UPDATED INDEX OF ABUNDANCE TO 2021 FOR WINTER FLOUNDER FROM NAFO DIV. 4T

Context

Fisheries and Oceans Canada (DFO) Fisheries Resource Management has instituted a multi-year management approach for the Winter Flounder stock of the southern Gulf of St. Lawrence (sGSL; Northwest Atlantic Fisheries Organization (NAFO) Division 4T). The last full assessment of the Winter Flounder of the sGSL (Surette and Rolland 2019) was completed in March 2017 with advice for the May 2017 to May 2022 fisheries period. An interim update of stock status was also completed in 2019 (DFO 2020). This stock did not undergo a full stock assessment in 2021 as was planned in its 5 year assessment cycle (DFO 2016, 2017) since a recovery plan is currently under development and is expected to be published in 2022. Instead, an update of indicators of stock status is presented to inform decision making.

This Science Response Report results from the Regional Science Response Process of March 1, 2022 on the update of indicators to 2021 of Winter Flounder (*Pseudopleuronectes americanus*) from NAFO Division 4T, southern Gulf of St. Lawrence.

Background

Directed commercial fishing for Winter Flounder (*Pseudopleuronectes americanus*) is permitted with an annual Total Allowable Catch (TAC) of 300 tonnes (t) (Table 1).

Table 1. Total allowable catch (TAC) values (t) in effect during 2017 to 2021, and Limit Reference Point (LRP) values expressed in in trawlable biomass (t) and in kg per tow for Winter Flounder in NAFO Div. 4T.

Species	Scientific name	Total Allowable Catch (t)	LRP Trawlable Biomass (t)	LRP (kg per tow)
Winter Flounder	*Pseudopleuronectes americanus*	300	6,609	3.82

Southern Gulf of St. Lawrence Survey

The September research vessel (RV) survey of the sGSL follows a stratified random sampling design (Figure 1) and examines fish and invertebrates species captured in a bottom trawl. The RV survey was designed to provide abundance trends for fish and invertebrates distributed between depths of about 20 m to 350 m. This survey, conducted annually since 1971, is the primary source of data for monitoring trends in species distribution, abundance, and biological characteristics (e.g., size and age composition, growth) in the sGSL (for details see Savoie 2016). The same stratification scheme has been used since 1971, with the exception of the addition of three inshore strata (401 to 403) in 1984. The analyses are presented here for the 24 strata (415 to 429 and 431 to 439) sampled since 1971. The survey indices have been standardized for changes in survey vessels, gears, and protocols which have occurred over the time series (Benoît and Swain 2003; Benoît 2006). Survey indices are expected to be

proportional to abundance for most species. The 2021 southern Gulf of St. Lawrence September RV survey was conducted between August 28 and September 27, 2021. A total of 166 representative tows were conducted. To account for missing stratum 421 in 2020, a hurdle model was used to predict the catch values in stratum 421 for 2020 to be used in the stratified calculations.

