Gulf of Maine Winter Flounder

2015 Assessment Update Report

This assessment of the Gulf of Maine Winter Flounder (Pseudopleuronectes americanus) stock is an operational update of the existing 2014 operational update area-swept assessment (NEFSC 2014). Based on the previous assessment the biomass status is unknown but overfishing was not occurring. This assessment updates commercial and recreational fishery catch data, research survey indices of abundance, and the area-swept estimates of 30+ cm biomass based on the fall NEFSC, MDMF, and MENH surveys.

State of Stock: Based on this updated assessment, the Gulf of Maine Winter Flounder (*Pseudopleuronectes americanus*) stock biomass status is unknown and overfishing is not occurring (Figures 1-2). Biomass (30+ cm mt) in 2014 was estimated to be 4,655 mt (Figure 1). The 2014 30+ cm exploitation rate was estimated to be 0.06 which is 26% of the overfishing exploitation threshold proxy (E_{MSY} *proxy* = 0.23; Figure 2).

Table 1: Catch and status table for Gulf of Maine Winter Flounder. All weights are in (mt) and E_{Full} is the exploitation rate on 30+ cm fish. Biomass is estimated from survey area-swept for non-overlaping strata from three different fall surveys (MENH, MDMF, NEFSC) using a q=0.6 assumption on the wing spread.

	2009	2010	2011	2012	2013	2014
Data						
Recreational discards	4	3	4	1	1	2
Recreational landings	60	40	38	22	29	55
Commercial discards	12	6	4	10	6	5
Commercial landings	283	139	173	348	218	213
Catch for Assessment	359	187	219	381	254	275
Model Results						
30+ cm Biomass	7,612	6,341	6,666	3,337	2,932	4,655
E_{Full}	0.05	0.03	0.03	0.11	0.09	0.06

Table 2: Comparison of reference points estimated in an earlier assessment and from the current assessment update. An $E_{40\%}$ exploitation rate proxy was used for the overfishing threshold and was based on a length based yield per recruit model from the 2011 SARC 52 benchmark assessment.

	2014	Current
E_{MSY} *proxy*	0.23	0.23
B_{MSY}	Unkown	Unkown
MSY (mt)	Unkown	Unkown
Overfishing	No	No
Overfished	Unknown	Unknown

Projections: Projections are not possible with area-swept based assessments. Catch advice was

based on 75% of $E_{40\%}$ (75% E_{MSY} proxy) using the fall area-swept estimate assuming q=0.6 on the wing spread. Updated 2014 fall 30+ cm area-swept biomass (4,655 mt) implies an OFL of 1,080 mt based on the E_{MSY} proxy and a catch of 810 mt for 75% of the E_{MSY} proxy.

Special Comments:

- What are the most important sources of uncertainty in this stock assessment? Explain, and describe qualitatively how they affect the assessment results (such as estimates of biomass, F, recruitment, and population projections).

  The largest source of uncertainty with the direct estimates of stock biomass from survey area-swept estimates originate from the assumption of survey gear catchability (q). Biomass and exploitation rate estimates are sensitive to the survey q assumption (0.6 on wing spread). The 2014 empirical benchmark assessement of Georges bank yellowtail flounder based the area-swept q assumption on an average value taken from the literature for west coast flatfish (0.37 on door spread). The yellowtail q assumption corresponds to a value close to 1 on the wing spread which would result in a lower estimate of biomass (2,995 mt). Another major source of uncertainty with this method is that biomass based reference points cannot be determined and overfished status is unknown.

- Does this assessment model have a retrospective pattern? If so, is the pattern strong, moderate, or mild?

  An analytical stock assessment model does not exist for Gulf of Maine Winter Flounder. An analytical model was no longer used for stock status determination at SARC 52 (2011) due to concerns with a strong retrospective pattern. Models have difficulty with the apparent lack of a relationship between a large decrease in the catch with little change in the indices and age and/or size structure over time.

