



UPDATE OF STOCK STATUS INDICATORS FOR SCALLOP IN SUBAREA 20A IN THE MAGDALEN ISLANDS

Context

Stock assessment of scallop in Quebec inshore waters is done every three years, with some exceptions, to determine whether recent changes in the status of the resource may justify adjusting the conservation approach and management plan. The last assessment was done in the winter of 2020.

In the case of subarea 20A in the Magdalen Islands, decision rules used to calculate annual authorized fishing effort have been in place since 2010 (Trottier et al. 2017). This effort is calculated using the primary stock status indicator (annual average catch per unit effort, or CPUE, from commercial fishermen logbooks) and secondary indicators (sea scallop abundance indices from the most recent Fisheries and Oceans Canada research survey). Because of the change in the vessel used for the 2021 scientific survey and the significant uncertainty concerning the estimated densities of scallops during the survey, it was decided that the historical median of the scientific survey would be used for this update. The mean, in contrast to the median, is more influenced by extreme values. The annual average CPUE was updated after the 2021 fishing season to provide Fisheries Management with information on the fishing effort for the 2022 season according to the precautionary approach guidelines.

This Science Response Report results from the Regional Science Response Process of February 15, 2022 on the Updated indicators status of the scallop stocks in Subarea 20A in Magdalen Islands.

Background

Two scallop species are fished commercially in the Gulf of St. Lawrence, namely the sea scallop (*Placopecten magellanicus*) and the Iceland scallop (*Chlamys islandica*). These two species are present in the Magdalen Islands and mainly inhabit gravel, shell or rock substrates, generally at depths of between 20 and 60 metres. A Digby dredge is used to harvest scallops near shore and catches are landed mostly as meat (muscle). Given the difficulty in visually distinguishing the meat of the two species, commercial fishing statistics are presented regardless of the species.

Area 20 in the Magdalen Islands is subdivided into five subareas: 20A, 20B, 20C, 20E and 20F (Figure 1). Since 2007, the fishing effort in subarea 20A has been controlled by a total authorized number of days at sea and by a fishing season; in subareas 20B, 20C and 20F, it has been controlled by a fishing season only. Subarea 20E is closed because it is a sea scallop refuge area. The number of days in subarea 20A can be compiled in half-days (≤ 8 hours) or full days (maximum of 16 hours), two half-days accounting for one day at sea. There are 22 scallop fishing licences in the Magdalen Islands.

In 2010, reference points were determined and guidelines were established to estimate fishing effort based on the primary stock status indicator (CPUE) and its position according to the

classification zones (high, average and low CPUE). Decision rules have been established and specify the recommended effort variations according to the results of the secondary indicators.

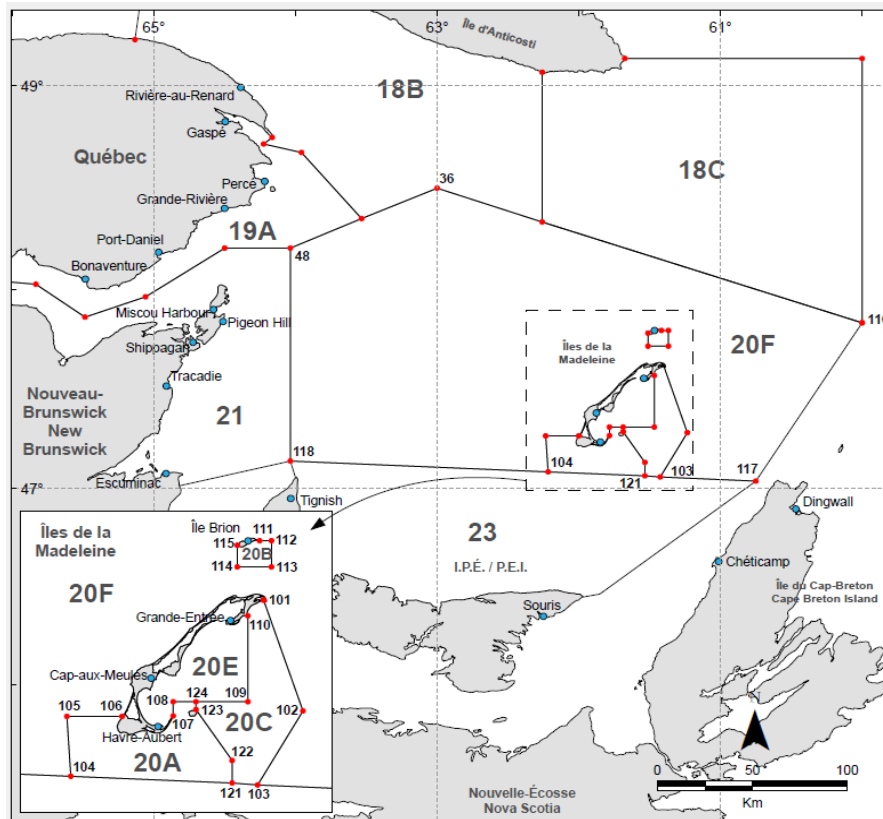


Figure 1. Scallop fishing subareas in the Magdalen Islands (20A, 20B, 20C, 20E and 20F).

