



UPDATE OF INDICES OF ABUNDANCE TO 2020 FOR ATLANTIC COD (NAFO DIV. 4T AND 4Vn (NOVEMBER TO APRIL)) AND AMERICAN PLAICE (NAFO DIV. 4T) ASSESSED AND MANAGED BY DFO GULF REGION

Context

Fisheries and Oceans Canada (DFO) Ecosystems and Fisheries Management has instituted a multi-year management approach for the Atlantic Cod stock of the southern Gulf of St. Lawrence (sGSL; NAFO Divs. 4T and 4Vn (November to April)). The last full assessment of the Atlantic Cod stock of the sGSL (Swain et al. 2019) was completed in March 2019 with advice for the May 2019 to May 2023 fisheries period. Following on the advice of DFO (2016a) and as identified in the advisory report for Atlantic Cod (DFO 2019a), an update of indicators of stock status is to be provided at the end of the year 2020, mid-way in the four-year assessment and fisheries management cycle.

Fisheries and Oceans Canada (DFO) Ecosystems and Fisheries Management has instituted a multi-year management approach for the American Plaice stock of the southern Gulf of St. Lawrence (sGSL; NAFO Div. 4T). The last full assessment of the American Plaice stock of the sGSL (Richard et al. 2016) was completed in March 2016 with advice for the May 2016 to May 2021 fisheries period. An interim update of stock status was also completed in 2019 (DFO 2019b). This stock is currently under evaluation by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC) and will not undergo a full stock assessment in 2021 as was planned in its 5 year assessment cycle (DFO 2016b). Instead, an update of indicators of stock status is presented to inform decision making until the COSEWIC report is published, which is expected to be in 2021.

This Science Response Report results from the Science Response Process of February 16, 2021 on the Update of indices of abundance to 2020 for Atlantic Cod (NAFO Div. 4T and 4Vn (November to April)) and American Plaice (NAFO Div. 4T) assessed and managed by DFO Gulf Region.

Background

There is no directed fishery for either Atlantic Cod (*Gadus morhua*) or American Plaice (*Hippoglossoides platessoides*) in the southern Gulf of St. Lawrence. A total allowable catch (TAC) of 300 t exist for Atlantic Cod and 250 t for American Plaice to cover bycatch in other commercial fisheries, Indigenous food, social and ceremonial fisheries, a limited recreational fishery and scientific purposes (DFO 2016b, 2019a) (Table 1).

Table 1. Total allowable catch (TAC) values (t) and Limit Reference Point (LRP) values expressed in trawlable biomass (t) and in kg per tow, in effect during 2019 to 2023 for Atlantic Cod in NAFO Div. 4T. and during 2016 to 2021 for American Plaice in NAFO Div. 4T.

Species	Scientific name	Total Allowable Catch (t)	LRP Trawlable Biomass (t)	LRP (kg per tow)
Atlantic Cod	<i>Gadus morhua</i>	300	47,900	27.70
American Plaice	<i>Hippoglossoides platessoides</i>	250	33,700	19.53

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 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 2020 southern Gulf of St. Lawrence September RV survey was conducted between September 10 and October 4, 2020. A total of 86 successful tows were conducted. Due to unforeseen circumstances, strata 401, 402, 403 and 421 were not sampled in 2020. The updated indices presented here are for strata 415 to 439. 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.