- Based on this stock assessment, are population projections well determined or uncertain?

  Population projections for Gulf of Maine Winter Flounder, do not exist for area-swept assessments. Catch advice from area-swept estimates tend to vary with interannual variability in the surveys.

- Describe any changes that were made to the current stock assessment, beyond incorporating additional years of data and the affect these changes had on the assessment and stock status.

  No changes, other than the incorporation of new data were made to the Gulf of Maine Winter Flounder assessment for this update. However, stabilizing the catch advice may be desired and could be obtained through the averaging of the area-swept fall and spring survey estimates.

- If the stock status has changed a lot since the previous assessment, explain why this occurred.

  The overfishing status of Gulf of Maine Winter Flounder has not changed.

- Indicate what data or studies are currently lacking and which would be needed most to improve this stock assessment in the future.

  Direct area-swept assessment could be improved with additional studies on survey gear efficiency. Quantifying the degree of herding between the doors and escapement under the footrope and/or above the headrope for each survey is needed since area-swept biomass estimates and catch advice are sensitive to the assumed catchability.

- Are there other important issues?

  The general lack of a response in survey indices and age/size structure is the primary source of concern with catches remaining far below the overfishing level.

References:

Hendrickson L, Nitschke P, Linton B. 2015. 2014 Operational Stock Assessments for Georges Bank winter flounder, Gulf of Maine winter flounder, and pollock. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 15-01; 228 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/

