



EXAMINATION OF INDUSTRY TRAWL SURVEY OF APRIL 2006 IN RELATION TO THE ASSESSMENT OF THE SNOW CRAB IN CFA 16

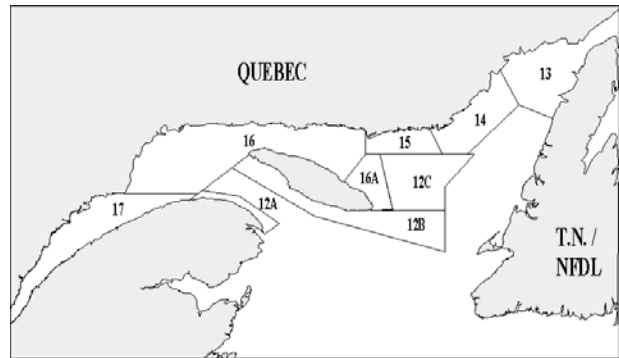
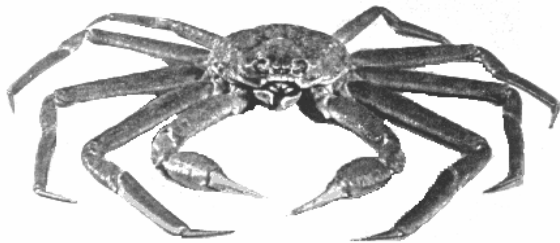


Figure 1. Snow crab management areas in the Estuary and the northern Gulf of St. Lawrence.

Context

The annual peer review of snow crab stock in area 16 took place from January 30 to February 2, 2006 at the Maurice-Lamontagne Institute (MLI). The Advisory Committee was held in Sept-Îles on February 21, 2006. On March 9, 2006, following this meeting, industry representatives asked the DFO for authorization to conduct, at their own expense, a scientific survey to confirm snow crab abundance in Area 16. These stakeholders believed the DFO was underestimating the available biomass and consequently, they were very critical of the management decisions, including access granted to non-traditional crabbers through temporary allocations.

The industry survey was conducted from April 3 to 12 2006, on board a chartered vessel, the Jean Jordannie, using a Bigouden nephrop trawl. Survey results were reviewed at MLI on May 15, 2006 in order to verify whether commercial size snow crab biomass estimates for Area 16 based on the survey could be used to establish a TAC, and also to determine if any improvements could be made to the survey.

SUMMARY

- In April 2006, the snow crab industry conducted a trawl survey in Area 16 in order to address perception issues concerning stock status following the January 2006 peer review.
- The survey was carried out in April 2006, but because of time constraints and several untrawlable areas, only approximately $\frac{1}{4}$ of the original sampling plan was carried out. Consequently, the survey cannot be used to estimate abundance in Area 16.

- However, preliminary 2006 CPUE, recruitment indices from the St. Marguerite Bay survey, combined with the partial results from the industry's trawl survey seem to indicate that the biomass in Area 16 is probably more abundant than estimated in January 2006. Consequently, a TAC increase in 2006 not exceeding 25% of the 2005 level can be recommended.

INTRODUCTION

Commercial fishery results indicated that the standardized catch rate had increased in 2004 and 2005, and that the mean size of crab also showed an upward trend since 2002, but remained relatively small nevertheless. Trap survey results indicated that biomass at the end of the 2005 fishing season was high and stable compared to 2003 and 2004, but that recruit abundance was showing a downward trend since 2003. Resource evaluation based on these indicators concluded that the biomass available to the fishery in 2006 should be similar to 2005 and the outlook for recruitment in 2006 was comparable or lower than in recent years. Science advice provided for a 2006 TAC similar to 2005 in order to maintain biomass at a level comparable to 2005.

However, industry had a much more optimistic outlook of the status of the resource. The non-standardized catch rate from fishers, particularly those from conical traps, were very high in 2005, so much so that they thought the TAC would be increased substantially in 2006. The difference between the industry's outlook based on very high performance, and scientific evaluation based on all the indicators became a considerable source of disagreement and led to the industry's rejection of the advice. In order to resolve this conflict, industry decided to fund and conduct a research survey to estimate snow crab biomass in Area 16 and show that the resource can support a substantial TAC increase in 2006.

Survey Method

The mission to estimate snow crab commercial biomass was carried out between April 3 and 12, 2006, on board the trawler "Jean Jordannie", chartered by the firm Marine Geomatics. The gear that was used was a Bigouden nephrop trawl. The sampling plan targeted a total of 128 stations selected randomly in a grid made of squares 6 nautical miles aside covering all depths between 10 and 120 fathoms in Area 16 (Figure 2). At each station, a 5 minute trawl was scheduled and the parameters for opening the trawl had to be measured using Netmind sensors. Catches were sorted according to commercial and non-commercial crabs by the fishers on board the ship using relevant criteria from the commercial fishery in Area 12. The sorted catches were weighed and additional data regarding weight, carapace condition and sexual maturity were recorded for all crabs caught.

