STOCK STATUS REPORT

LAURENTIAN REGION

Maurice Lamontagne Institute
PO Box 1000, Mont Joli, Quebec G5H 3Z4, CANADA

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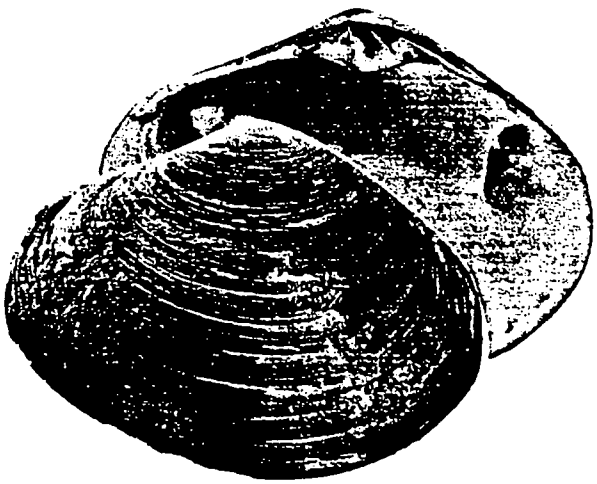
QUÉBEC STIMPSON'S SURF CLAM



OVERVIEW OF THE SURF CLAM

Background

During the past few years, fisheries have been developing around new resources, such as certain species of bivalve molluscs. The Stimpson's surf clam (*Mactromeris polynyma*) can be harvested with mechanized fishing gear and has attracted considerable interest in the Industry. It is a sedentary species and lives in concentrations of varying size called beds. It needs a specific type of habitat to become established and form a bed of sufficient density to permit harvesting. Stimpson's surf clams are found in varying quantities along the coast of Québec, owing to the diversity of habitats.

Conservation measures for the Stimpson's surf clam in Québec are aimed at ensuring the continued existence of each bed. It is important to protect a sector's diversity by ensuring the conservation of the many beds it supports. Relations between neighbouring beds may be significant in the recruitment process, and to protect the sector's productivity, it is essential to ensure that sites maintain their larval production capacity. Setting up a number of fishing areas or subareas and a cautious approach to developing the fishery are a normal part of this conservation strategy.

As for other bivalve fisheries, the objective of conservation is to maintain reproductive potential. This may be accomplished by:

1. Maintaining unharvested sites that can produce larvae for neighbouring sites;

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2. Harvesting individuals whose size and age allow them to reproduce before being recruited to the fishery;
3. Harvesting only a fraction of breeders so as to leave a minimum spawning biomass in the population.

These strategies may be used individually or in combination. However, there is not yet enough scientific information about surf clams for the strategies to be used quantitatively. The spawning biomass needed to maintain reproductive potential is not yet known, nor is the response of populations to harvesting. Applying a global quota to an area where several beds have been identified will not prevent local overharvesting or underharvesting. Since the biological characteristics of this sedentary species may differ from one bed to another, the conservation strategy chosen should be tailored to each bed. As is the case for several bivalve molluscs, once the surf clam has completed its pelagic stage, it does not move about much. Accordingly, the biological characteristics of each individual will be determined largely by the environmental conditions in the immediate area.

Up until now, relatively few individuals have been harvested from surf clam populations in the Gulf of St Lawrence. In general, when natural mortality is low, a virgin bed supports a biomass made up of a lot of old individuals; the biomass and density of large individuals on the bed is thus high. When fishing begins on a