Northeast Fisheries Science Center. 2011. 52nd Northeast Regional Stock AssessmentWorkshop (52nd SAW) Assessment Report. US Dept Commer, Northeast Fish SciCent Ref Doc. 11-17; 962 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/
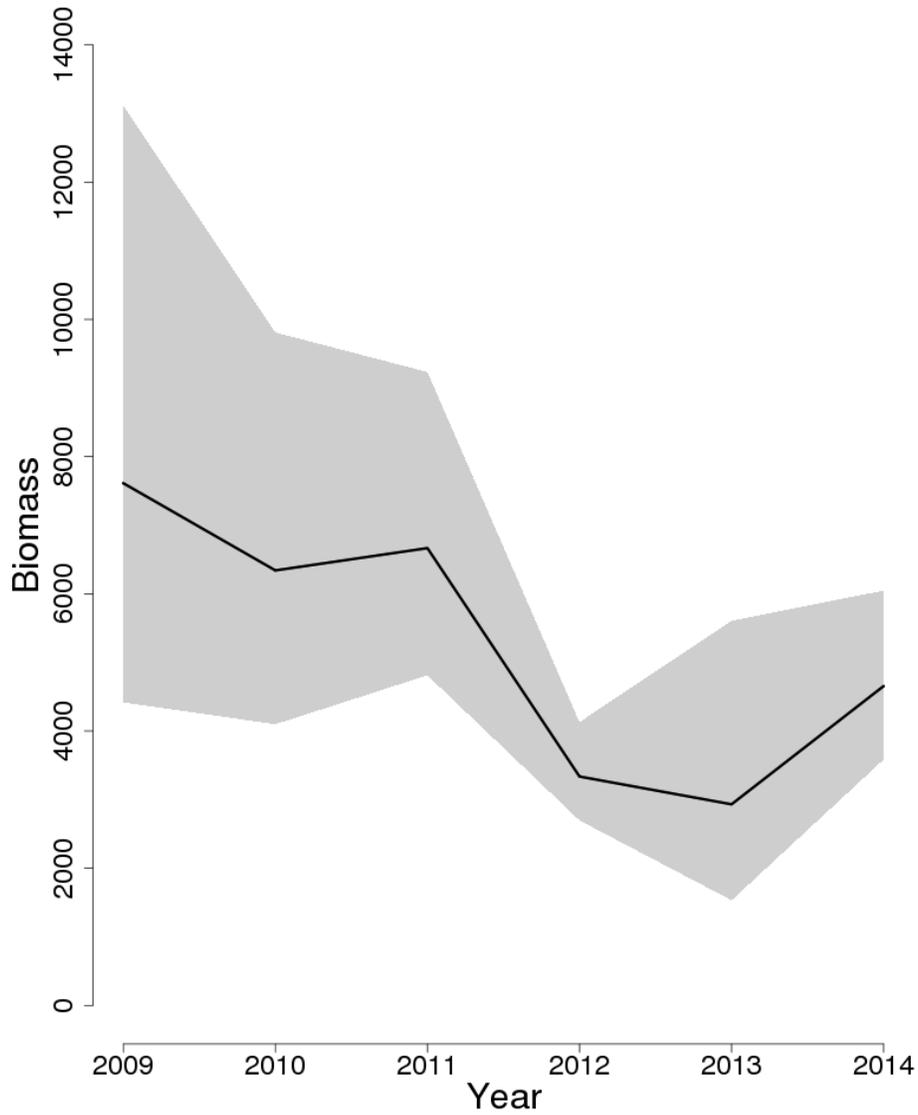
Figure 1: Trends in 30+ cm area-swept biomass of Gulf of Maine Winter Flounder between 2009 and 2014 from the current assessment based on the fall (MENH, MDMF, NEFSC) surveys. The approximate 90% lognormal confidence intervals are shown.
