



ASSESSMENT OF THE STIMPSON'S SURFCLAM STOCKS OF QUEBEC COASTAL WATERS IN 2008

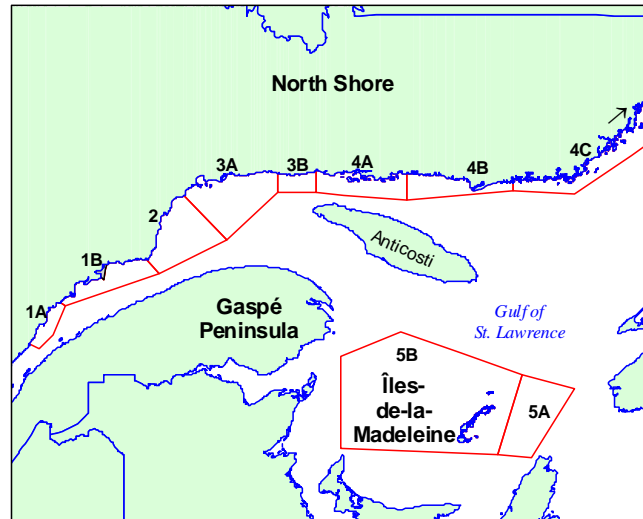
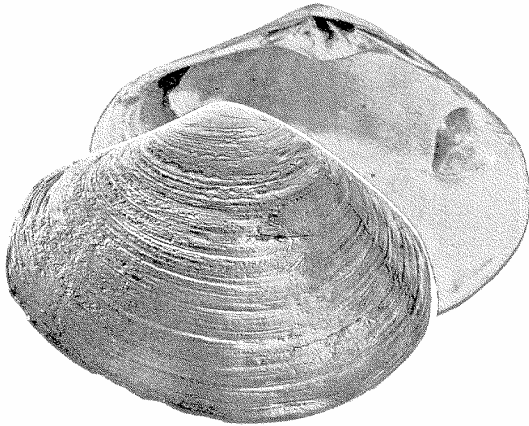


Figure 1 : Stimpson's surfclam fishing areas in Quebec.

Context

Stimpson's surfclam (*Mactromeris polynyma*) fishing is a recent activity in the Gulf of St. Lawrence. The most significant beds are mainly located on the North Shore of Quebec as well as in the Magdalen Islands area. Stimpson's surfclam is also found in low densities in certain areas on the Lower North Shore and the northern coast of the Gaspé Peninsula. Stimpson's surfclam fishing is conducted inshore using hydraulic dredges. Quebec waters are divided into ten fishing areas. This fishery is mostly managed by the number of permits issued, a fishing season, and a quota. Exploitation occurs on the North Shore and in the Magdalen Islands.

Resource assessment is made every three years in order to determine if the changes that have occurred in the status of the resource justify adjustments to the conservation approach and management plan. The main indicators used in this assessment are derived from landing, logbook and commercial capture sampling data.

SUMMARY

- The Quebec region has ten Stimpson's surfclam fishing areas, eight on the North Shore and two in the Magdalen Islands. In 2008, 10 permanent licenses and 8 exploratory licenses were issued in Quebec.
- Landings totalled 650 tons in 2008 and 99% of them were on the North Shore. Landings dropped by 30% between 2006 and 2007 due to a reduced fishing effort resulting from fishing licences that remained inactive. Therefore, areas 1B, 4C, 5A and 5B were hardly exploited in 2008. However, the quota was reached in areas 1A and 3B.

- In 2008, the average catch rates fluctuated between 149 and 884 kg/hm according to the area. The average from each area was either higher or equal to the 1998-2007 series mean.
- The annual proportion of exploited surfclam beds varies between 2% and 8% of the total area.
- The mean size of captured individuals remains stable on the main beds harvested.
- Capture and recapture experiments show that the Stimpson's surfclam growth is very slow and that it has a long lifespan.
- The status quo is recommended in all areas, according to the decision rules established for adjusting quotas. These rules explain that a quota cannot be increased unless the quota has been reached consistently for five years and that the stock status indicators are stable or show an upward trend.