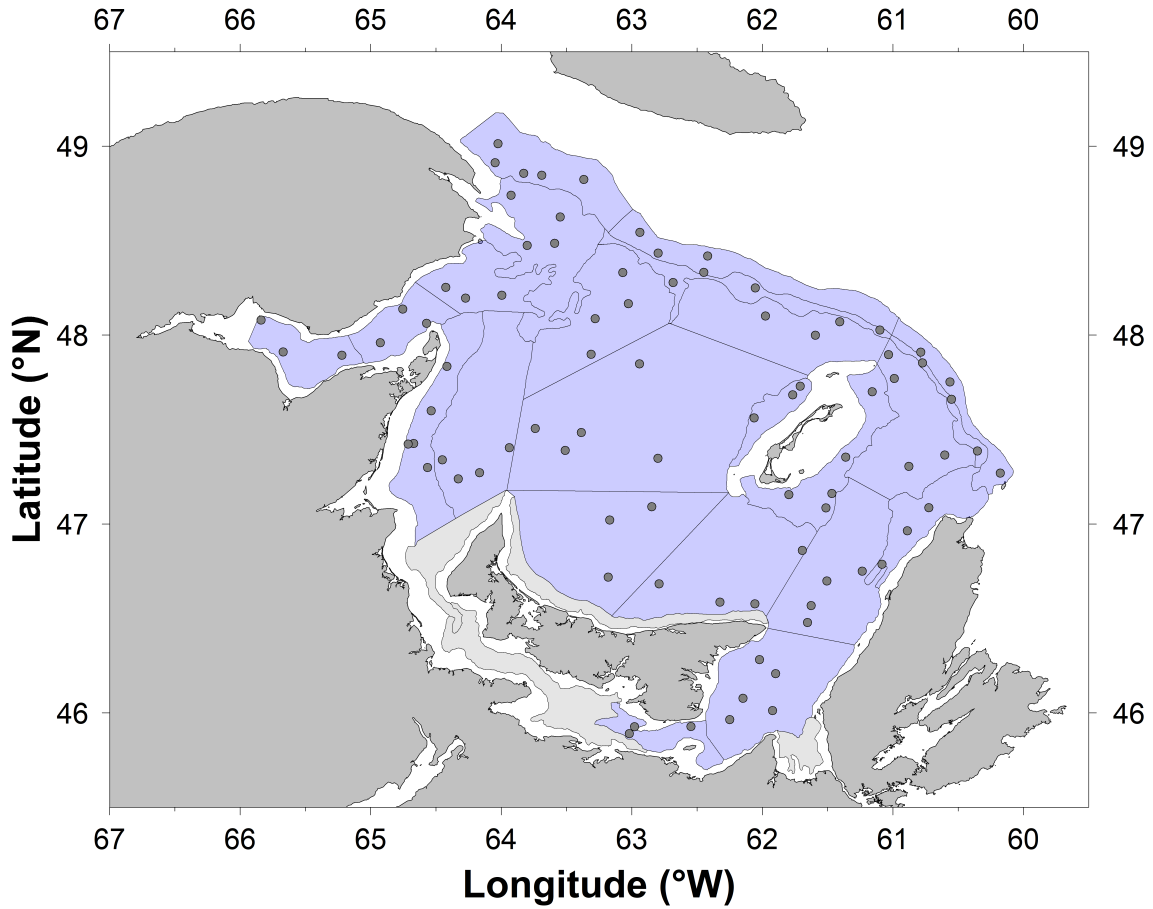


Figure 1. Location of the fishing sets from the 2020 southern Gulf of St. Lawrence September RV survey (survey area and strata boundaries appear in blue with set locations indicated by grey dots, $n = 86$ tows in strata 415 to 420, and 422 to 439). Strata that were not sampled in the 2020 September RV survey are indicated in light grey (strata 401, 402, 403 and 421).

Analysis and response

Indices by species

Atlantic Cod

The last full assessment of the Atlantic Cod stock of the sGSL was completed in March 2019 with advice for the May 2019 to May 2023 fisheries period (DFO 2019a; Swain et al. 2019). As part of the full assessment for the Atlantic Cod stock, DFO indicated that an interim year update would be provided mid-way in the four-year assessment cycle, no later than early December 2020, to allow sufficient time to complete a full assessment and plan the peer review if the species-specific indicator signaled that a re-assessment was warranted in winter 2021 (Swain et al. 2019).

An assessment before the scheduled four-year cycle would be recommended if the three-year moving average of the RV biomass index for commercial-sized Atlantic Cod exceeded the re-scaled Limit Reference Point (LRP) of trawlable biomass. For 2020, the three-year (2018 to 2020) average value of the index is 5,469 t of trawlable biomass in September (equivalent to 3.16 kg per tow, Figure 2). This value is well below the LRP threshold value of 47,900 t of trawlable biomass in September (equivalent to 27.7 kg per tow). Had this threshold value been exceeded, it would trigger an earlier than scheduled assessment.