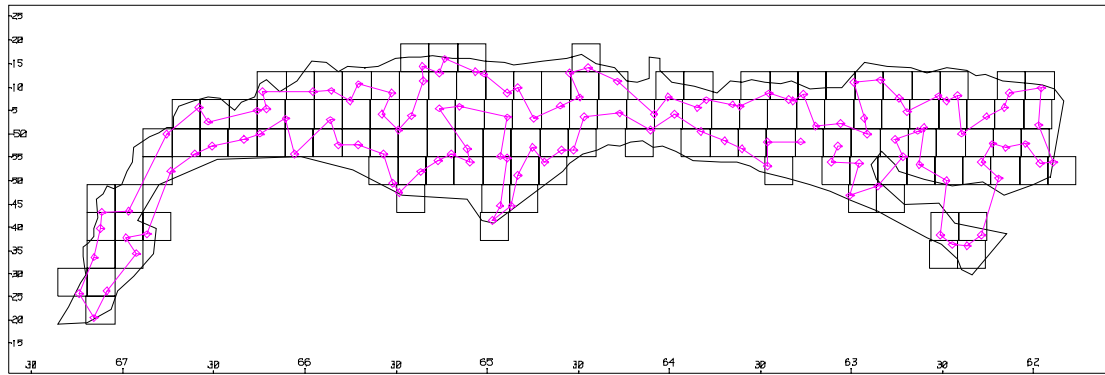


Figure 2. Sampling plan for Area 16, including 128 stations with one station per every 6 nautical-mile cell across.

The mission was scheduled for 20 days but had to be cut short. Furthermore, there were difficulties finding trawlable bottoms and thus most targeted stations could not be sampled (either because of trawl breakdowns or because of depth-sounder readings). Consequently, a total of 34 stations were carried out successfully out of the scheduled 128, and 9 stations weren't part of the initial sampling plan but were added by fishers as suggested trawlable areas. The sampling conducted during the mission is shown at Figure 3.

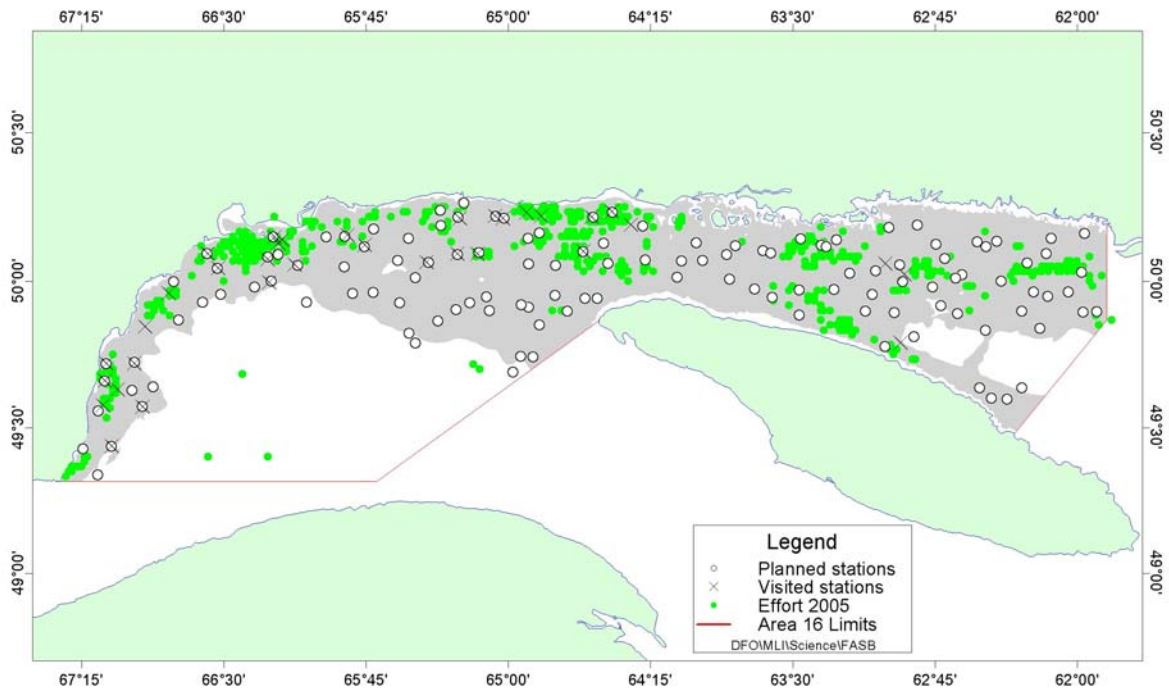


Figure 3. Geographical distribution and relative importance of snow crab catches using the Bigouden trawl in Area 16. The distribution of the 2005 fishing effort is shown by small full circles.

