Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat
Quebec Region | Science Response 2021/006

UPDATE OF STOCK STATUS INDICATORS FOR NORTHERN GULF OF ST. LAWRENCE (3Pn, 4RS) ATLANTIC COD IN 2020

Context

The assessment of the northern Gulf of St. Lawrence (3Pn, 4RS) Atlantic Cod (*Gadus morhua*) stock is conducted every two years, with the most recent assessment conducted in February of 2019 (DFO 2019). The full assessment of this stock scheduled for February 2021 has been canceled to allow for the review of the assessment framework including the review of available data and the establishment of a new stock assessment model.

In the interim years, an update of the main indicators of this resource is conducted to determine if major changes in stock status have occurred (DFO 2019).

This Science Response results from the January 14, 2021 Science Response Process on the Update of Stock Status Indicators for Cod (3Pn4RS) in the northern Gulf of St. Lawrence.

Background

The indicators used to monitor the status of the stock in the interim years are the landings from the commercial fishery, the biomass and abundance indices from the bottom trawl survey carried out by Fisheries and Oceans (DFO) in the northern Gulf of St. Lawrence (NAFO divisions 4RS) and indices from the sentinel fishery (trawl, longline and gillnet) conducted in NAFO divisions 3Pn and 4RS (DFO 2019).

The Fishery

The total allowable catch (TAC) was 1,000 t for the 2020-2021 fishing season (from May 15, 2020 to May 14, 2021). As of December 16, 2020, preliminary directed fishery cod landings totaled 662 t (Figure 1), 21% of which were landed in Quebec and 79% in Newfoundland and Labrador. In 2020, the three main fishing gears used were gillnet (70%), longline (25%) and handline (5%). In 2020, the recreational fishing season was 39 days and no estimate of catches is available.

Analysis and Response

Indicators of the Stock Status

DFO Bottom Trawl Research Survey (4RS)

In the DFO survey, the average number and weight of cod per tow had generally shown a slow and gradual increase from 1993 to 2014. From 2014 to 2016, the values of these indices were stable and above the series average. These indices fluctuated between 2017 and 2020. In 2020, the average number per tow was above the average and the average weight was close to the series average. (Figure 2).

In 2020, the size frequency distribution of cod caught indicated that the abundance of fish over 30 cm was similar to the series average. However, the abundance of juvenile cod with a modal size of 24 cm was above the series average. These fish are from the 2018 cohort that had been observed at 1 year (16 cm) in the 2019 survey (Figure 3).

Over the past two years, the duration of this survey has had to be shortened, resulting in a decrease in the coverage of the study area. In 2019, some areas of the study area where concentrations of cod are normally observed could not be sampled (Bourdages et al. 2020). In 2020, strata of importance for estimating cod abundance were well sampled.

