



UPDATE OF STOCK STATUS INDICATORS FOR NORTHERN SHRIMP IN THE ESTUARY AND GULF OF ST. LAWRENCE

Context

The stock assessment of Northern Shrimp (*Pandalus borealis*) in the Estuary and Gulf of St. Lawrence (EGSL) is conducted every two years, with the most recent assessment completed in January 2018. The precautionary approach adopted for this fishery demands an annual update of the stock status indicators. This indicator of stock status is calculated from the indices obtained from the summer commercial fishery and the Fisheries and Oceans Canada (DFO) research survey. This update has been prepared to provide to the Fisheries Management the projected harvests for 2019 in the four shrimp fishing areas (SFA 8, 9, 10 and 12) according to the guidelines of the precautionary approach.

This Science Response Report results from the Science Response Process of December 17, 2018 on the update of stock status indicators for Northern Shrimp in the Estuary and Gulf of St. Lawrence.

Background

The Northern Shrimp fishery in the Gulf of St. Lawrence is conducted by trawlers in four shrimp fishing areas: Estuary (SFA 12), Sept-Iles (SFA 10), Anticosti (SFA 9) and Esquiman (SFA 8).

Shrimp fishing is regulated by a number of management measures, including the setting of total allowable catches (TAC) in the four areas. TAC-based management limits fishing in order to protect the reproductive potential of the population. The essential elements for the establishment of a precautionary approach were adopted in 2012. Reference points were determined and harvest guidelines were established based on the main indicator and its position in relation to the stock status classification zones (healthy, cautious and critical). Once the harvest is projected, decision rules are applied by Fisheries Management to determine the TAC.

Description of the Fishery

Following the last assessment, the 2018 TACs were reduced by 74% in the Estuary fishing area, by 60% in Sept-Iles, and by 15% in Anticosti and Esquiman, representing a 35% decrease in whole of the EGSL. Preliminary 2018 statistics indicate landings of 16,680 tons (t) for all areas for a possibility of 17,335 t. Preliminary landings reached more than 90% of the TAC in Estuary and Anticosti, and 100% of the TAC in Sept-Iles and Esquiman (Figure 1). The total fishing effort in the EGSL has decreased by 30% in 2018 to total approximately 82,000 fishing hours.