INTRODUCTION

Biological Context

Stimpson's surfclam, *Mactromeris polynyma*, is a bivalve mollusc found along the west coast of the Atlantic, from Baffin Island to Rhode Island. It is also found on the Pacific coast, from Alaska to Vancouver Island. In the Gulf of St. Lawrence, Stimpson's surfclam is found under the low tide line up to a depth of 60 meters. It is a benthic, sedentary, and filter-feeding bivalve that lives buried in sandy sediments. It is found in waters with temperatures below 15°C. Surfclams gather in aggregations called "beds".

In the northern Gulf of St. Lawrence, surfclams reach a length of 80 mm (anteroposterior length) after 13 to 15 years, but growth fluctuates substantially from an individual to another. Five surfclams, among several that were tagged on the shell in 1995, were recaptured 8-13 years after being tagged. Based on these recaptures, growth was estimated at less than 1 mm per year after reaching 100 mm. The mean size of surfclams harvested on the North Shore is around 110 mm, which would represent individuals of 25+ years-old. The oldest specimens with sizes that reach 140 mm could be more than 75 years-old. The mollusc therefore has a significant lifespan.

Sexes are separate and fertilization is external. In the Middle North Shore, the size at sexual maturity of females would be higher than 60 mm. However, size at sexual maturity may vary according to the sex and fishing area. In the Middle North Shore, spawning would occur mostly from early July to early August. In certain sectors, there could also be a second spawning period later in the fall. After eggs hatching, a pelagic larvae stage extending over a few weeks precedes benthic life.

Fishery Management

Stimpson's surfclam (*Mactromeris polynyma*) fishing began in the early 1990s in the Gulf of St. Lawrence. This inshore fishery is conducted inshore using hydraulic dredges, whose spacing between basket stems must be equal or greater than 3.175 cm. The effectiveness of this type of dredge was estimated at more than 90% for surfclam size categories caught by the dredge, i.e. those measuring at least 80 mm.

Quebec has ten Stimpson's surfclam fishing areas, eight on the North Shore and two in the Magdalen Islands (Figure 1). This fishery is managed by fishing area, the number of permits issued, a fishing season, and quotas (Table 1). In 2008, ten permanent licenses and eight exploratory licenses were issued. Some permanent licenses can give access to more than one fishing area.

Table 1. Management measures for Stimpson's surfclams in 2008.

Management measures	Fishing areas									
	1A	1B	2	3A	3B	4A	4B	4C	5A	5B
Number of licences (exploratory)	1	1	4	2	2	2	(6)	(3)	4	4
Quota (t)	75.5	68.6	54.9	75.8	83.4	164.7	425	170	136	113
Quota management ¹	Comp.	Comp.	Comp.	ITQ	ITQ	ITQ	Comp.	Comp.	Comp.	Comp.
Fishing season	²	³	← 30/06 to 26/10 →				⁴	⁵	⁶	⁶
Stem spacing	← 3.175 cm →					← 3.175 cm →				
Number of dredges (2.134 m)	← 1 →			← 2 ⁷ →			← 1 →			
Minimal size										← 80 mm →

¹ = ITQ (individual transferable quota with restriction), Comp. (competitive fishing)

² = 07/04 to 08/06 and 30/06 to 12/10

³ = 07/04 to 08/06 and 13/07 to 12/10

⁴ = 16/06 to 12/10

⁵ = 30/06 to 12/10

⁶ = 01/04 to 14/06 and 01/08 to 13/12

⁷ = 2.438 m of overall width

RESOURCE ASSESSMENT

The assessment of the Stimpson's surfclam stock status is mostly based on analysis of data from landings, logbook information recorded by fishermen, and samples of commercial catches collected at sea on board of fishing vessels until 2003 and now at dockside. Scientific surveys and exploratory fisheries enhance information regarding surfclam beds and the status of the resource.

