



UPDATE OF INDICATORS OF THE STATUS OF THE NORTHERN GULF OF ST. LAWRENCE (3PN, 4RS) ATLANTIC COD STOCK IN 2019

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 completed in February of 2019 (DFO 2019). 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. Monitoring indicators for the interim years were identified during the last assessment. The next full assessment will be carried out in winter 2021.

This Science Response results from the January 15, 2020 Science Response Process on the update of the status indicators for Atlantic cod in the northern Gulf of St. Lawrence in 2019.

Analysis

The indicators used to monitor the state 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 Canada (DFO) in the northern Gulf of St. Lawrence (NAFO divisions 4RS) and sentinel fishery indices (trawl, longline and gillnet) made in NAFO divisions 3Pn and 4RS (DFO 2019).

The Fishery

A TAC of 1,000 t was in place for the 2019-2020 fishing season from May 15, 2019 to May 14, 2020. This is the lowest TAC since the 2003 moratorium. As of December 16, 2019, preliminary directed fishery cod landings totaled 685.7 t, or 69% of the TAC (Figure 1). In 2019, the recreational fishing season was 39 days and as in previous years, no estimate of catches is available.

Stock Status Indicators

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 (1990-2018). These indices fluctuated in 2017 and 2018, then decreased in 2019 and are below the series average (Figure 2). In 2019, the DFO survey was shortened by approximately twelve days, which resulted in a decrease in the coverage of the study area. Thus 13 of the 54 strata that make up this survey have not been sampled or have been partially sampled. This lack of coverage is located south of the west coast of Newfoundland, along the North Shore and in the Strait of Belle-Isle. Several of these strata (8) usually make a significant contribution to the abundance of cod in this survey. A multiplicative model is used to fill in the missing or poorly sampled strata. This approach provides predicted

value for these strata using survey data from the previous three surveys. Despite the use of the multiplicative model, the lack of coverage in the survey increases the uncertainty for these indices in 2019.

