11 Witch flounder

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This assessment of the witch flounder (Glyptocephalus cynoglossus) stock is an operational assessment of the existing 2016 benchmark assessment (NEFSC 2017). Based on the 2016 assessment the stock status was overfished and overfishing unknown, and stock condition was poor. This assessment updates commercial fishery catch data through 2016 (Table 35, Figure 56), and updates research survey biomass indices and the empirical approach assessment through 2016 (Figure 57). No stock projections can be computed using the empirical approach.

State of Stock: Based on this updated assessment, witch flounder (*Glyptocephalus cynoglossus*) recommended stock status is overfished and overfishing is unknown due to a lack of biological reference points associated with the empirical approach; stock condition remains poor. Retrospective adjustments were not made to the model results. The exploitable biomass in 2016 (defined as the arithmetic average of the 2016 NEFSC spring and 2015 NEFSC fall surveys population biomass estimates and converted to exploitable biomass using 0.9 based on examination of survey and fishery selectivity patterns) was estimated to be 14,563 (mt) (Figure 54). The 2016 exploitation rate (2016 catch divided by 2016 exploitable biomass) was estimated to be 0.035 (Figure 55).

Table 35: Catch and model results table for witch flounder. All weights are in (mt). The exploitable biomass in year y is the arithmetic average of the year y NEFSC spring and year y-1 NEFSC fall surveys then converted to exploitable biomass using 0.9. The exploitation rate is the year y catch divided by the year y exploitable biomass. Model results are from the current updated empirical approach assessment.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
					Data						
Commercial Landings	1,863	1,076	1,009	954	759	870	1,038	686	570	492	397
Commercial Discards	211	135	127	203	153	201	230	124	106	93	115
Catch for Assessment	2,075	1,210	1,136	1,158	912	1,071	1,268	810	675	585	512
					Model Results						
Exploitable Biomass	18,082	16,728	31,661	18,756	16,380	14,834	16,817	10,617	13,486	15,862	14,563
Exploitation Rate	0.115	0.072	0.036	0.062	0.056	0.072	0.075	0.076	0.05	0.037	0.035

Table 36: Comparison of reference points estimated in an earlier assessment and from the current assessment update.

	2016	2017
F_{MSY} *proxy*	NA	NA
SSB_{MSY} (mt)	NA	NA
MSY (mt)	NA	NA
Overfishing	Unknown	Unknown
Overfished	Yes	Yes

Projections: Short term projections cannot be computed using the empirical approach. The estimated 2017 exploitable biomass is 19,202 mt. Using the January 2017 NEFMC PDT/SSC approach for catch advice, application of the mean exploitation rate of 6.0% (based on nine years, 2007-2015) to the 3 year (2015- 2017) moving average of exploitable biomass (16,543 mt) results in an estimated catch for 2018 of 993 mt.

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).
  Uncertainty in the catch has increased due to recent reports/allegations of catch misreporting currently under litigation.

- Does this assessment model have a retrospective pattern? If so, is the pattern minor, or major? (A major retrospective pattern occurs when the adjusted SSB or F_{Full} lies outside of the approximate joint confidence region for SSB and F_{Full}; see Table 8).
  The model used to estimate status of this stock does not allow estimation of a retrospective pattern.

- Based on this stock assessment, are population projections well determined or uncertain? If this stock is in a rebuilding plan, how do the projections compare to the rebuilding schedule?
  Population projections for witch flounder are not computed. Catch advice is derived from applying a mean exploitation rate of 0.060 (based on nine years, 2007-2015) to the 3 year average (2015-2017) of the exploitable biomass.

- Describe any changes that were made to the current stock assessment, beyond incorporating additional years of data and the effect these changes had on the assessment and stock status.
  Recent landings and discards were updated and the time series of survey indices was updated; however, this has no impact on the stock status.

- If the stock status has changed a lot since the previous assessment, explain why this occurred.
  No change in stock status has occurred for witch flounder since the previous assessment. Biological references points remain unknown.

- Provide qualitative statements describing the condition of the stock that relate to stock status.
  The witch flounder stock condition remains poor. Fishery landings and survey catch by age indicate truncation of age structure and a reduction in the number of older fish in the population. NEFSC relative indices of abundance and biomass remain below their time series average.