The annual average CPUE (kg/hm) for the commercial fishery in subarea 20A is calculated based on information recorded in logbooks (i.e. landings in kg of meat, fishery duration in hours, and dredge width in metres). When CPUE is increasing, the average CPUE for the last two years is used as the primary indicator of the decision rule; when the CPUE is down, the value of the last year is used. Following the adoption of Bill C-68 in 2019, scallop scientific surveys have been changed from biannual to annual on the North Shore and Magdalen Islands. The scientific survey planned for the summer of 2020 was cancelled due to the COVID-19 pandemic. The scientific survey was conducted in the summer of 2021 on a different vessel because the Canadian Coast Guard vessel normally used for the survey was not available. Some modifications to the fishing technique had to be made, which resulted in significant uncertainty in the estimated densities of scallops during the scientific survey. Owing to this uncertainty, a decision was made, contrary to general practice, to use the historical medians as secondary indicators. The advantage of using historical medians is that this approach does not unduly influence the recommended adjustment of fishing effort and that the adjustment will be based on reliable historical data. The four secondary indicators used in this document are the medians from the research surveys conducted in the Magdalen Islands from 1987 to 2019. Those indicators chosen are relative density (number/1000 m²) of sea scallop for the <70-mm, 70 to 84-mm, 85 to 99-mm, and ≥100-mm size classes. The reference period for calculation of the 15th, 50th and 85th percentiles of the density is from 1987 to 2008.

For 2021, the maximum recommended fishing effort, calculated from the indicators, was 252 days. However, the effort authorized by DFO Fisheries Management was 230 days after consultation with the Industry.

Description of the fishery

Landings were 31.9 tons of meat in 2020 and 35.3 tons in 2021 in all of Area 20 (Figure 2), corresponding to a 10.8% increase in landings between 2020 and 2021. The majority of landings were from subarea 20A with 31.3 t in 2020 and 34.8 t in 2021. The fishing effort was 268 days (out of 299 authorized days) in 2020 and 218 days (out of 230 authorized days) in 2021.

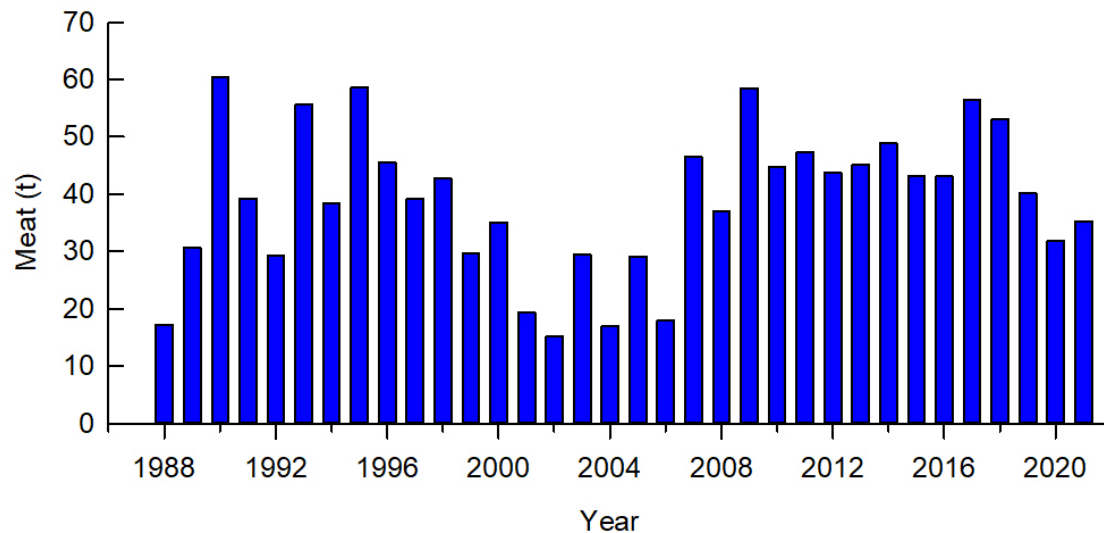


Figure 2. Scallop landings (t of meat) for all of Area 20 in the Magdalen Islands.