ANALYSIS

The area covered by the survey is very incomplete (under 25%) and triggered several discussions during the review. Results appear to be very uncertain and they cannot be used to estimate an absolute biomass of crabs in all of Area 16. The following issues were brought up:

- The small number of trawls does not cover sufficiently Area 16. Any result trend for the entire management area would be somewhat hazardous and was not considered valid.
- The stations sampled correspond mostly to usual fishing grounds in the sector west of Anticosti Island. Shallow waters (under 90 m) and the entire eastern part of the area were greatly under-sampled, whereas traditional fishing grounds to the west were over-represented.
- The stations that were added were done so on a mostly empirical (discretionary) basis and not on a statistical (random) basis, and therefore a biomass estimate that includes these stations would be biased.
- Finally, Area 16 is extremely heterogeneous, presenting a wide range of habitats. This variety could lead to an equally heterogeneous distribution of crab (which no doubt explains the weak autocorrelation observed in the kriging calculations made during the preliminary analysis). Once again, any extrapolation is difficult to accept.

For these reasons, it was decided not to use biomass extrapolations from the survey to represent the available commercial biomass of crab in Area 16 or to determine a TAC. However, it was noted that crab densities in the sampled sectors appear to be relatively significant, even though they may be somewhat upwardly biased (see above), which could show that crab abundance might be higher than what had been observed by the commercial fishery and trap survey. On the other hand, the proportion of legal-size crab with older carapaces was low in the survey, which could suggest that the stock is being exploited at an adequate level (around 35-40%) or that a biomass increase was very recent.

If this survey is carried out in the future, several changes will have to be made to correct biases and uncertainties:

- a more appropriate gear instead of the Bigouden nephrop trawl, or a combination of gear could be used in order to sample a large portion of untrawlable bottoms;
- the survey should be conducted later in the year to avoid periods when crab is largely aggregated;
- a series of detailed biological data and data concerning gear performance should be collected systematically and rigorously to maximize the benefits of the survey.

CONCLUSIONS AND ADVICE

This type of survey represents an interesting approach to completing the stock assessment, but the survey conducted in 2006 should be considered as an experimental phase which highlighted the inherent difficulties and constraints of the area and which will help develop this type of survey according to the particular local conditions.

Furthermore, since the assessment was presented at the Regional Advisory Process of January 2006, several positive signs helped define the status of the stock and the science advice for 2006.

- Catches per unit effort in the 2006 fishery appear to be very high for a third consecutive year;
- preliminary results from the St. Marguerite Bay survey of May 2006 provide the first indications that a new wave of recruitment (young crabs between 7 and 30 mm CW) have settled on the bottom.
- Finally, the industry survey results, although limited geographically, indicate that there may be interesting crab concentrations on traditional fishery bottoms in the western sector of the area;

In light of these results, a small TAC increase in 2006 should not have any short-term negative impacts. However, because the new wave of recruitment will not be available to the fishery until 5 or 6 years, and because the abundance of pre-recruits appears to be rather weak, the biomass currently settled on the bottom will have to support the commercial fishery for several years.

Recommendations

A TAC increase in 2006 not exceeding 25% of the 2005 level should not lead to any significant biomass drop in 2006.

SOURCES OF INFORMATION

DFO, 2006. Assessment of the Estuary and Gulf of St. Lawrence (Areas 13 to 17 and 12A, 12B and 12C) snow crab stock in 2005. DFO Can. Sci. Advis. Sec., Sci. Advis. Rep. 2006/019.

FOR MORE INFORMATION

Contact : Dominique Gascon
Or Bernard Sainte-Marie
Maurice Lamontagne Institute
850, route de la Mer
P.O. Box. 1000
Mont-Joli, Québec
G5H 3Z4

Tel. : (418) 775-0631 or 775-0617
Fax : (418) 775-0740
E-mail : Gascond@dfo-mpo.gc.ca
Sainte-MarieB@dfo-mpo.gc.ca

This report is available from the:

Regional Advisory Process (RAP) Office
Quebec Region
Fisheries and Oceans Canada
Maurice Lamontagne Institute
P.O. Box 1000
Mont-Joli
Quebec, Canada
G5H 3Z4

Telephone: (418) 775-0825
Fax: (418) 775-0740
E-Mail: Bras@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas

ISSN 1480-4913 (Printed)
© Her Majesty the Queen in Right of Canada, 2006

La version française est disponible à l'adresse ci-dessus.



CORRECT CITATION FOR THIS PUBLICATION:

DFO, 2006. Examination of Industry Trawl Survey of April 2006 in Relation to the Assessment of the Snow Crab in CFA 16. DFO Can. Sci. Advis. Sec., Sci. Advis. Rep. 2006/026.