- Indicate what data or studies are currently lacking and which would be needed most to improve this stock assessment in the future.
  The witch flounder assessment could be improved with accurate catch statistics. Additional research recommendations are given in NEFSC 2017.

- Are there other important issues?

  Minimum estimates of scientific research removals of witch flounder ranged between 0.1 and 15.9 mt, with an average of 1 mt between 1963 and 2016. The NEFSC bottom trawl surveys, Massachusetts Division of Marine Fisheries inshore surveys, Atlantic States Marine Fisheries Commission summer shrimp surveys, and various Cooperative Research surveys (e.g., such as Industry-based surveys for cod and for yellowtail flounder) and gear studies have contributed to scientific research removals. The August 2016 Gear Efficiency Study removed 14.0 mt of witch flounder.

11.1 Reviewer Comments: Witch flounder

Assessment Recommendation:

The panel concluded that the operational assessment with the August 2016 cooperative research catchability estimates was acceptable as a scientific basis for management advice. At the previous 2016 benchmark assessment, where the analytical model was rejected, an empirical approach was adopted as a basis for management advice. The panel affirmed the approach to developing a catch recommendation as described in the assessment report was adequate.

Alternative Assessment Approach:

Not applicable

Status Recommendation:

Based on this operational assessment, the panel supports the conclusion that the witch flounder stock status remains overfished with overfishing unknown due to a lack of biological reference points associated with the empirical approach. The witch flounder stock condition remains poor. Fishery landings and survey catch by age indicate truncation of age structure and a reduction in the number of older fish in the population. Catch is at a time-series low and relative indices of abundance and biomass from the National Marine Fisheries Service survey remain below their time series average.

Key Sources of Uncertainty:

Uncertainty in the catch has increased due to recent reports/allegations of catch misreporting currently under litigation, which creates additional uncertainty surrounding the exploitation rate estimate. Additional uncertainties with the empirical approach applied to witch flounder include the survey indices, catchability estimates, catch efficiency, and the consequent swept-area-biomass expansion methods.

Research Needs:

The witch flounder assessment could be improved with research into the veracity of catch statistics. Additional research recommendations were provided in the recent benchmark stock assessment report and these should be addressed in an attempt to return to an analytical model. Work was conducted by the Plan Development Team, following the 2016 benchmark assessment on the relationships between the survey indices, catchability estimates, and resulting swept-area-biomass estimates. Further work exploring the validity of the swept-area-biomass estimates, catch efficiency, and the approach to developing catch advice is warranted.

References:

Northeast Fisheries Science Center. 2017. 62^{nd} Northeast Regional Stock Assessment Workshop Assessment Report, Northeast Fisheries Science Center, Woods Hole, Massachusetts, January 2017. US Dep Commer, NOAA Fisheries, Northeast Fish Sci Cent Ref Doc. 17-03; 822 p. CRD17-03

Northeast Fisheries Science Center. 2015. Operational Assessment of 20 Northeast Groundfish Stocks, Updated through 2014. US Dep Commer, NOAA Fisheries, Northeast Fish Sci Cent Ref Doc. 15-24; 251 p. CRD15-24