Analysis and Response

Indicators of the stock status

The CPUE was 1.51 kg/hm in 2021, up 35.9% from 1.11 kg/hm in 2020 (Figure 3). The average CPUE for the last two years (2020-2021) is 1.31 kg/hm and is between the upper reference level and the limit reference level, i.e. in the "Mean CPUE" classification zone. According to the medians of the research survey carried out from 1987 to 2019, sea scallop relative densities observed were 3.94/1000 m² for the ≥100-mm size class, 2.01/1000 m² for the 85 to 99-mm class, 1.73/1000 m² for the 70 to 84-mm class, and 5.15/1000 m² for the <70-mm class. The medians of density of all size classes fall between the 50th and 85th percentile (Figure 4).

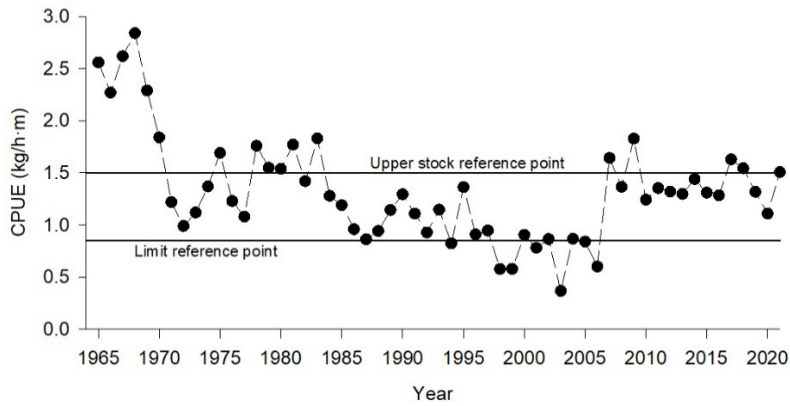


Figure 3. Annual catch per unit effort (CPUE) estimated from logbooks, subarea 20A.

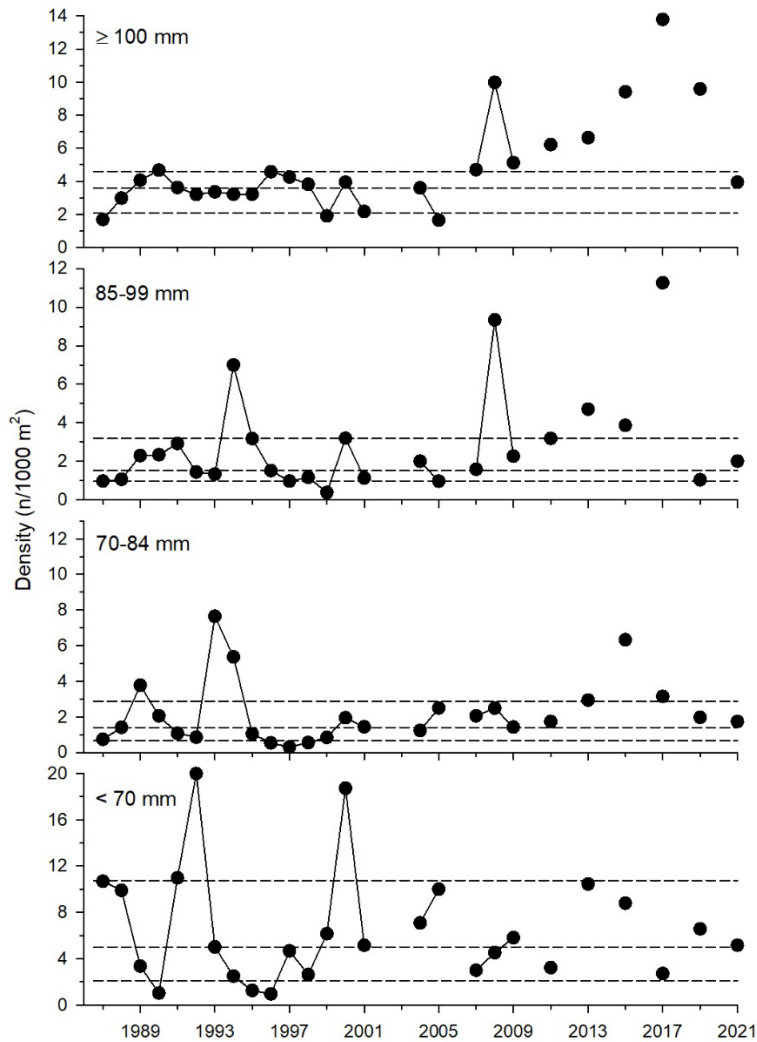


Figure 4. Density, by size class, of sea scallops sampled in subarea 20A during research surveys. The value of all size classes in 2021 represents the median from 1987 to 2019. The dashed horizontal lines represent the 15th, 50th and 85th percentiles of the 1987–2008 series.