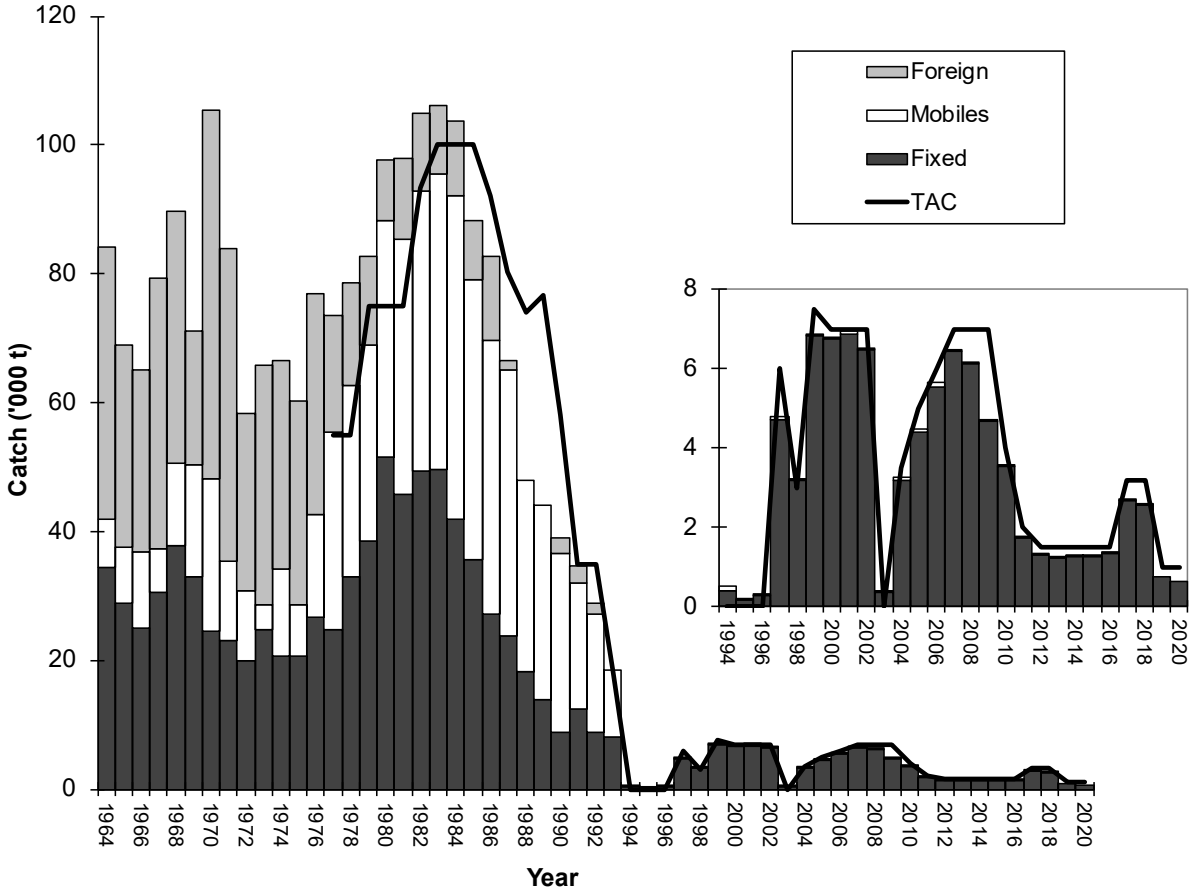

Figure 1. Annual and total allowable catches (TAC) by fleet and by management year (1964 to 1998, management according to calendar year; 1999: TAC from 1999/01/01 to 2000/05/14; 2000 to 2020: TAC from May 15 to May 14 of the following year).