Since 1990, several beds of different sizes have been found. These beds are mostly located on the North Shore and in the Magdalen Islands. Stimpson's surfclam is also found in low densities in certain areas on the Lower North Shore and the northern coast of the Gaspé Peninsula (Figure 2).

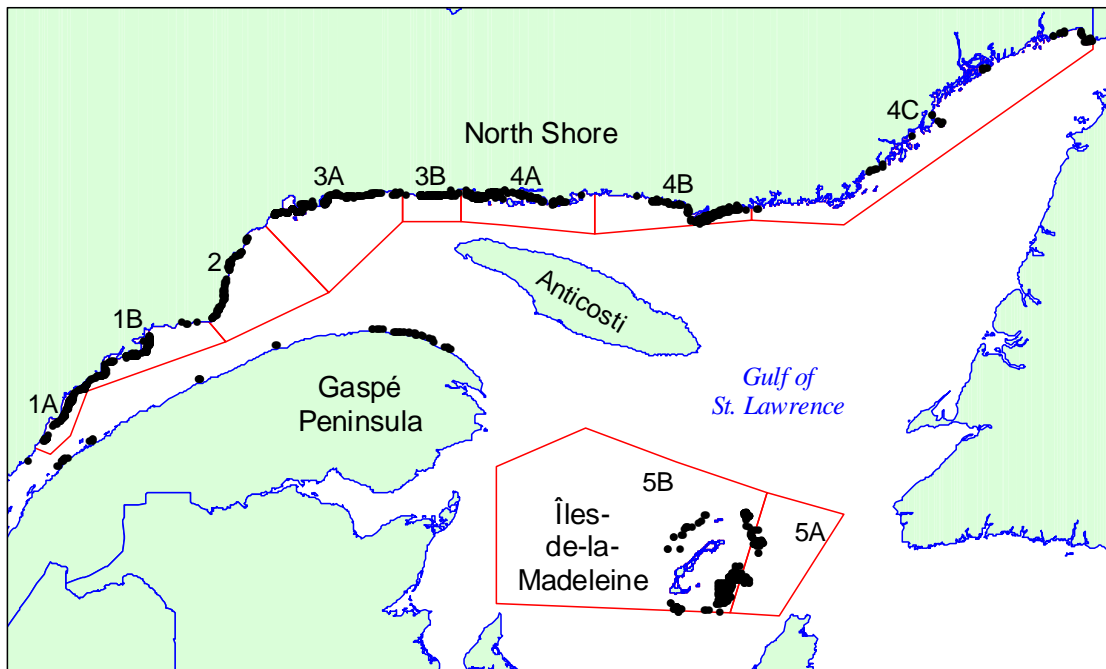


Figure 2. Known distribution sites for Stimpson's surfclam in Quebec.

Stimpson's surfclam landings peaked at 888 tons liveweight in 2005 and 2006 (Figure 3). Landings dropped by 30% in 2007 and then increased by 4% in 2008 and totalled 650 tons liveweight. This drop in landings was due to a reduced fishing effort resulting from fishing licences that remained inactive. In 2008, 99% of the landings were from the North Shore (Figure 4). The total allowable catch (TAC) was reached in areas 1A and 3B, but not in the others areas due to an insufficient fishing effort. Areas 1B, 4C, 5A and 5B were almost not exploited in 2008.