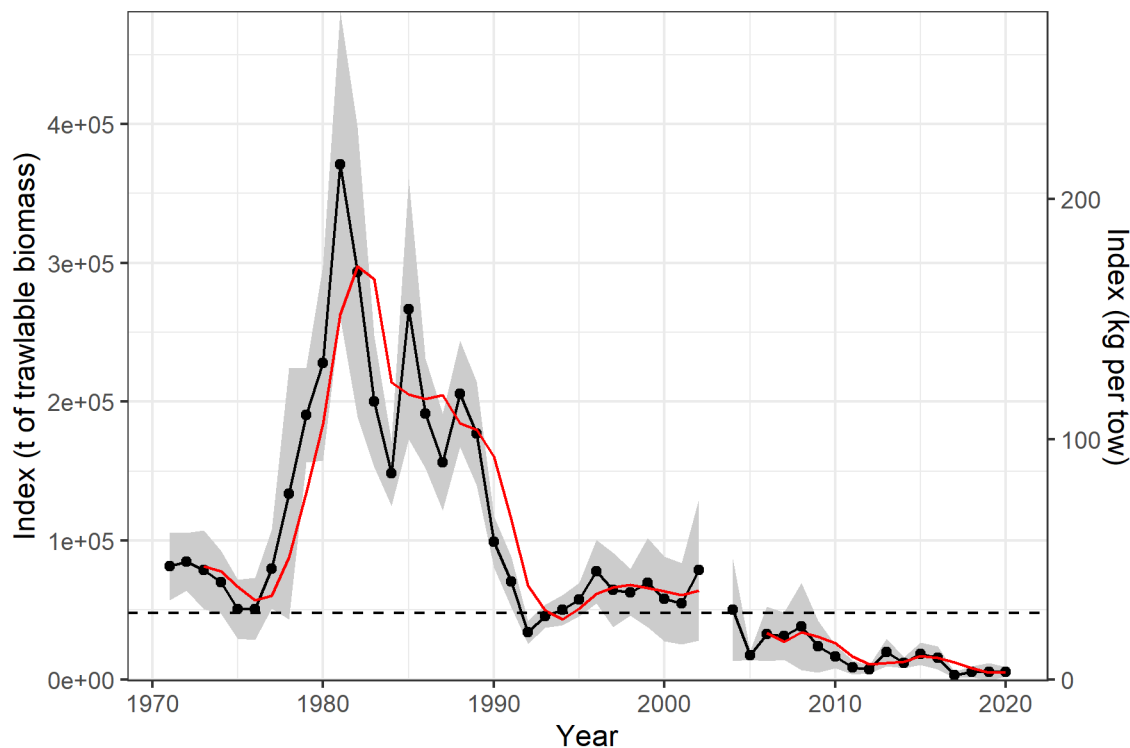


Figure 2. Annual RV survey index (kg per tow) of commercial size (≥ 42 cm total length) Atlantic Cod from strata 415-439 in the southern Gulf of St. Lawrence, 1971 to 2020. The black circles and solid black line are the stratified mean estimates and the grey shading denotes the 95% confidence intervals 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 47,900 t of trawlable biomass in September, equivalent to a catch rate from the survey of 27.7 kg per tow. Data from 2003 is omitted from the figure as an uncalibrated vessel was used in that year.

American Plaice

The last full assessment of the American Plaice stock of the sGSL was completed in March 2016 with advice for the May 2016 to May 2021 fisheries period (DFO 2016b; Ricard et al. 2016). An update of indicators to 2018 took place in 2019 (DFO 2019b). A full stock assessment was planned for the May 2021 to May 2026 fisheries period as part of the 5 year assessment cycle. However, American Plaice is currently being evaluated by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC) and will therefore not be assessed at this time. An update of indicators to 2020 is presented instead.

For 2020, the three-year (2018 to 2020) average value of the index is 4,665 t of trawlable biomass in September (equivalent to 2.7 kg per tow, Figure 3). The index value has been increasing for the last two years, but is still well below the re-scaled Limit Reference Point (LRP) of trawlable biomass in September of 33,770 t (equivalent to 19.53 kg per tow).