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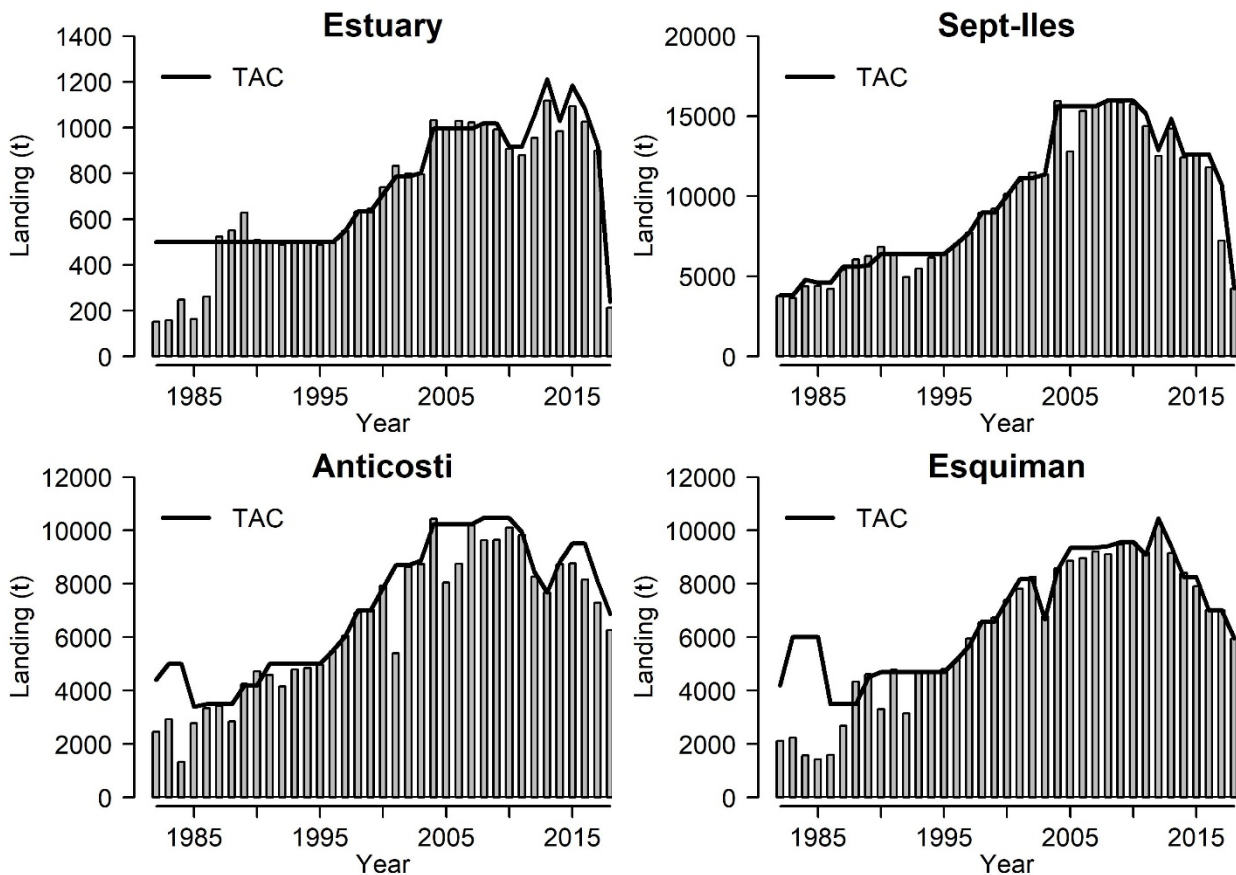


Figure 1. Landings and total allowable catch (TAC) by fishing area and by year. The 2018 landings data are preliminary on date of December 17, 2018.

Analysis and Response

Abundance indices

The update of the main stock status indicator is based on two independent sources of data, the number of shrimp per unit of effort (NPUE) from the summer commercial fishery (June, July and August) and the index of shrimp abundance from the DFO research survey. From these two sources of data, indices for male and female components are estimated, for a total of four indices by fishing area. In order to combine them into one indicator, each index is standardized in relation to a reference period.

The downward trend, observed in recent years in male and female survey abundance indices, continued in 2018 in the four areas to reach low values comparable to those observed in the early 1990s (Figure 2). The decline in abundance is also noticeable in the indices of the commercial fishery, the downward trend continued in 2018 in all the stocks except for the Estuary area, where there are strong inter-annual variations in these indices.