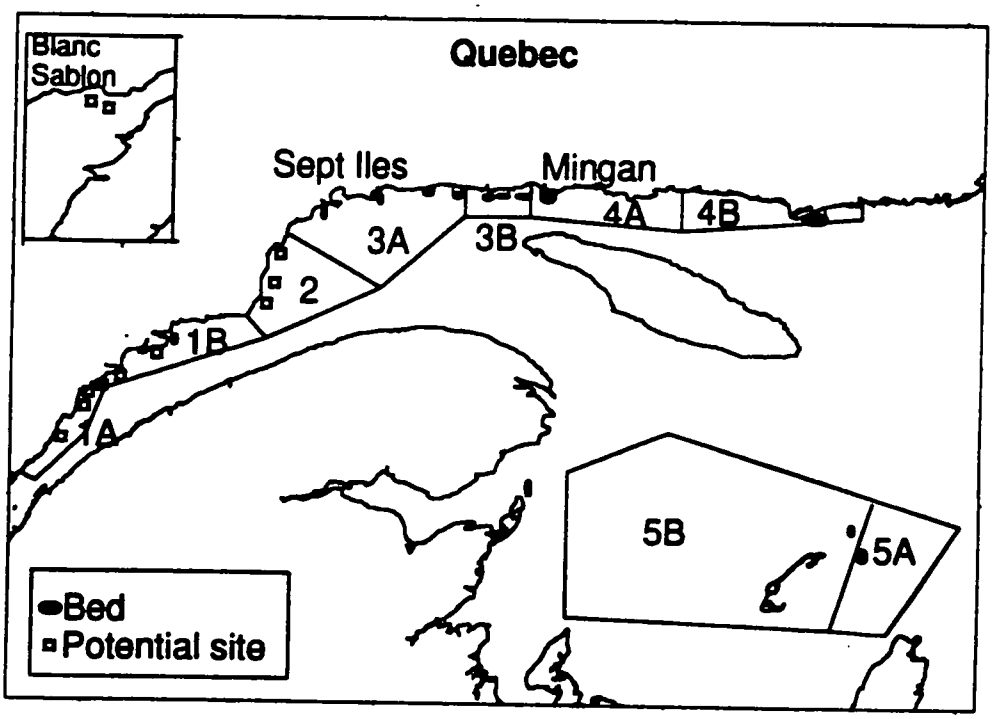

Figure 1: Stimpson's surf clam beds and management areas in the Gulf of St Lawrence in 1995.

virgin bed, these old individuals are removed first and yields are high. Subsequently, catches per unit of effort will decline as this portion of the population is reduced. A balance should eventually be reached between production in the bed and the harvesting level. However, harvesting and catches per unit of effort should be lower at equilibrium than in the early stages of harvesting. Since the surf clam grows slowly and has a long life span, there is every indication that natural mortality is low. After the initial stage of depletion of the existing biomass, the optimum harvesting rate is likely to be low. The exact population level corresponding to the minimum spawning biomass is unknown, but it would appear that a low harvesting rate would protect reproductive potential.

Table 1. 1995 Stimpson's surf clam catches (kg) for each management area in Québec. (preliminary data).

Area	Catches Québec (kg)	Allocations Québec (kg)	Catches N.-B. (kg)	Allocations N.-B. (kg)
1A	0	56 700	-	0
1B	2 788	56 700	-	0
2	250	22 680	-	0
3A	40 355	45 360	-	14969
3B	44 667	45 360	-	14969
4A	100 231	102 059	-	0
4B	2 014	68 040	-	181 439
5A	-	136 080	34 018	68 040
5B	54 511	90 719	-	0
Total:	24 4816	62 3698	34 018	279 417

THE FISHERY

In the Gulf of St Lawrence, the Stimpson's surf clam is undoubtedly the fastest expanding fishery directed at underutilized species. Since 1990, several beds of varying size have been discovered, most of them on the Upper and Middle North Shore and in the Magdalen Islands sector. Exploratory missions conducted in 1994 showed that the Stimpson's surf clam was also present, albeit in low densities, in a few places on the Lower North Shore, in the Lower St Lawrence and along the southern coast of the Gaspé. Surf clam beds in the Gulf of St Lawrence are located in the subtidal zone, on mainly sandy bottoms, and usually to a depth of up to 40 metres. In 1995, the number of fishing areas on the Québec coast increased from six to nine per division of already existing areas (Figure 1).

The purpose of reorganizing fishing areas was to distribute fishing pressure more evenly across the beds and better protect reproductive potential. In 1995, the total allowable catch (TAC) for all Québec fishing areas was 903 metric tonnes (1,991,000 pounds) (Table 1)

As in 1994, 11 fishermen in Québec and two in New Brunswick had fishing licences for Stimpson's surf clams. In 1995, 279 tonnes (615,000 pounds) of surf clams were landed in Québec, which is half the peak amount of 639 tonnes (1,409,000 pounds) landed in 1994 (Figure 2). These figures reflect a drop in activity in 1995 compared to 1994. Total landings are strongly affected by the