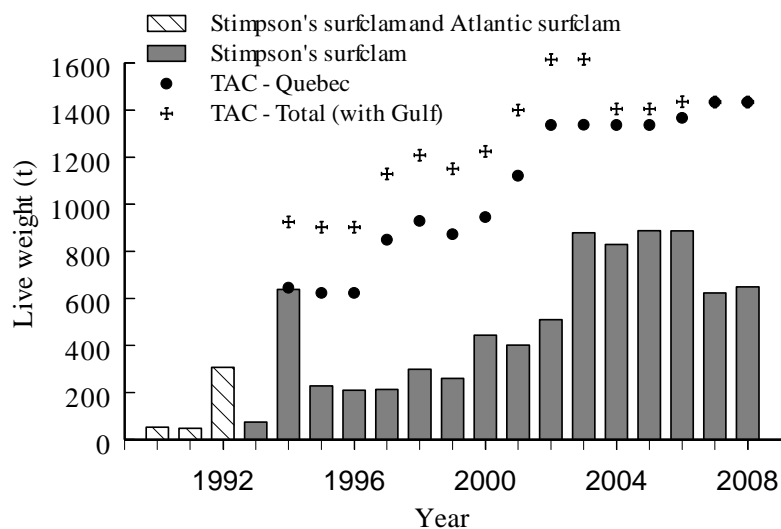


Figure 3. Annual Stimpson's surfclam landings and quotas (TAC) in Quebec.

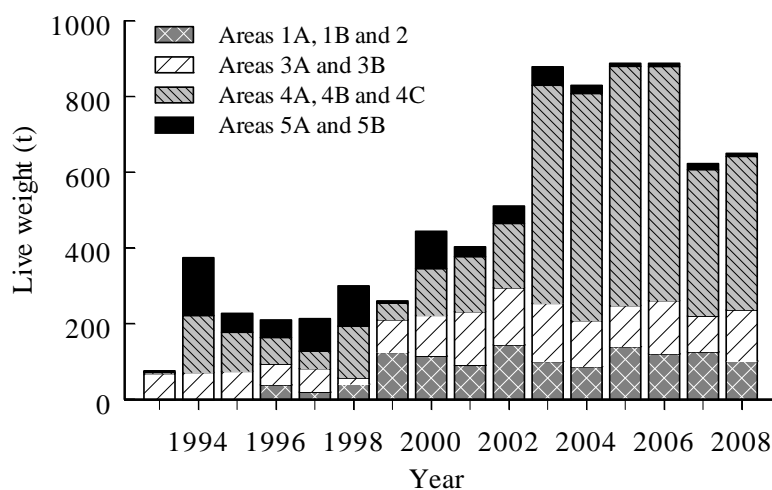


Figure 4. Annual Stimpson's surfclam landings in Quebec per fishing unit area.

The average of catches per unit of effort has fluctuated from year to year in most of the areas since 1998 (Table 2). It should be noted however that variability in catches per unit of effort from one tow to the other is high. Moreover, given the low number of fishermen in each area, variations in annual average catch rates can reflect changes in fishing strategy, for example fishing gear modifications or exploitation of different beds. In 2008, catches per unit of effort fluctuated from 149 to 884 kg liveweight per fishing hour for a 1 m wide tow according to areas, which suggests different densities between areas. The mean CPUE for each area in 2008 was higher or equal to the 1998-2007 series average.

Table 2. Catches per unit of effort (kg of liveweight per fishing hour for a 1 m wide tow) estimated using logbook data.

	Fishing areas									
	1A	1B	2	3A	3B	4A	4B	4C	5A	5B
1998	165	199		298		514	294			269
1999	262	215	398	273	454	923				141
2000	336	221	456	363	699	790				151
2001	319	217	361	255	540	632				179
2002	283	103	355	359	390	621	537			182
2003	238	100	278	296	358	567	639			167
2004	395	156	371	293	417	762	424			178
2005	431	246	748	214	564	643	381			147
2006	432	101	326	276	523	597	351			169
2007	370	191	357	334	387	879	398			164
2008	326		673	379	465	884	498			149

Since 1995, the average size of surfclams harvested by commercial fishing has remained stable in most of the main beds harvested (Table 3). In 2008, the average sizes were larger than 109 mm in almost every area, except for areas 3B and 4B, where it was 105 mm and 102 mm respectively. The percentage of individuals measuring less than 80 mm in commercial samples was low due to dredge selectivity.

Table 3. Average sizes (mm) of Stimpson's surfclams estimated using commercial fishery samples.