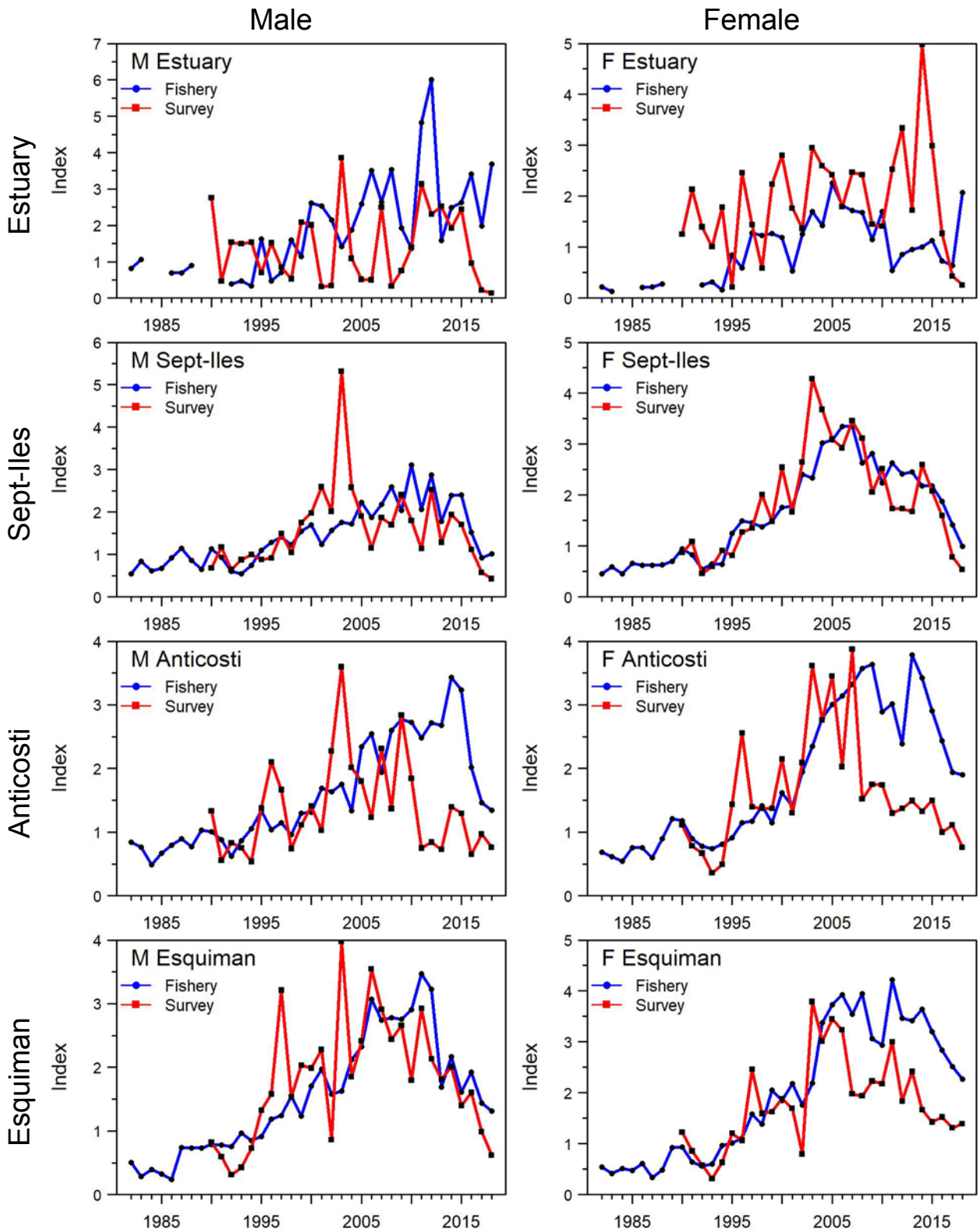


Figure 2. Standardized indices from the commercial fishery (blue) and the research survey (red) for males (M) and females (F) by fishing area and year.

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Main stock status indicator

For each stock, the main stock status indicator represents the mean of the four indices, the males and females obtained from the summer commercial fishery and the DFO research survey.

The main indicator of Estuary stock status increased in 2018 following three years of decline (Figure 3). In 2017, the indicator for this stock had been in the cautious zone to come out in 2018 and be in the healthy zone. The value of the 2018 indicator is comparable to the value observed in 2016. This indicator shows large inter-annual variations in the Estuary area.

The downward trend in the main stock status indicator for Sept-Iles, Anticosti and Esquiman continued in 2018. This indicator has been decreasing since 2014 for these three stocks and is equal to or close to values observed in the middle of 1990s. In 2018, the indicator for Sept-Iles stock was in the caution zone for a second consecutive year. The indicators for Anticosti and Esquiman stocks remained in the healthy zone, but very close to the upper reference point and thus to the cautious zone.