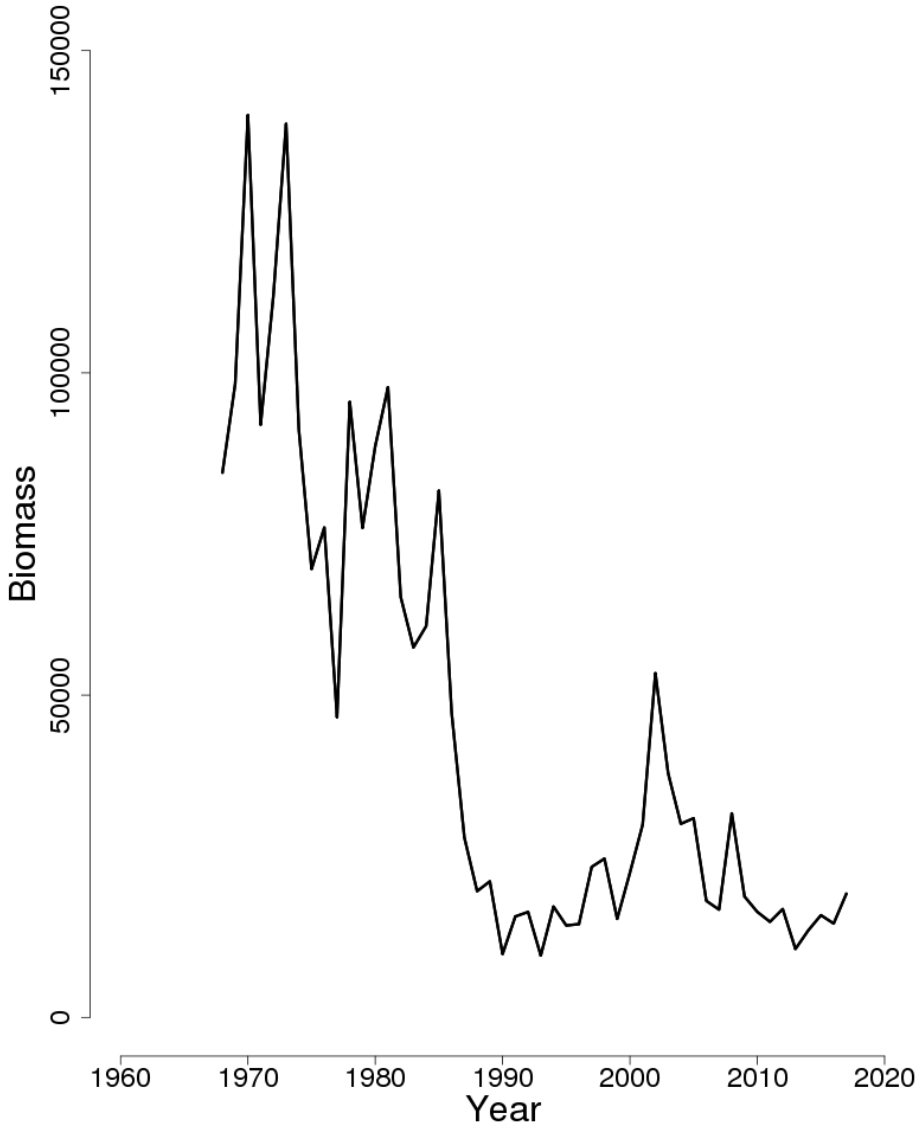

Figure 54: Trends in exploitable biomass (mt) of witch flounder between 1968 and 2017 from the current assessment.