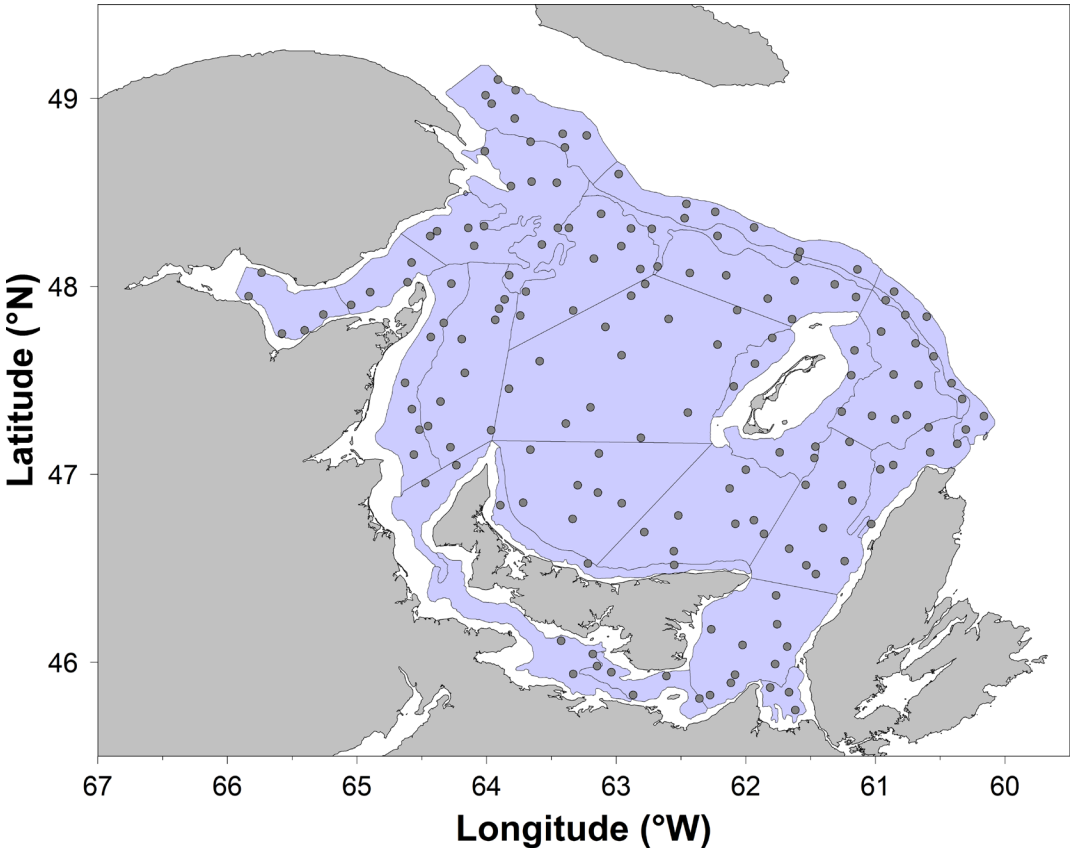

Figure 1. Location of the fishing sets from the 2021 southern Gulf of St. Lawrence September RV survey (survey area and strata boundaries appear in blue with set locations indicated by grey dots, n = 166 tows in all strata and n = 156 in strata 415 to 429 and 431 to 439).

Analysis and Response

Winter Flounder

The last full assessment of the Winter Flounder stock of the sGSL, NAFO Div. 4T, was completed in March 2017 with advice for the May 2017 to May 2022 fisheries period (DFO 2017; Surette and Rolland 2019). In that assessment it was indicated that the three-year moving average of the RV survey biomass index for commercial-sized Winter Flounder (≥ 25 cm) would be used as the indicator of stock status in the interim years of the multi-year management cycle. This index is to be compared to the Limit Reference Point (LRP) value for this stock, adjusted to the scale of the biomass index which is not corrected for survey gear catchability. The re-scaled LRP is 6,609 t of trawlable biomass in September, equivalent to a catch rate from the survey of 3.82 kg per tow. The value of the three-year moving average of the index in 2021 was 1,606 t of trawlable biomass in September, equivalent to a catch rate from the survey of 0.93 kg per tow. The three-year moving average of the index is therefore estimated to be 24% of the LRP, slightly above the 17% reported in the last indicator update (DFO 2020).