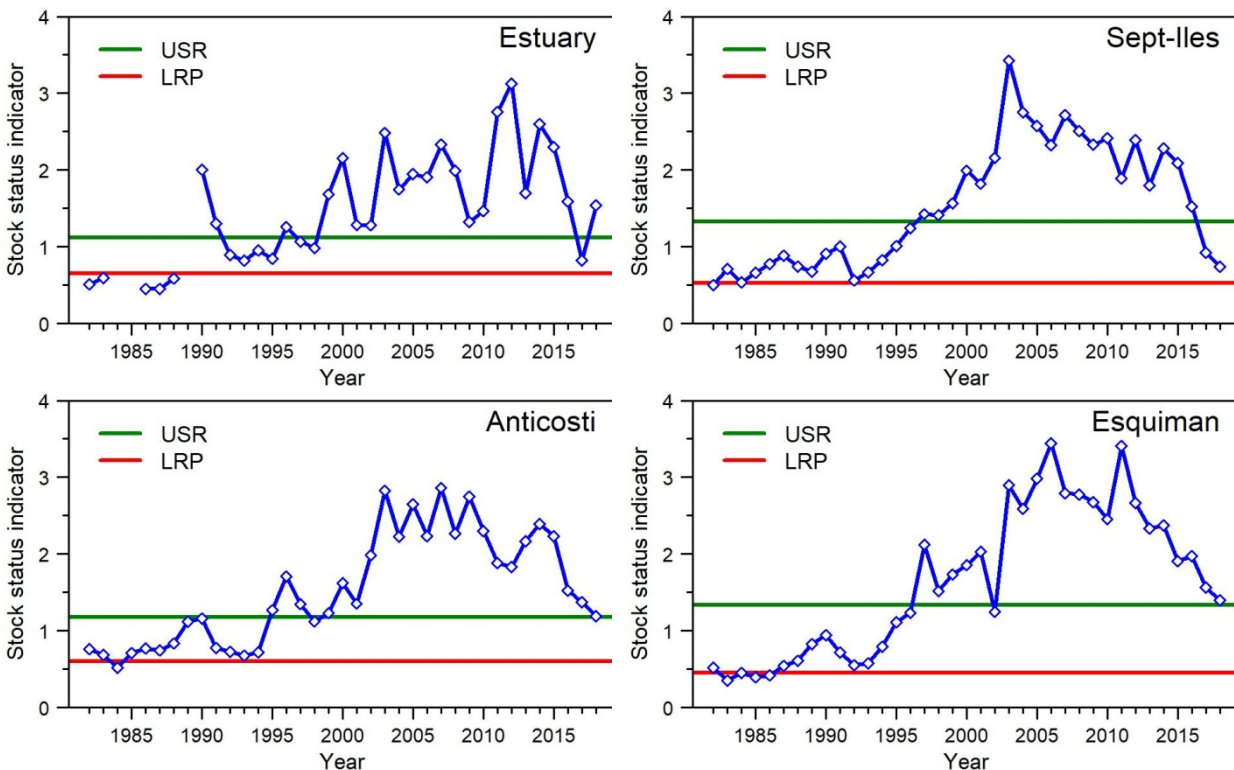


Figure 3. Main stock status indicator by year and limit (LRP) and upper (USR) stock reference points for each fishing area.

Conclusions

These changes in environmental and ecosystem conditions observed in the Gulf of St. Lawrence have an impact on the Northern Shrimp population dynamic through their effects on such factors as abundance, spatial distribution, growth and reproduction.

The analysis of the main stock status indicator shows that the Estuary stock status situation may have improved in 2018, although it is difficult to conclude that this is the case given the

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large inter-annual variations. The indicator for this stock that was in the cautious zone in 2017 is again in the healthy zone. The situation of Sept-Iles, Anticosti and Esquiman stocks does not appear to have improved in 2018. The downward trend continued for a fourth consecutive year for these three stocks. The indicator for Sept-Iles stock is still in the caution zone while those for Anticosti and Esquiman stocks are in the healthy zone but very close to the caution zone.

According to the guidelines, the projected harvests for 2019 are 724 t for Estuary, 2,658 t for Sept-Iles, 4,979 t for Anticosti and 4,930 t for Esquiman (Figure 4). Fisheries Management will set the 2019 TACs based on these projected harvests by following the decision rules of the precautionary approach currently in effect.

