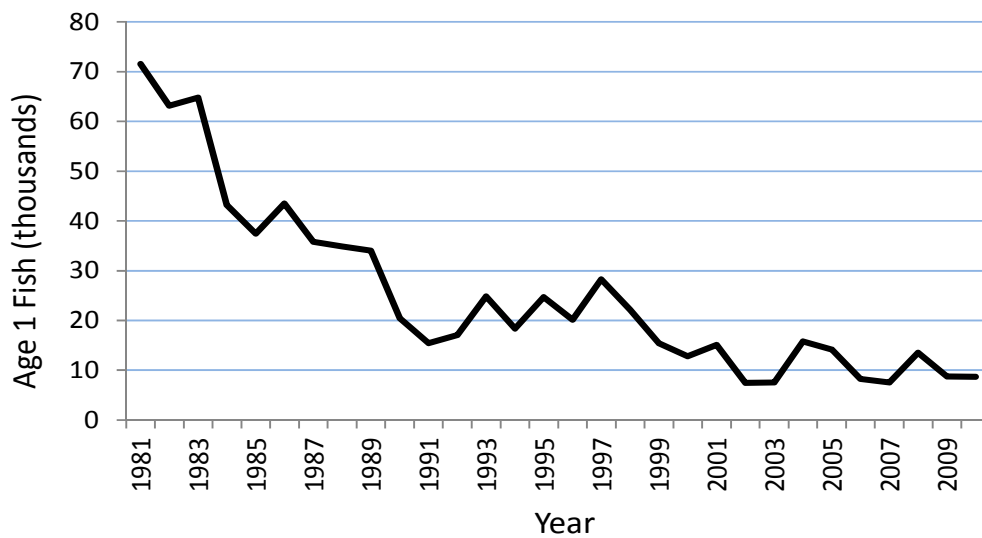
**Figure 1. Southern New England/ Mid-Atlantic winter flounder spawning stock biomass and biological reference points.**

Data Source: SAW52 (2011)



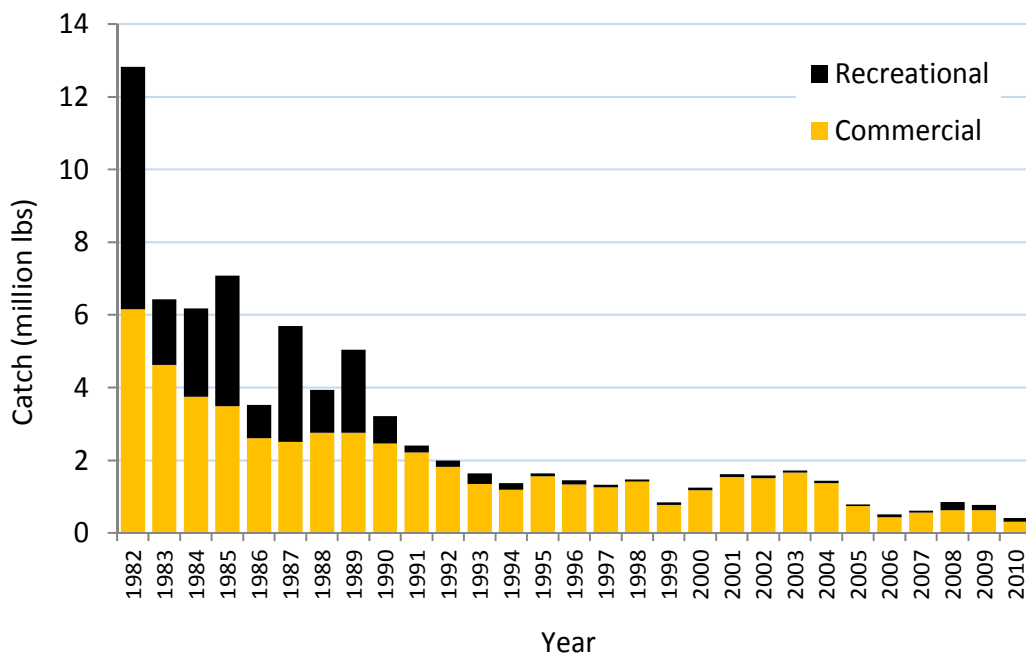
**Figure 2. Southern New England/ Mid-Atlantic winter flounder recruitment.**

Data Source: SAW52 (2011)