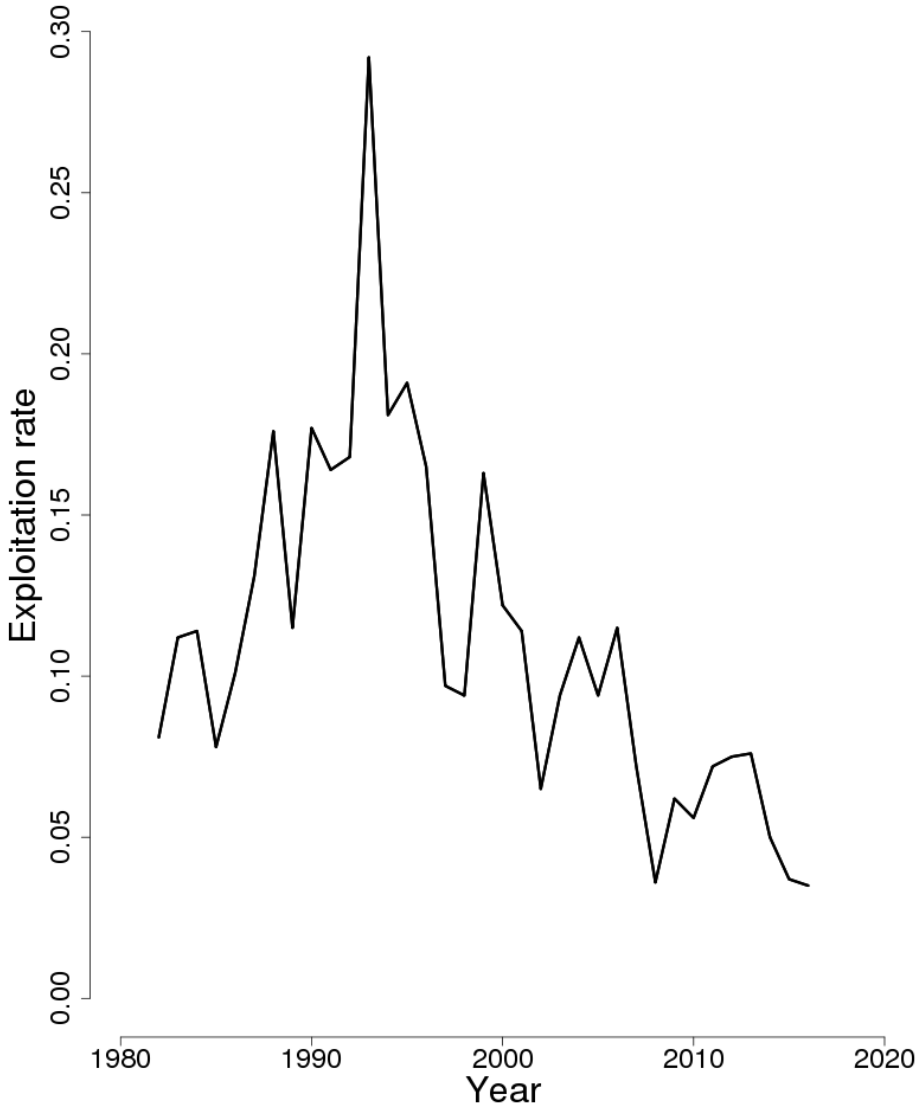

Figure 55: Trends in the exploitation rate (catch/ exploitable biomass) of witch flounder between 1982 and 2016 from the current assessment.

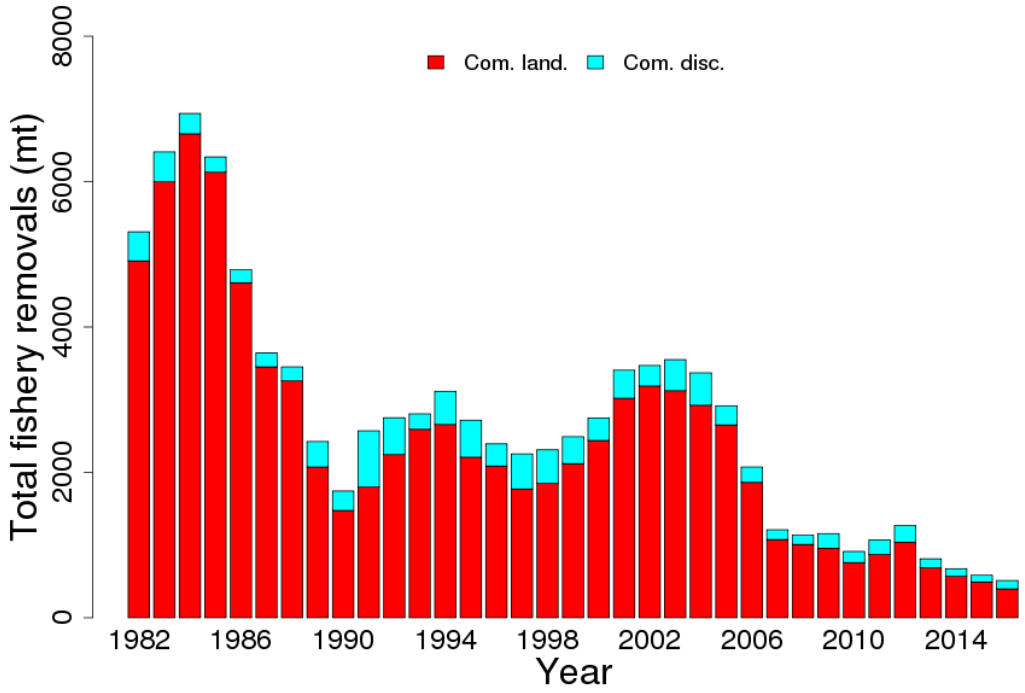

Figure 56: Total catch of witch flounder between 1982 and 2016 by fleet (commercial) and disposition (landings or discards).