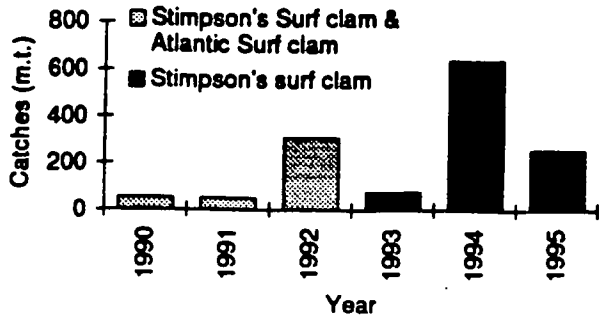

Figure 2. Stimpson's surf clam catches in Québec since 1990 (1995 data are prelminary).

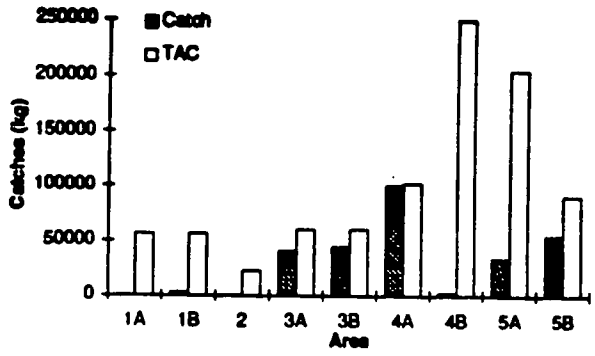

Figure 3. 1995 Catches and quotas for Stimpson's surf clam management areas (preliminary data).

activity of New Brunswick fishermen, who harvest a large proportion of the total allowable catch. Most of the 1994 landings came from New Brunswick boats, contrary to 1995 landings, which came mainly from Québec fishermen.

In 1995, Québec fishermen harvested basically the same sites as in 1993 and 1994, that is, beds in Areas 3A, 3B and 4A (Figure 3). The Natashquan bed in Area 4B, which was fished mainly by New Brunswick fishermen in 1994, was not harvested in 1995. In the Magdalen Islands sector, only the Rocher aux Oiseaux bed in Area 5B was harvested by Québec fishermen, as in 1994. According to 1995 logbooks, average catches per unit of effort remained high in the main beds that were fished, even if slight decreases were seen at some sites (Table 2). As in 1994, the Upper North Shore and the western section of the Middle North Shore (Areas 1A, 1B and 2) were harvested only lightly.(Table 2).

Lambert et al (1995) have shown that the New England-type hydraulic dredge can catch on average more than 90% of

Table 2. Average catches per unit of effort (kg per hour of dredging and per metre of dredge width).

Bed	Area	Year	Number of sets	CPUE.
Baie-Comeau	1B	1994	67	311
		1995	38	288
Baie Ste-Marguerite	3A	1995	18	309
Moisie	3A	1995	96	329
Sheldrake	3B	1993	74	595
		1994	142	656
		1995	46	479
Rivière-au-Tonnerre	3B	1993	248	537
		1994	226	594
		1995	366	540
Longue-pointe-de-Mingan	4A	1993	338	515
		1994	958	550
		1995	789	616
Natashquan	4B	1995	20	391
Rocher aux Oiseaux	5B	1994	974	626
		1995	360	527

commercial-size Stimpson's surf clams on each set. The percentage of smaller individuals surviving the dredge's passage is unknown, but may be very low. In the study, a relatively high number of harvested surf clams (20%), were damaged between the time they were caught on the bottom and when they were deposited on deck (Figure 4).

Given the great efficiency of dredging and the surf clam's low growth rate, it may take many years before overharvested sites are repopulated by commercial-size individuals.

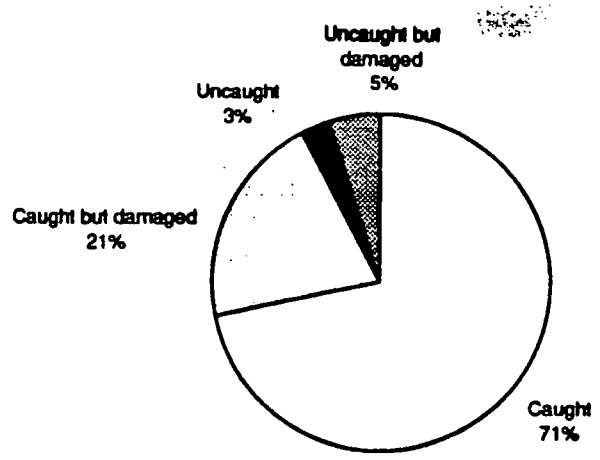

Figure 4. Efficiency of New England-type hydraulic dredge for the 1993 and 1994 Stimpson's surf clam harvest.