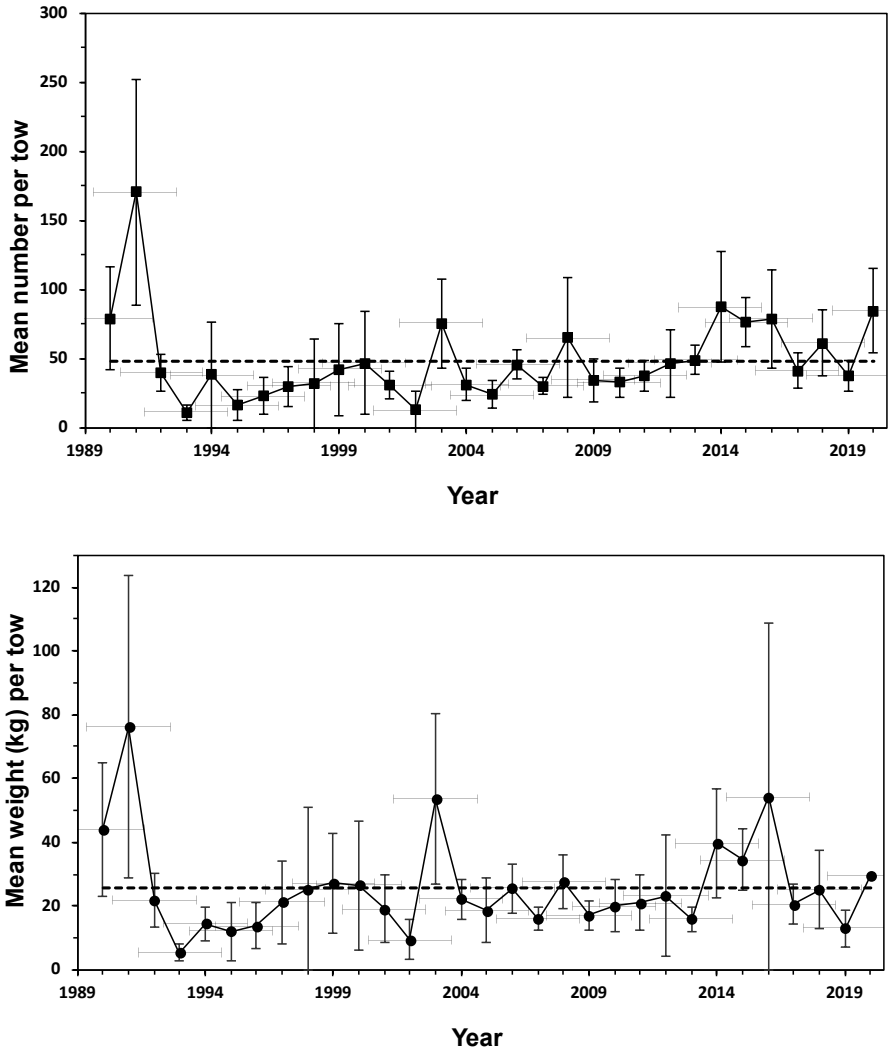

Figure 2. Average number and average weight of cod per 15-minute tow observed between 1990 and 2020 during DFO research surveys (4RS). The dotted line represents the 1990–2019 series average.

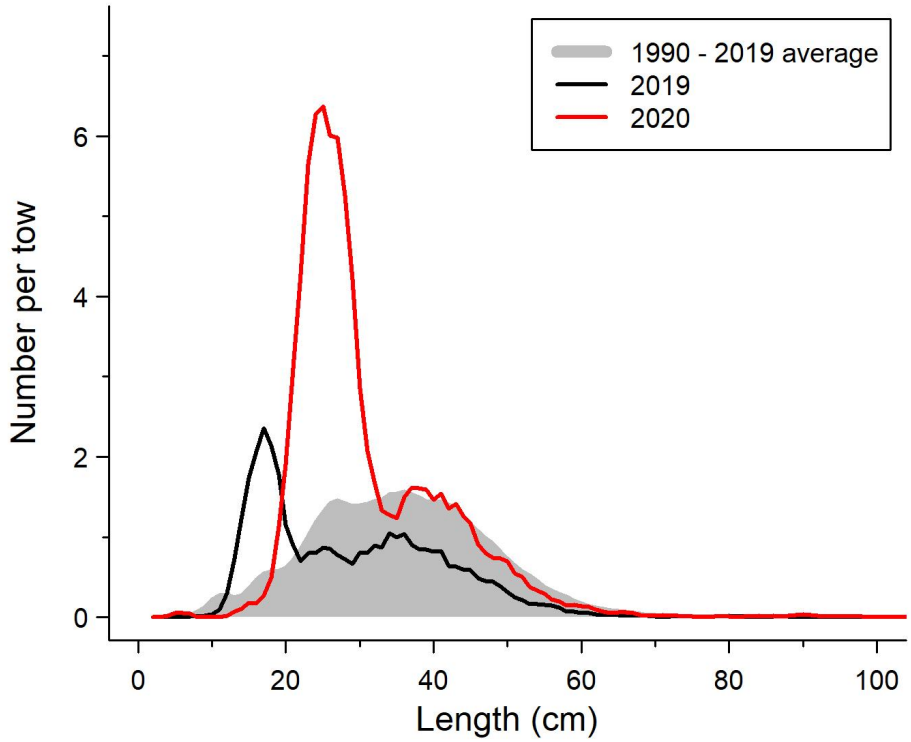

Figure 3. Observed length frequency distributions of cod (mean number per 15-minute tow) in the DFO survey in NAFO divisions 4RS.