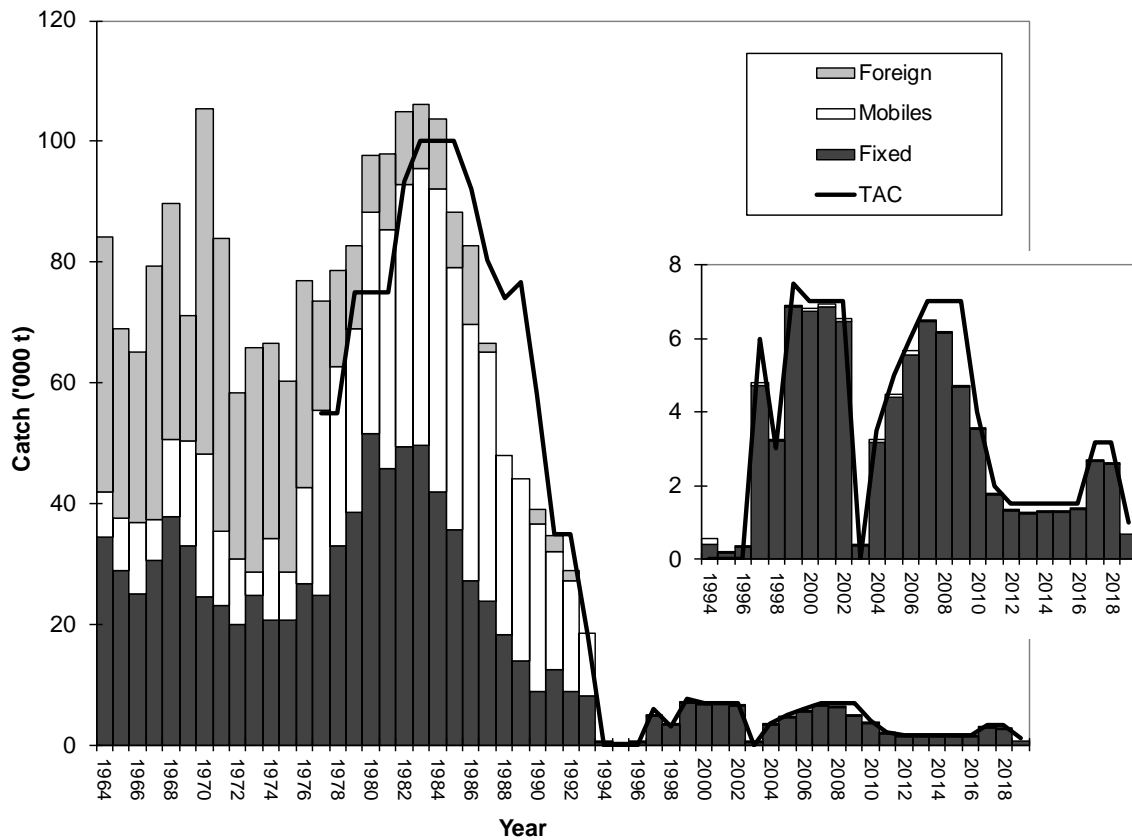


Figure 1. Annual and total allowable catches (TAC) by fleet and by management year (1964 to 1998, management according to calendar year; 1999: TAC from 1999/01/01 to 2000/05/14; 2000 to 2019: TAC from May 15 to May 14 of the following year).

In 2019, the size frequency distribution of cod caught during the DFO survey indicates that the abundance of fish over 20 cm is below the 1990-2018 series average. Cod with a modal size of 18 cm (2018 cohort) are above average abundance (Figure 3).