STATUS OF THE RESOURCE

Stimpson's surf clam beds vary in area and density, and fishing pressure also differs from one bed to another. Consequently, some beds are still considered virgin, while others have been harvested regularly since the fishery began.

In 1993 and 1994, the average size of surf clams harvested with a lined dredge on various Middle North Shore beds was 78 to 85 mm. The percentage of individuals smaller than 50 mm varied between 8 and 22%, depending on the bed. There are thus a high number of pre-recruits even if the beds are primarily made up of larger individuals. The average size of surf clams, based on commercial fishing samples in the Gulf of St Lawrence, has remained between 95 and 115 mm since harvesting began. Figure 5 shows the size distribution based on regular sampling of the most intensively harvested beds on the Middle North Shore.

Until now, surf clams were believed to grow very slowly and live up to 40 years. However, preliminary results of a laboratory study show that the surf clam may not grow as slowly as previously believed. The same study suggests that a decrease in their density could boost the growth rate as this would lessen competition for space and food. Moreover, the results indicate that young Stimpson's surf clams reared under identical conditions may grow at very different rates. Field studies are under way to verify these hypotheses.

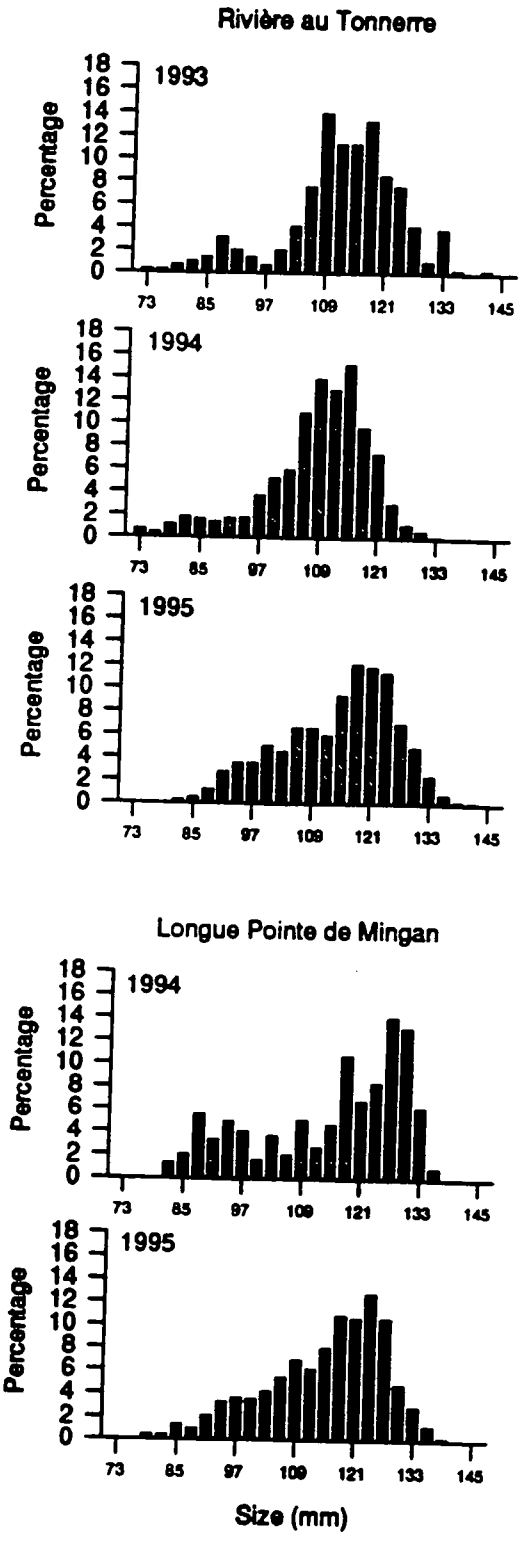

Figure 5. Stimpson's surf clam size frequencies measured from commercial samples.