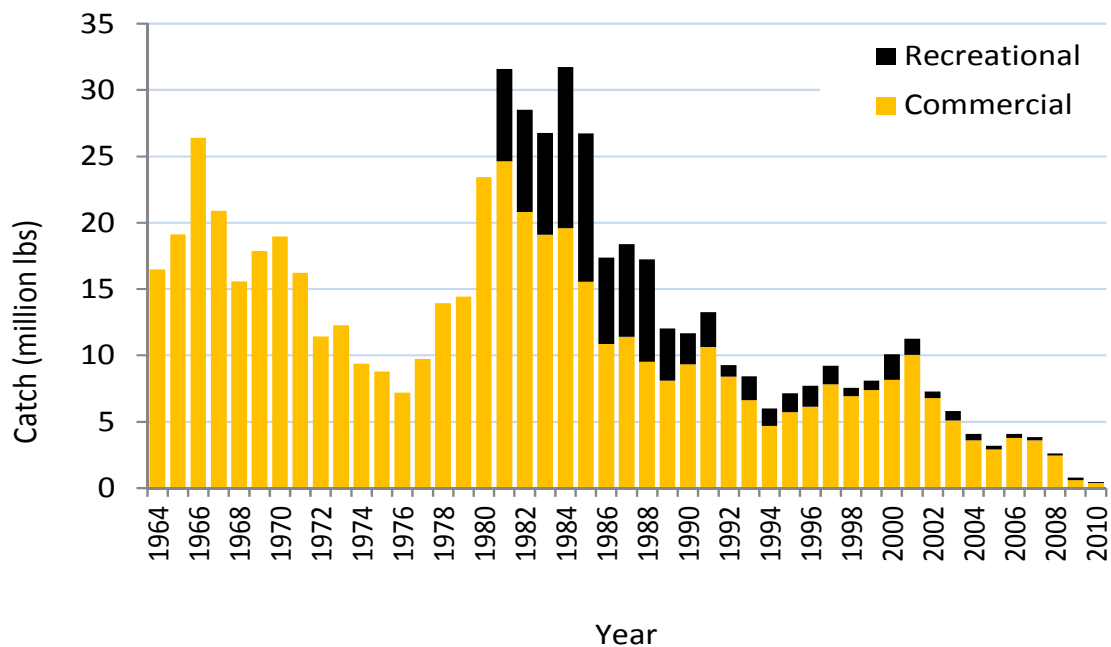
**Figure 3. Gulf of Maine winter flounder commercial and recreational landings.**

Data Source: SAW52 (2011)



**Figure 4. Southern New England/Mid-Atlantic winter flounder commercial and recreational landings. Recreational time series began in 1981.**

Data Source: SAW52 (2011)



**Table 1. Winter flounder commercial landings and percentage by state from 2009-2011.**

Source: Personal communication from the NMFS Fisheries Statistics Division, Silver Spring, MD

State	2009		2010		2011	
	Pounds	%	Pounds	%	Pounds	%
Massachusetts	4,350,100	89.3	3,341,962	95.5	4,474,275	95.6
Rhode Island	330,404	6.8	76,413	2.2	84,759	1.8
New York	92,578	1.9	17,421	0.5	11,952	0.3
New Jersey	58,146	1.2	6,938	0.2	6,051	0.1
Connecticut	28,407	0.5	6,075	0.2	7,175	0.2
New Hampshire	10,221	0.2	3,245	0.1	5,189	0.1
Maine	<i>Confidential: please see three-year averages</i>					
Delaware	0	0.0	0	0.0	0	0.0
<b>Annual Total</b>	<b>4,872,718</b>		<b>3,498,577</b>		<b>4,683,577</b>	

**Table 2. Recreational harvest (A + B1 + B2) by weight (pounds) by state 2009-2011.**

Source: Personal communication from the NMFS Fisheries Statistics Division, Silver Spring, MD

State	2009		2010		2011	
	Pounds	%	Pounds	%	Pounds	%
New York	121,704	42.23	40,095	20.19	66,012	31.54
Massachusetts	121,752	42.25	86,220	43.42	66,728	31.88
Connecticut	17,897	6.21	20,196	10.17	25,449	12.16
New Hampshire	12,215	4.24	1,930	0.97	17,385	8.31
New Jersey	9,380	3.25	48,481	24.42	33,744	16.12
Rhode Island	5,226	1.81	1,640	0.83	0	0.00
Maine	NA		NA		NA	
Delaware	0	0.00	0	0.00	0	0.00
<b>Annual Total</b>	<b>288,174</b>		<b>198,562</b>		<b>209,318</b>	

**Table 3. Recreational harvest (A + B1 + B2) in numbers of fish by state 2009-2011.**

Source: Personal communication from the NMFS Fisheries Statistics Division, Silver Spring, MD

State	2009		2010		2011	
	Number of Fish	%	Number of Fish	%	Number of Fish	%
New York	178,808	41.86	94,223	27.12	165,650	43.82
Massachusetts	171,195	40.07	153,949	44.32	126,674	33.51
New Jersey	33,978	7.95	62,897	18.11	52,346	13.85
Connecticut	18,368	4.30	26,310	7.57	19,761	5.23
New Hampshire	14,421	3.38	6,637	1.91	13,551	3.58
Rhode Island	5,221	1.22	2,551	0.73	29*	0.01
Maine	4,675	1.09	NA		NA	
Delaware	536	0.13	810	0.23	0	0.00
<b>Annual Total</b>	<b>427,202</b>		<b>347,377</b>		<b>378,011</b>	

\* There was a high PSE in 2011, likely due to low number of trips intercepted.