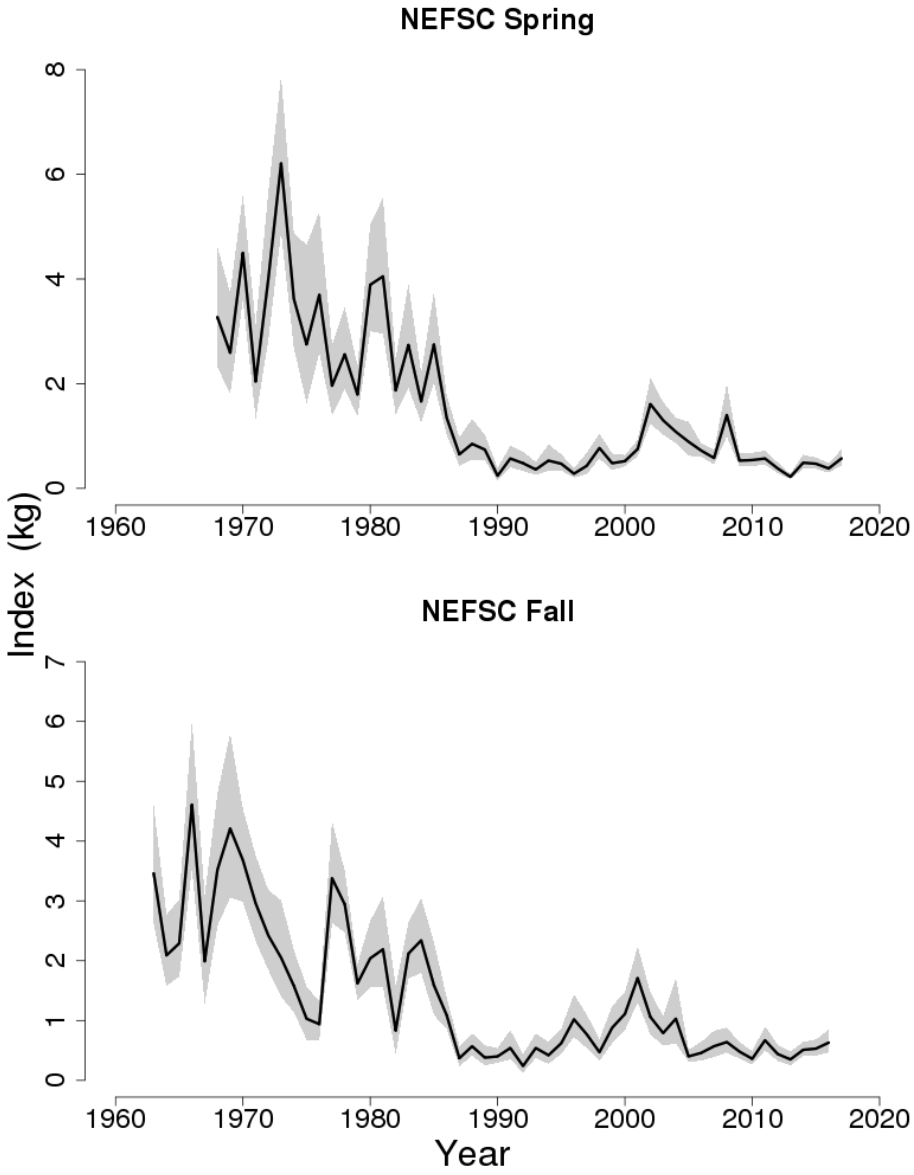

Figure 57: Indices of biomass for the witch flounder between 1963 (Fall) and 2017 (Spring) for the Northeast Fisheries Science Center (NEFSC) spring and fall bottom trawl surveys. The approximate 90% lognormal confidence intervals are shown.