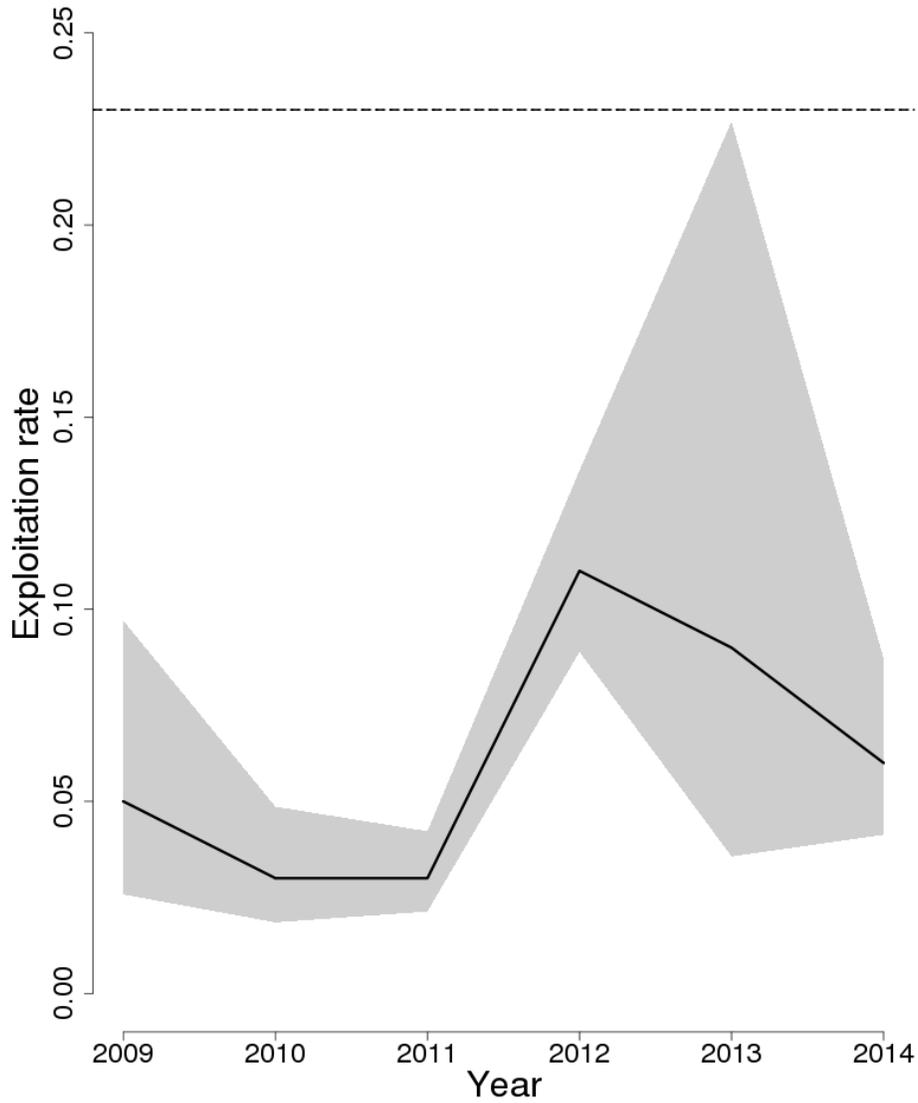
Figure 2: Trends in the exploitation rates (E_{Full}) of Gulf of Maine Winter Flounder between 2009 and 2014 from the current assessment and the corresponding $F_{Threshold}$ (E_{MSY} *proxy*=0.23; horizontal dashed line). The approximate 90% lognormal confidence intervals are shown.
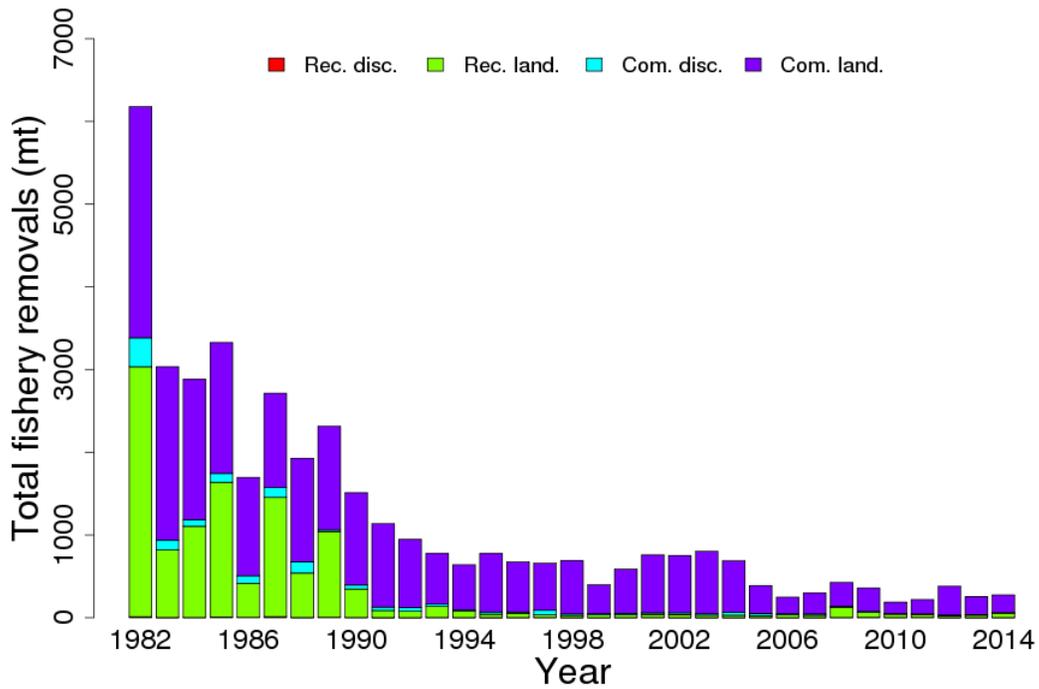
Figure 3: Total catch of Gulf of Maine Winter Flounder between 2009 and 2014 by fleet (commercial and recreational) and disposition (landings and discards). A 15% mortality rate is assumed on recreational discards and a 50% mortality rate on commercial discards.