**Table 4. Three-year average commercial landings by state from 2009-2011.**

Source: Personal communication from the NMFS Fisheries Statistics Division, Silver Spring, MD

State	3-Year Averages from 2009-2011	
	Pounds	%
Massachusetts	4,055,446	93.5
Rhode Island	163,859	3.6
New York	40,650	0.9
New Jersey	23,712	0.5
Connecticut	13,886	0.3
New Hampshire	6,218	0.1
Maine	1,204	0.0
Delaware	0	0.0

**Table 5. Three-year average recreational harvest by state from 2009-2011.**

Source: Personal communication from the NMFS Fisheries Statistics Division, Silver Spring, MD

State	3-Year Averages from 2009-2011			
	Pounds	%	Number of Fish	%
New York	146,227	37.6	75,937	31.3
Massachusetts	150,606	39.3	91,567	39.2
New Jersey	49,740	13.3	30,535	14.6
Connecticut	21,480	5.7	21,181	9.5
New Hampshire	11,536	3.0	10,510	4.5
Rhode Island	2,600	0.7	2,289	0.9
Delaware	449	0.0	0	0.0
Maine	NA		NA	

**Table 6. State-by-state compliance with ASMFC winter flounder commercial regulations**

State	Stock Unit	Size Limit	Trip Limit	Seasonal Closure (dates inclusive)	Recruitment Assessment	SSB Assessment	Min. Mesh Size	<i>De minimis Request</i>
Maine	GOM	12"	250 lbs	May 1 – June 30	N/A	N/A	6.5"	No
New Hampshire	GOM	12"	250 lbs	April 1 – June 30	N/A	N/A	6.5"	No
Massachusetts	GOM	12"	250 lbs	Open all year	YOY Seine Survey (June)	Bottom Trawl Survey (May, Sept)	6.5"	No
	SNE/MA	12"	50 lbs	Open all year	YOY Seine Survey (June)	Bottom Trawl Survey (May, Sept)	6.5"	No
Rhode Island	SNE/MA	12"	50 lbs	Open all year	Narragansett Bay Juvenile Finfish Survey	Trawl Surveys	6.5"	No
Connecticut	SNE/MA	12"	50 lbs or 38 fish	March 1 – April 14	N/A	Long Island Sound Trawl Survey	6.5"	No
New York	SNE/MA	12"	50 lbs	June 14 – Nov 30	Small Mesh Trawl Survey, Seine Survey	N/A	6.5"	No
New Jersey	SNE/MA	12"	38 fish	June 1 – Nov 30. Fyke net closed Feb 20 – Oct 31	N/A	Ocean Trawl Survey	6.5"	No
Delaware	SNE/MA	12"	50 lbs	N/A	Juvenile Trawl Survey	N/A	Trawling prohibited	YES, Recommended

**Table 7. State-by-state compliance with ASMFC winter flounder recreational regulations**

<b>State</b>	<b>Stock Unit</b>	<b>Creel Limit</b>	<b>Size Limit</b>	<b>Seasonal Closure (dates inclusive)</b>	<b>Qualifies for <i>de minimus</i>?</b>	<b><i>De Minimis Request?</i></b>
<b>Maine</b>	GOM	8	12"	October 1 – June 30	Yes	No
<b>New Hampshire</b>	GOM	8	12"	May 15 – May 24	No	No
<b>Massachusetts</b>	GOM	8	12"	September 1 – October 31 February 1 – May 31 (spawning closure)	No	No
	SNE/MA	2	12"	OPEN from 4 <sup>th</sup> Saturday in April and Sept., to remain open for 30 consecutive days	No	No
<b>Rhode Island</b>	SNE/MA	2	12"	OPEN from 4 <sup>th</sup> Saturday in April and last Saturday in Sept., to remain open for 30 consecutive days	No	No
<b>Connecticut</b>	SNE/MA	2	12"	May 31 – March 31	No	No
<b>New York</b>	SNE/MA	2	12"	May 31 – March 31	No	No
<b>New Jersey</b>	SNE/MA	2	12"	May 22 – March 22	No	No
<b>Delaware</b>	SNE/MA	2	12"	April 11 – Feb 10	Yes	YES, Recommended