Quebec Region

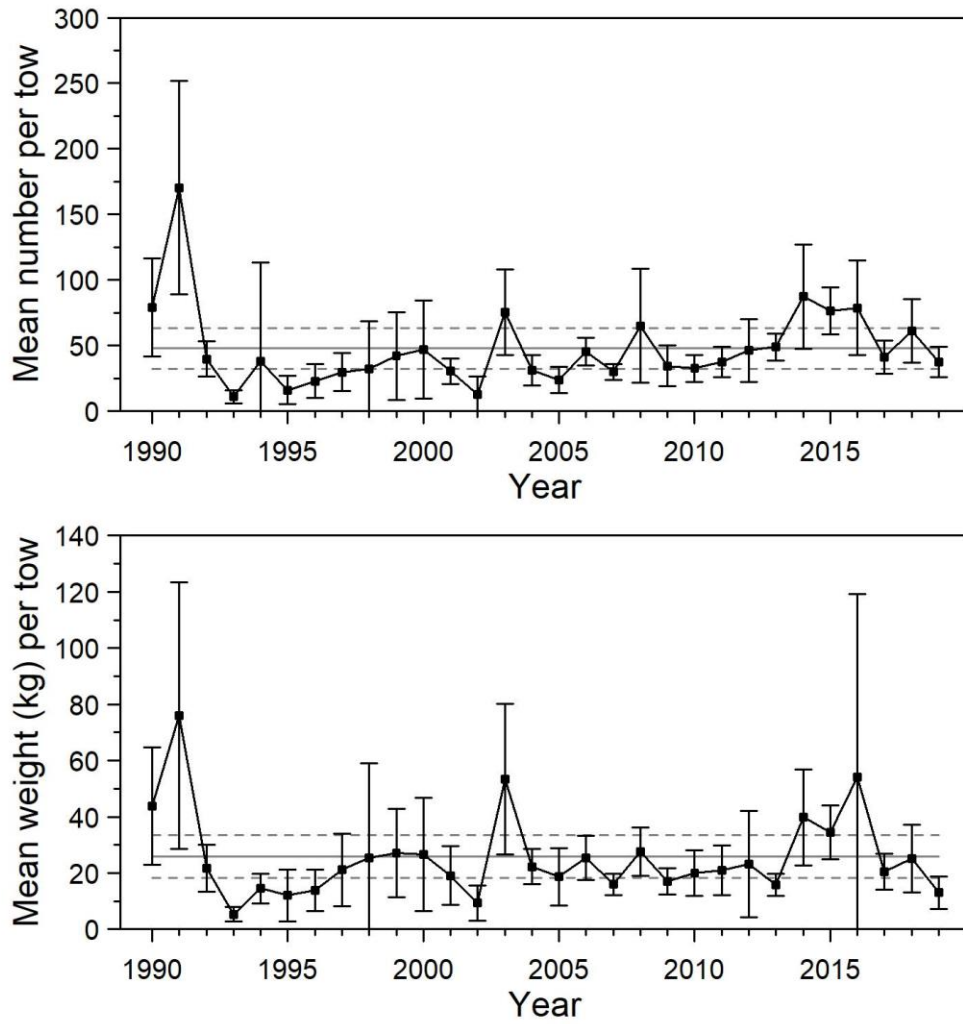


Figure 2. Average number and average weight of cod per 15-minute tow observed between 1990 and 2019 during DFO research surveys (4RS). The error bars indicate 95% confidence intervals. The solid line represents the 1990–2018 series average and the dotted lines $\pm 1/2$ standard deviation around the average.

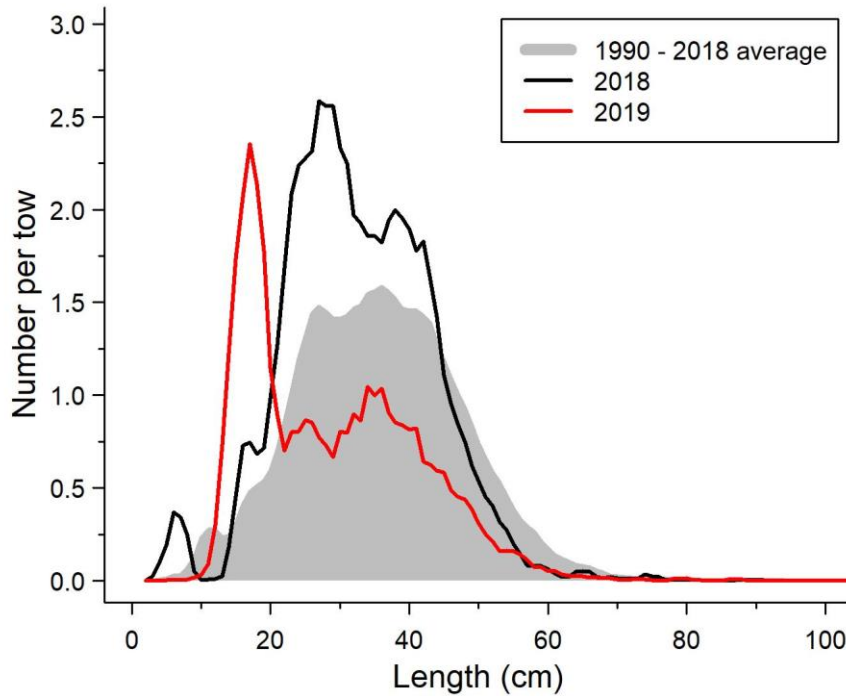


Figure 3. Observed length frequency distributions of cod (mean number per 15-minute tow) in the DFO survey in NAFO divisions 4RS.

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. In 2019, the observed value is similar to that of 2018 and is below the series average (Figure 4).