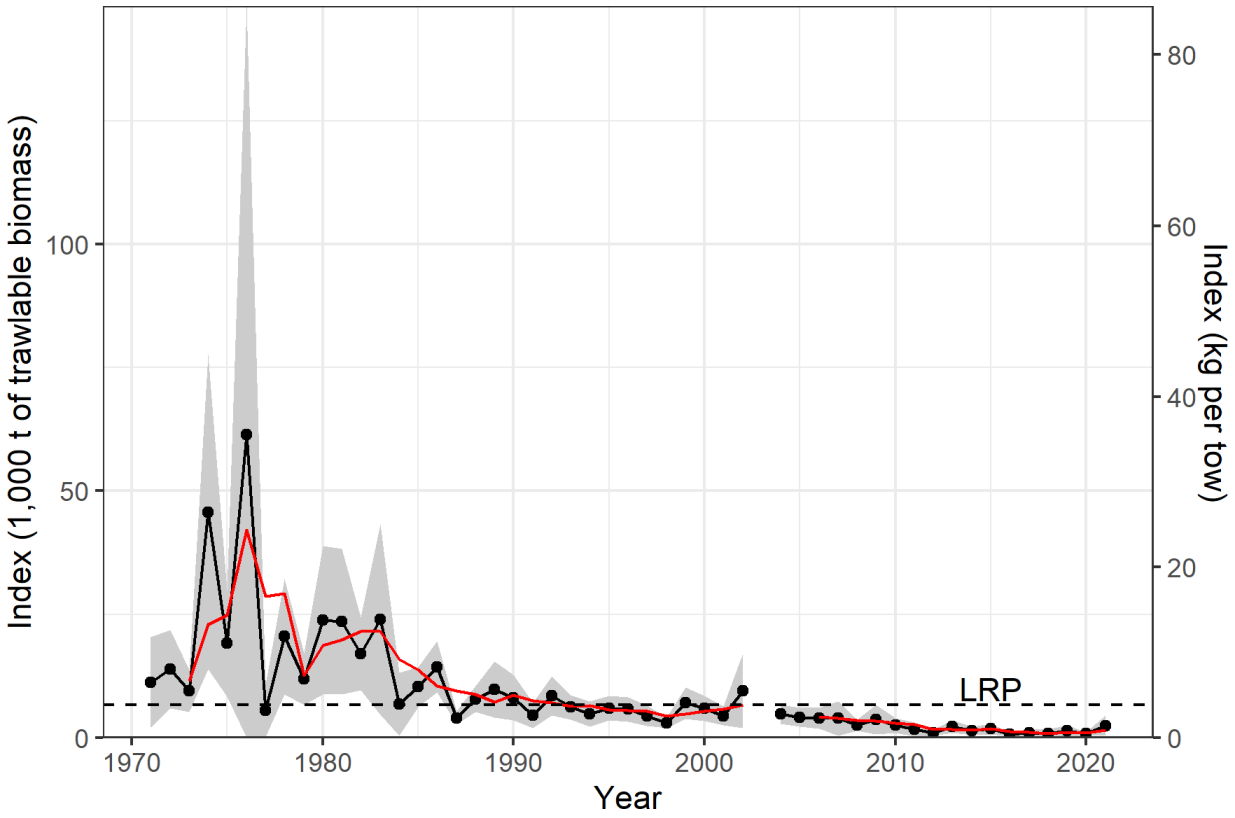

Figure 2. Annual RV survey index (1,000 t of trawlable biomass, left axis and kg per tow, right axis) of commercial size (≥ 25 cm total length) Winter Flounder from strata 415 to 429 and 431 to 439 in the southern Gulf of St. Lawrence, 1971 to 2021. The black circles and solid black line are the stratified mean estimates and the grey shading denotes the 95% confidence intervals of the annual means. The red solid line is the three-year moving average shown in correspondence to the third year of the block of years. The horizontal dotted line is the Limit Reference Point (LRP) threshold value of 6,609 t of trawlable biomass in September, equivalent to a catch rate from the survey of 3.82 kg per tow. Data from 2003 is omitted from the figure as an uncalibrated vessel was used in that year.

Conclusions

Despite an increase in the value of the RV biomass index for commercial-sized (≥ 25 cm total length) Winter Flounder in the southern Gulf of St. Lawrence for 2021, its value remains below the LRP. A stock re-assessment is not warranted and the previous advice for the fishery remains appropriate. The last assessment stated that fishing mortality is a very small proportion of the total mortality of Winter Flounder in the southern Gulf of St. Lawrence and that natural mortality was estimated to be the dominant factor affecting abundance. When a stock is below the LRP, removals by all human sources must be kept to the lowest possible level and there should be no tolerance for preventable decline (DFO 2006, 2009).