Conclusions

The update of the primary indicator indicates a higher CPUE in 2021 than in 2020. The average CPUE of the last two years is in the "Mean CPUE" classification zone (Figure 5). Projected fishing effort for 2022 according to the primary indicator is 337 days. The adjustment calculated from the secondary indicators is -10% for all size classes according to the decision rules. The average adjustment calculated indicates that the maximum fishing effort in Subarea 20A for 2022 would be 303 days at sea [337 days + (-10-10-10-10)/4%]. This value is higher than the effort actually exerted in 2021 (218 days) in a context where fishing yield has increased in 2021 as anticipated and the medians of the secondary indicators of the research survey from 1987 to 2019 were used instead of specific densities for the 2021 research survey. Fisheries Management will determine the 2022 authorized fishing effort.

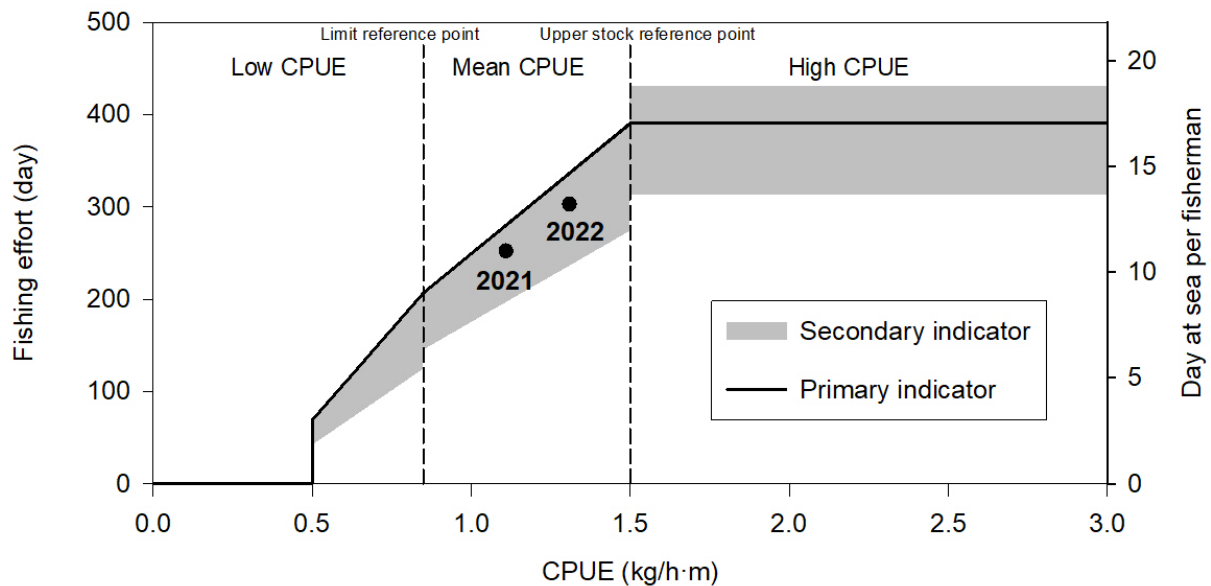


Figure 5. Calculation of fishing effort (days at sea) based on primary (CPUE) and secondary indicators (research survey indices) for subarea 20A in 2021 and 2022.

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Sources of Information

This Science Response Report results from the Regional Science Response Process of February 15, 2022 on the Updated indicators status of the scallop stocks in Subarea 20A in Magdalen Islands.

DFO. 2021. [Scallop stock assessment in Quebec coastal waters in 2019](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/054.

Trottier, S., Bourdages, H., Goudreau, P. and Brulotte, S. 2017. [Évaluation des stocks de pétoncle des eaux côtières du Québec en 2015 : données de la pêche commerciale, des relevés de recherche et des pêches exploratoires](#). Secr. can. de consult. sci. du MPO. Doc. de rech. 2017/037. xvi + 175 p.

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