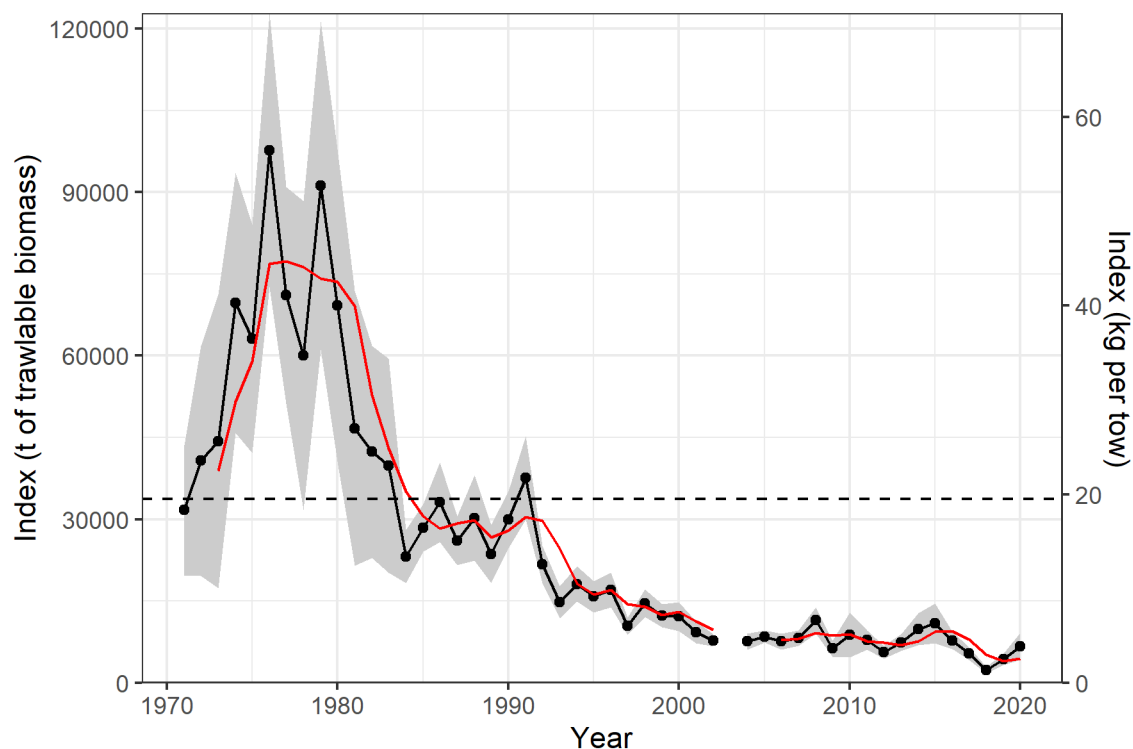


Figure 3. Annual RV survey index (kg per tow) of commercial size (≥ 30 cm total length) American Plaice from strata 415-439 in the southern Gulf of St. Lawrence, 1971 to 2020. The black circles and solid black line are the stratified mean estimates and the grey shading denotes the 95% confidence intervals 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 33,770 t of trawlable biomass in September, equivalent to a catch rate from the survey of 19.53 kg per tow. Data from 2003 is omitted from the figure as an uncalibrated vessel was used in that year.

Conclusions

The RV biomass index for commercial-sized (≥ 42 cm total length) Atlantic Cod in the southern Gulf of St. Lawrence indicates that there has been no improvement in status since the last assessment and the commercial biomass remains near the record low level. A stock re-assessment is not warranted and the previous advice for the fishery remains appropriate.

The RV biomass index for commercial-sized (≥ 30 cm total length) American Plaice in the southern Gulf of St. Lawrence indicates that there has been no improvement in status since its last assessment and, despite a small increase in the index value in the last two years, the commercial biomass remains near the record low level of 2018. The COSEWIC report for American Plaice will be available in 2021 and the previous advice for the fishery remains appropriate.

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Sources of information

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