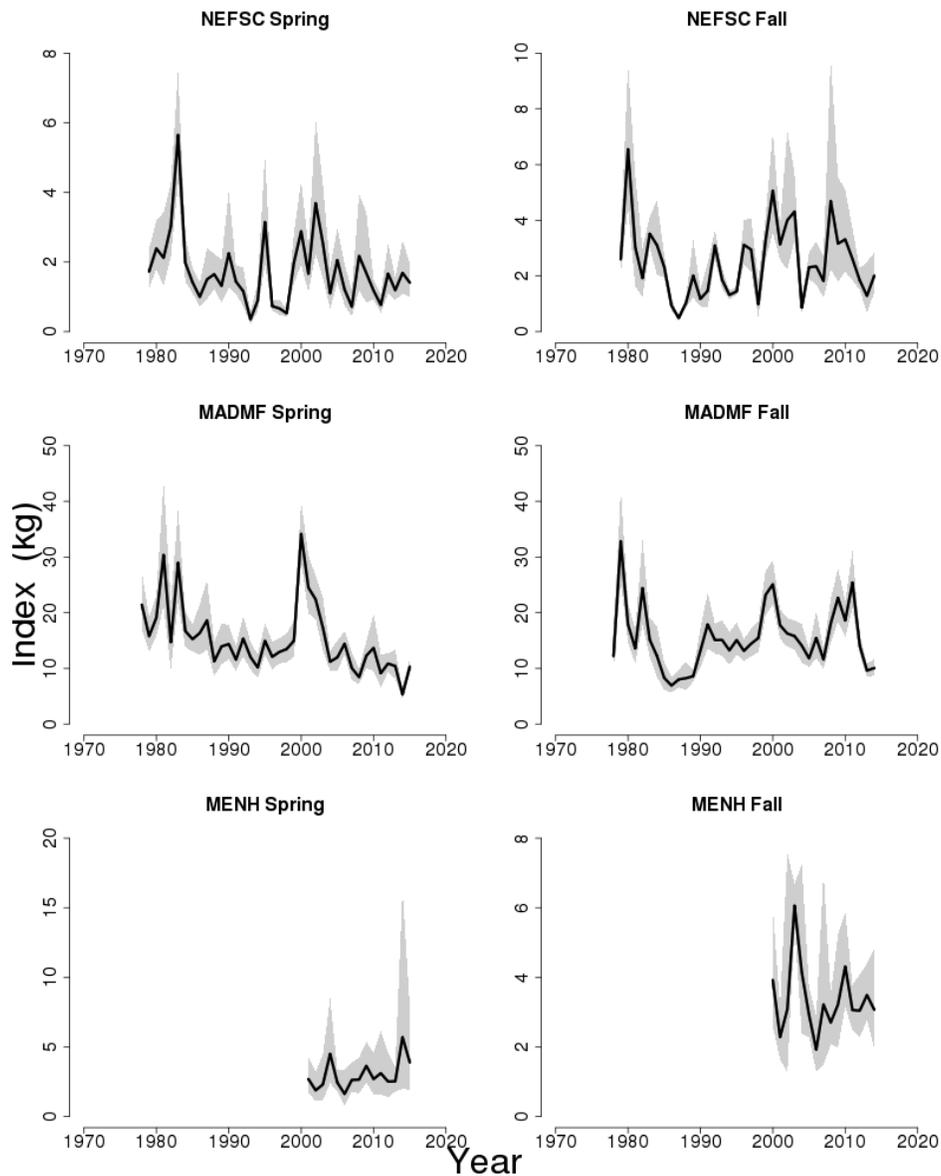
Figure 4: Indices of biomass for the Gulf of Maine Winter Flounder between 1978 and 2015 for the Northeast Fisheries Science Center (NEFSC), Massachusetts Division of Marine Fisheries (MDMF), and the Maine New Hampshire (MENH) spring and fall bottom trawl surveys. NEFSC indices are calculated with gear and vessel conversion factors where appropriate. The approximate 90% lognormal confidence intervals are shown.