Sentinel Fisheries Program – Mobile Gear Survey (3Pn, 4RS)

The average number of cod abundance index per tow from the mobile gear sentinel survey showed some stability from 2003 to 2009 and then fluctuated without showing a clear trend. From 2017 to 2019, this index was below the average for the 2003-2019 series, while in 2020, the observed value was above this average (Figure 4).

In 2020, the size frequency distribution of cod shows that the abundance of fish 15 to 40 cm is higher than the series average. The fish of the 2018 cohort, modal size between 20 and 22 cm, are also well captured in this survey (Figure 5).

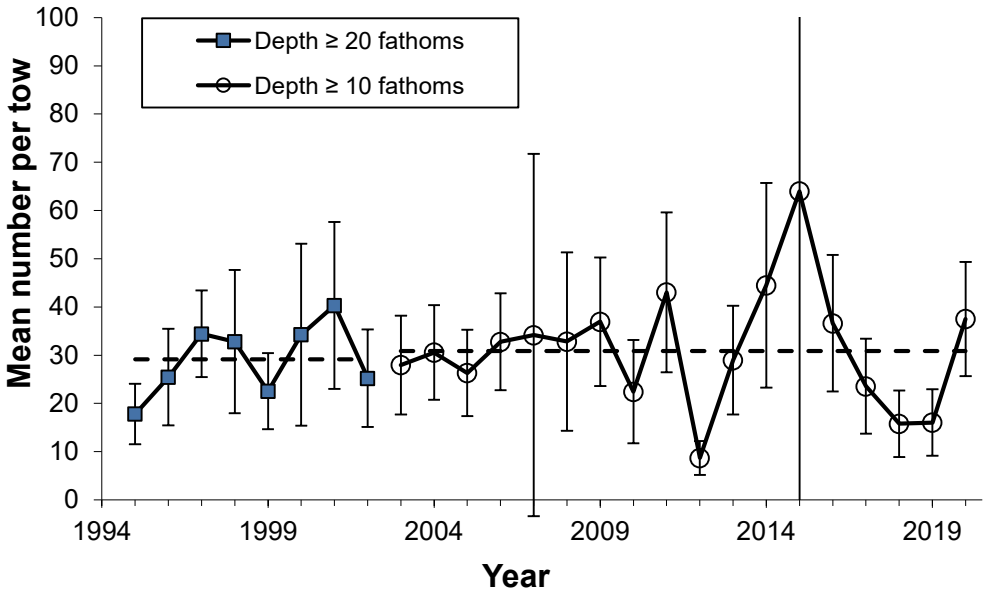

Figure 4. Average observed number of cod per tow of 30 minutes (± 95% confidence interval) during the mobile survey of the sentinel program (1995 to 2002, including strata of more than 20 fathoms; 2003-2019, includes strata of more than 10 fathoms). The dotted line represents the average of each series (1995-2002 and 2003-2019).