The size of Stimpson's surf clams at maturity in the Gulf of St Lawrence is not yet known with any degree of accuracy. Some preliminary figures indicate that they may reach maturity beginning at about 60 mm, as is the case for the Stimpson's surf clam population in the Bering Sea. In 1994, the main spawning period on the Middle North Shore took place from the end of June to the middle of July.

The average density of Stimpson's surf clam was estimated in certain beds (Table 3). The units used to express the density vary according to the study and are in kilograms per square metre or in number per square metre. The average density was similar in the various beds, if we consider that the average weight of a 100-

Table 3. Average estimated density in certain Stimpson's surf clam beds.

Bed	Area	Estimated area	Density		Precision
		Km^2	Kg/m^2	n/m^2	
Îles-de-la-Madeleine (South & East)[1]	5A	27	-	2.73	± 23.5%
Natashquan1[1]	4B	45	-	3.31	± 68%
Manitou River[1]	3A	5	-	2.82	± 53%
Magpie[1]	3B	2.5	-	3.57	± 112%
Longue-Pointe-de Mingan[2]	4A	12	0.577	-	± 3.3%
Rivière-au-Tonnerre[2]	3B	9.8	0.409	-	± 7.3%

[1] Landry et al (1992)

[2] This study

millimetre surf clam is almost 0.150 kilograms. The main difference between the beds is area, the Natashquan bed being much bigger than the others.

OUTLOOK

From the results of recent exploratory missions conducted by fishermen and the analysis of logbooks and scientific findings, more has been learned about the geographical distribution of the Stimpson's surf clam and new beds have been found within existing fishing areas. These beds vary in size and some are quite accessible, making them more suitable for harvesting than other, less conveniently located beds. Since existing fishing areas often contain several beds, there is a danger of local overharvesting. This risk was reduced in 1995 after 1994 management units were subdivided. This management strategy improves distribution of the fishing effort in order to protect the reproductive potential of all fishable concentrations. The extent of several beds is still unknown. Moreover, there are no average density estimates for many secondary beds. At this time, it is thus impossible to provide relative quantities for all of the beds in Figure 1.

Stimpson's surf clams appear to be present in varying quantities along most of the north shore of the estuary and the Gulf of St Lawrence and near the Magdalen Islands. Exploratory activities carried out by the Industry to date have identified several beds that were subsequently visited by a few fishermen. This research strategy thus yielded interesting results for the Industry and has proved to be a good way to gather data essential for locating and characterizing the resource.

Good control of the development of this fishery and the harvesting of the resource should help to conserve the reproductive potential of harvested beds and of any that may be discovered in the future. In all cases, this strategy should be combined with close monitoring of the fishery in order to assess the capacity of the resource to support sustained harvesting, using commercial harvesting data.

Catches per unit of effort and average size have remained high in the main beds harvested since the fishery began in the Gulf. This suggests that the resource is still abundant and demonstrates that the populations are not yet in equilibrium. Consequently, it would be preferable to maintain the same harvesting levels for 1996. Therefore, maintaining the exploitation rate at current levels corresponds to the principles put forward in the development of this new fishery, while allowing more information to be collected on the population dynamics of surfclams on exploited beds.

For more information:

Lambert, J. and P. Goudreau. 1995. Performance de la drague hydraulique de type Nouvelle-Angleterre pour la récolte de la mactre de Stimpson (*Mactromeris polynyma*). Can Ind Rep of Fish and Aquat Sci. 235: vii + 28 pages.

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Landry, T., E. Wade et M. Giguère. Évaluation de gisements de mactre de Stimpson, *Mactromeris polynyma*, dans le golfe du Saint-Laurent : résultats préliminaires. CAFSAC, Research Doc. 92/86: 29 p.

Prepared by:

Jean Lambert
Tel : (418) 775-0717
Fax : (418) 775-0542
E-mail: J_Lambert@qc.dfo.ca

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Regional Stock Assessment Office
Laurentian Region
Department of Fisheries and Oceans
Maurice Lamontagne Institute
PO Box 1000, Mont Joli
Quebec, Canada
G5H 3Z4

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