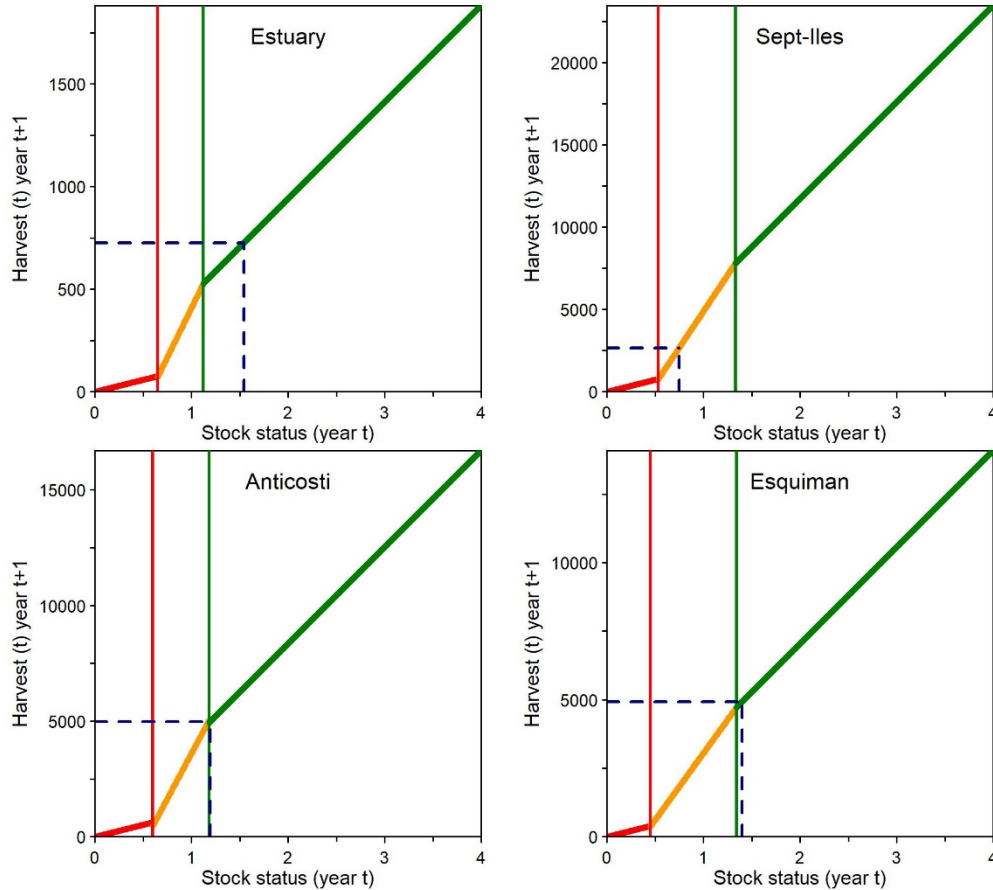


Figure 4. Harvest guidelines by fishing area. The projected harvest for 2019 is shown (dashed line) in view of the main stock indicator in 2018.

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Sources of information

This Science Response Report results from the Science Response Process of December 17, 2018 on the update of stock status indicators for Northern Shrimp in the Estuary and Gulf of St. Lawrence.

Additional publications from this process will be posted on the [DFO Science Advisory Schedule](#) as they become available.

Bourdages, H., and Marquis, M.C. 2019. Assessment of northern shrimp stocks in the Estuary and Gulf of St. Lawrence in 2017: commercial fishery data. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/056. iv + 99 p.

Bourdages, H., Marquis, M.C., Nozères, C. and Ouellette-Plante, J. 2018. [Assessment of northern shrimp stocks in the Estuary and Gulf of St. Lawrence in 2017: data from the research survey](#). DFO Can. Sci. Advis. Sec. Res. Doc. 2018/057. iv + 67 p.

DFO 2011. [Reference points consistent with the precautionary approach for northern shrimp in the Estuary and Gulf of St. Lawrence](#). DFO Can. Sci. Advis. Sec., Sci. Advis. Rep. 2011/062.

DFO. 2018. [Assessment of Northern Shrimp stocks in the Estuary and Gulf of St. Lawrence in 2017](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2018/015.

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