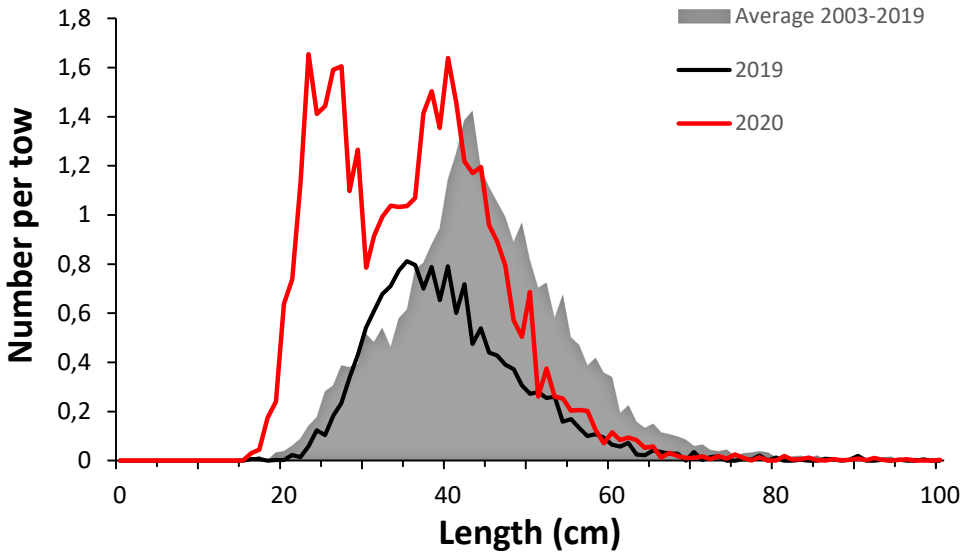

Figure 5. Length frequency distributions (mean number per 30 minute tow) observed for Atlantic Cod from the mobile survey (depth ≥ 10 fathoms) of the sentinel fishery program in NAFO Divisions 3Pn, 4RS

Sentinel Fisheries Program – Fixed Gear (3Pn, 4RS)

The standardized catch per unit effort (CPUE) index of the sentinel longline program increased from 1995 to 2006, to then decrease until 2010. It subsequently fluctuated around the average (1995-2019). The 2020 value was slightly lower than the average series (Figure 6).

The standardized CPUE sentinel fishery index with gillnets shows a pattern similar to that of the sentinel longline fishery index. From 2017 to 2020, the values were at the level of the average series (Figure 6). These last two indices are mainly representative of the abundance of commercial-sized cod (Brassard et al. 2020).