	Fishing areas									
	1A	1B	2	3A	3B	4A	4B	4C	5A	5B
1995		95	110	105	115	115				98
1996		93		103	111	112				95
1997		95		104	111	111				96
1998		102		116		112	117			99
1999		110	106	115	108	111				
2000	113	108	107	118	106	111				100
2001	108	108	102	112	112	111				99
2002	109	107	115	103	104	112				99
2003	108		113	110	114	110	101			102
2004	112	104	114	114	107	108	106			101
2005	112		111	110	105	111	103			101
2006	112		116	107	102	106	104			
2007	112		115	109	107	113	102			102
2008	110		114	109	105	113	102			

Research surveys and exploratory fisheries, conducted mostly by the industry between 1990 and 2001, have helped to define Stimpson's surfclam geographic distribution in Quebec. The industry's contribution in the study has helped us to gather essential data in order to evaluate this resource. These efforts have also helped us to locate many beds of commercial interest, but of various sizes, in each fishing area.

An exploitation index, as follows, was developed for the primary beds harvested. First, the surface portion of the bed that is exploited was calculated using daily fishing positions recorded in the logbooks: this area is smaller than the total bed area. Second, the portion that apparently dredged was calculated using fishing effort, the width of the dredges and vessel speed: this portion is larger than the actual disrupted area because there could be some dredge tow overlapping. Finally, the exploitation index is calculated as the ratio of the surface apparently dredged over the total bed area, in percentage. This index varies between 1.5% and 3%, except for the Natashquan bed where the area harvested annually is around 8%.

Sources of Uncertainty

This assessment is based only on indices derived using logbook data and commercial capture sampling at dockside. There is no independent source of information available on this fishery. With unknown exploitation rates, bed productivity and recruitment, using a precautionary approach seems to be the only mean to adjust quotas.

CONCLUSIONS AND ADVICE

Catches per unit of effort along with the average size of surfclams harvested have remained stable in the main beds exploited since the beginning of this fishery in the Gulf of St. Lawrence.

Quota increases must be conservative as the weak growth rate and the sedentariness of this species make certain sites vulnerable to overexploitation. In reality, such an approach could correspond to a maximum increase of 10% in the captures by 5-year period, in as much as TACs are reached on a regular basis. This would allow sufficient time to observe the effects of such increases. Moreover, these increases will have to account for the productivity of each area.

The status quo is therefore recommended in all areas, according to the decision rules established for adjusting quotas, since no area was exploited to the authorized TAC level for five consecutive years following the last increase.

OTHER CONSIDERATIONS

Conservation Approach

The weak growth rate and sedentariness of the Stimpson's surfclam make it vulnerable to local overexploitation. The lack of protective measures for spawners on the North Shore increases the overexploitation risks. In order to protect the spawning potential and to improve yield by recruiting new cohorts, it is recommended, to take example on the Magdalen Islands, to prohibit the capture of individuals of less than 80 mm on the North Shore.

Stimpson's surfclams spawn in July, and juvenile deposition on the bottom occurs at least six weeks later. Suspending fishing during the reproductive period and during larvae deposition on the bottom can only be beneficial in protecting the reproductive potential.

As the growth level is weak and longevity is high, natural mortality is likely to be low. The optimal exploitation rate will probably have to remain low in order to ensure a sustained yield over time.

SOURCES OF INFORMATION

Lambert, J. et P. Goudreau. 1997. Biologie et exploitation de la mactre de Stimpson (*Mactromeris polynyma*) sur les côtes du Québec. MPO Sec. can. éval. stock, Doc. Rech. 97/101. 44 p.

FOR MORE INFORMATION

Contact: Hugo Bourdages
Maurice Lamontagne Institute
850 route de la Mer
Mont-Joli (Quebec)
G5H 3Z4

Tel: (418) 775-0587
Fax: (418) 775-0740
E-Mail: Hugo.Bourdages@dfo-mpo.gc.ca

This report is available from the:

Centre for Science Advice (CSA)
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) 775-0679
E-Mail: Bras@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas

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