Contributors

Name	Affiliation
Amélie Rondeau	DFO Science, Gulf Region
Curtis Dinn	DFO Science, Gulf Region
Daniel Lapierre	DFO Fisheries Resource Management, Gulf Region
Daniel Ricard	DFO Science, Gulf Region
Elizabeth Thompson	DFO Science, Gulf Region
Jenni McDermid	DFO Science, Gulf Region
Joeleen Savoie	DFO Science, Gulf Region
Jolene Sutton	DFO Science, Gulf Region
Nicolas Rolland	DFO Science, Gulf Region
Ryan Chlebak	DFO Science, National Capital Region
Stephanie Boudreau	DFO Science, Gulf Region
Steve Trottier	DFO Fisheries Resource Management, Québec Region

Approved by

Matthew Hardy
Regional Director
Science Branch, Gulf Region
Fisheries and Oceans Canada

May 12, 2022

Sources of Information

Benoît, H. 2006. Standardizing the southern Gulf of St. Lawrence bottom-trawl survey time series: Results of the 2004-2005 comparative fishing experiments and other recommendations for the analysis of the survey data. DFO Can. Sci. Advis. Sec. Res. Doc. 2006/008. iv + 127 p.

Benoît, H., and Swain, D.P. 2003. Standardizing the southern Gulf of St. Lawrence bottom-trawl survey time series: Adjusting for changes in research vessel, gear and survey protocol. Can. Tech. Rep. Fish. Aquat. Sci. 2505: iv + 95 p.

DFO. 2006. A harvest strategy compliant with the precautionary approach. DFO Can. Sci. Advis. Sec. Advis. Rep. 2006/023.

DFO. 2009. A fishery decision-making framework incorporating the precautionary approach. Date modified: 2009-03-23. Available online.

DFO. 2016. Guidelines for providing interim-year updates and science advice for multi-year assessments. DFO Can. Sci. Advis. Sec. Advis. Rep. 2016/020.

DFO. 2017. Stock assessment of Winter Flounder (Pseudopleuronectes americanus) of the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2016. DFO Can. Sci. Advis. Sec. Advis. Rep. 2017/022.

DFO. 2020. Updated indices of abundance to 2019 for Winter Flounder from NAFO Div. 4T, Witch Flounder from NAFO Divs. 4RST and White Hake from NAFO Div. 4T. DFO Can. Sci. Advis. Sec. Sci. Resp. 2020/008.

Savoie, L. 2016. Indices of abundance to 2014 for six groundfish species based on the September research vessel and August sentinel vessel bottom-trawl surveys in the southern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2015/085. v + 52 p.

Surette, T., and Rolland, N. 2019. Assessment of the Winter Flounder (Pseudopleuronectes americanus) stock of the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2016 and advice for the May 2017 to May 2022 fisheries. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/026. x + 94 p.

This Report is Available from the:

Centre for Science Advice (CSA)
Gulf Region
Fisheries and Oceans Canada
343 Université Ave.
Moncton, NB, E1C 9B6

E-mail: DFO.GLFCSA-CASGOLFE.MPO@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

ISSN 1919-3769
ISBN 978-0-660-44128-3 Cat. No. Fs70-7/2022-025E-PDF

Correct Citation for this Publication:

DFO. 2022. Updated index of abundance to 2021 for Winter Flounder from NAFO Div. 4T. DFO Can. Sci. Advis. Sec. Sci. Resp. 2022/025.

Aussi disponible en français :

MPO. 2022. Mise à jour de l'indice d'abondance de 2021 pour la Plie Rouge dans la division 4T de l'OPANO. Secr. can. des avis sci. du MPO. Rép. des Sci. 2022/025.