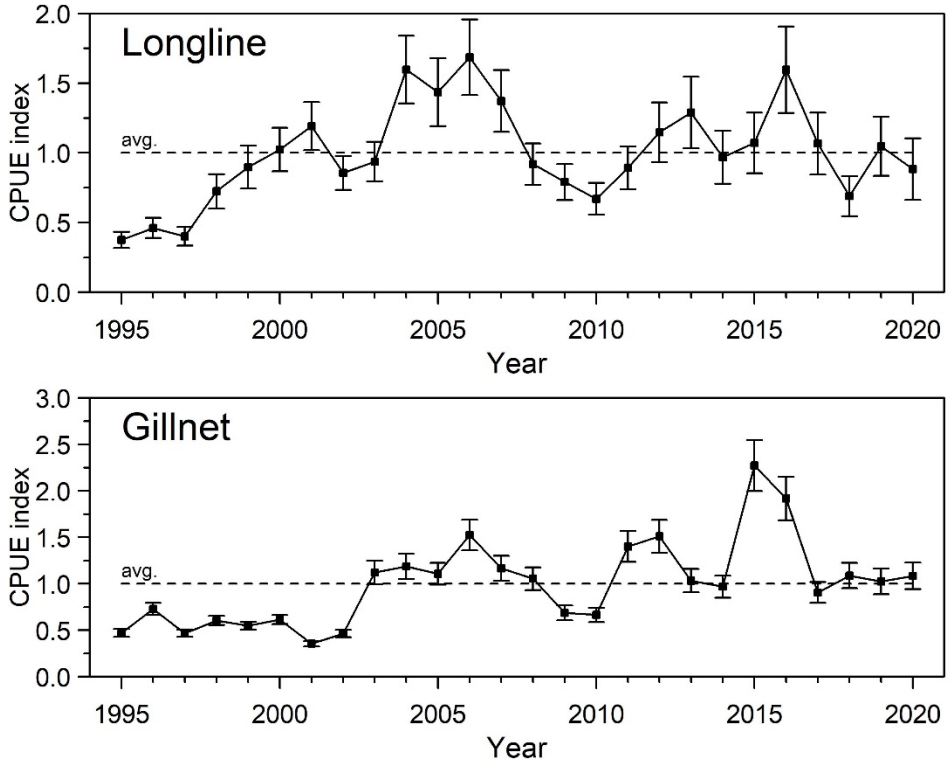

Figure 6. Standardized catch per unit of effort (CPUE) (± 95% confidence interval) of the sentinel fixed gear program (longline and gillnet). The dotted line represents the average of the 1995-2019 series. These data are preliminary and do not include the activities carried out in November and December 2020.

Conclusions

The abundance of commercial-sized cod appears to be stable with the arrival of a new cohort (2018). However, the fish in this new cohort, whose size is well below the commercial regulatory size of 43 cm, will not be available for the 2021-2022 commercial fishing season and their abundance will have to be specified in the coming years.

The update of the main indicators for monitoring the state of the Atlantic Cod stock in the northern Gulf of St. Lawrence (3Pn, 4RS) in 2020 does not present any major changes compared to the previous assessment. Therefore the conclusion of the most recent scientific advice remains appropriate:

"According to the precautionary approach, harvests from all sources should be as low as possible in order to promote spawning stock biomass recovery.″(DFO 2019).

Contributors

Name	Affiliation
Benoît, Hugues	DFO, Science, Quebec Region
Boudreau, Mathieu	DFO, Science, Quebec Region
Bourdages, Hugo	DFO, Science, Quebec Region
Brassard, Claude	DFO, Science, Quebec Region
Cyr, Charley	DFO, Science, Quebec Region
Dwyer, Shelley	DFO, Resource Management, Newfoundland Region
Gauthier, Johanne	DFO, Science, Quebec Region
Lussier, Jean-François	DFO, Science, Quebec Region
Ouellette-Plante, Jordan	DFO, Sciences, Quebec Region
Pomerleau, Corinne	DFO, Sciences, Quebec Region
Senay, Caroline	DFO, Sciences, Quebec Region
Trottier, Steve	DFO, Resource Management, Quebec Region

Approved by

Jean-Yves Savaria
Regional Director, Science
Quebec Region
Fisheries and Oceans Canada

Date: January 22, 2021

Sources of information

Bourdages, H., Brassard, C., Desgagnés, M., Galbraith, P., Gauthier, J., Nozères, C., Scallon-Chouinard, P.-M. and Senay, C. 2020. Preliminary results from the ecosystemic survey in August 2019 in the Estuary and northern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2020/009. iv + 93 p.

Brassard, C., Lussier, J-F., Benoît, H, Way, M. and Collier, F. 2020. The status of the Northern Gulf of St. Lawrence (3Pn, 4RS) Atlantic cod (*Gadus morhua*) stock in 2018. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/075. x + 117 p.

DFO. 2019. Assessment of the Northern Gulf of St. Lawrence (3Pn, 4RS) Atlantic Cod Stock in 2018. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2019/032.

This report is available from the:

Centre for Science Advice (CSA)
Quebec Region
Fisheries and Oceans Canada
Maurice Lamontagne Institute
P.O. Box 1000
Mont-Joli, Quebec
Canada G5H 3Z4

Telephone: 418-775-0825
Email: bras@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

ISSN 1919-3769

Correct Citation for this Publication:

DFO. 2021. Update of stock status indicators for northern Gulf of St. Lawrence (3Pn, 4RS) Atlantic Cod in 2020. DFO Can. Sci. Advis. Sec. Sci. Resp. 2021/006.

Aussi disponible en français :

MPO. 2021. Mise à jour des indicateurs de l'état du stock de morue franche du nord du golfe du Saint-Laurent (3Pn, 4RS) en 2020. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2021/006.