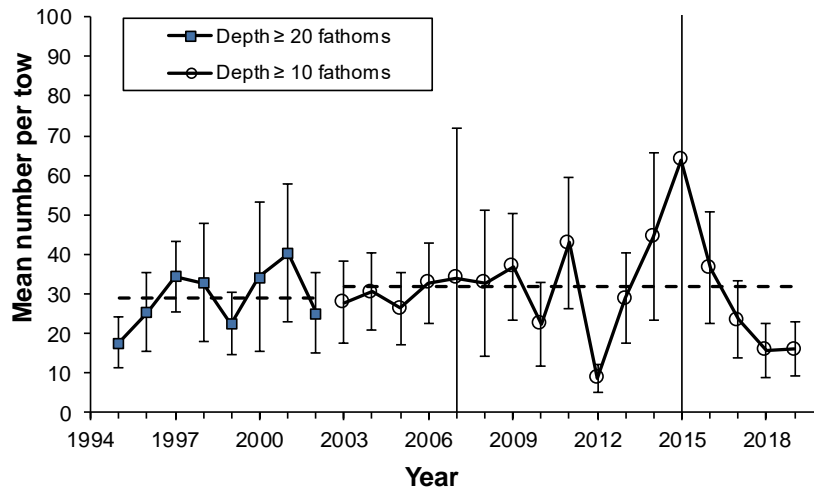


Figure 4. Average observed number of cod per tow of 30 minutes (\pm 95% confidence interval) during the mobile survey of the sentinel program (1995 to 2002, including strata of more than 20 fathoms; 2003-2019, includes strata of more than 10 fathoms). The dotted line represents the average of each series (1995-2002 and 2003-2018).

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, then declined, reaching its lowest point in 2010. It then generally increased until 2016 for reach a value well above the series average (1995-2016). This index shows a decrease from 2017 to reach in 2019 a value below the series average (Figure 5).

The standardized CPUE sentinel fishery index with gillnets shows a pattern similar to that of the sentinel longline fishery index with values in 2015 and 2016 significantly above the 1995-2018 series average. The values for 2017, 2018 and 2019 are comparable and are at the level of the series average (Figure 5).

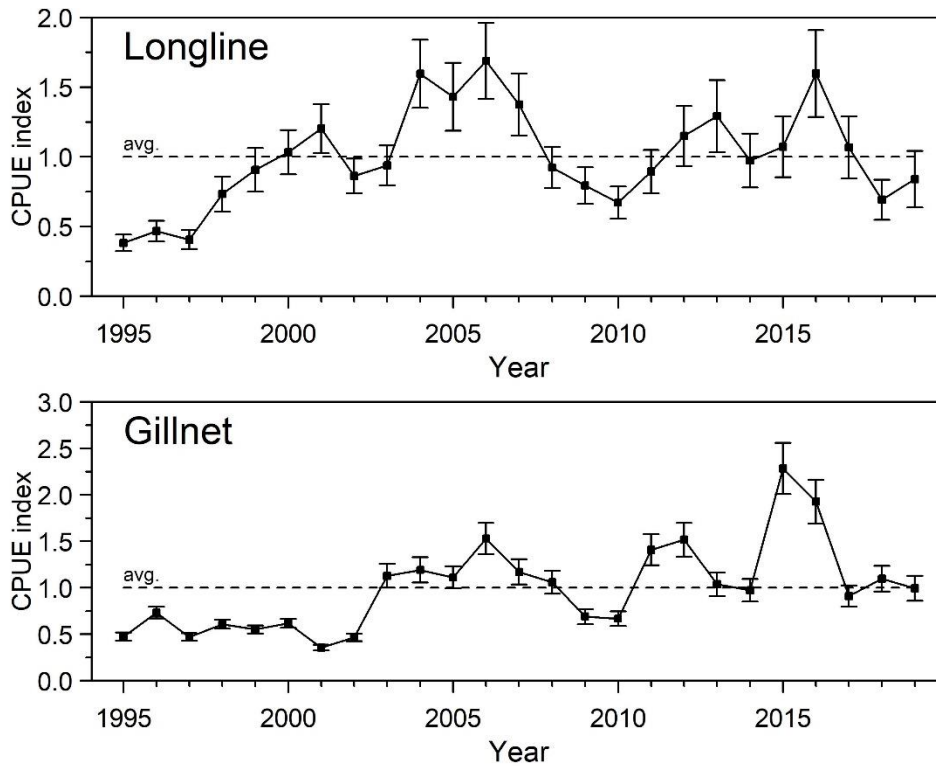


Figure 5. Standardized catch per unit of effort (CPUE) (\pm 95% confidence interval) of the sentinel fixed gear program. The dotted line represents the average of the 1995-2018 series. These data are preliminary and do not include the activities carried out in November and December 2019.

Conclusion

This update of the status indicators for the Atlantic cod stock in the northern Gulf of St. Lawrence (3Pn, 4RS) does not present any major changes compared to the previous assessment, the conclusion of the scientific advise 2019 therefore 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).

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Sources of information

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