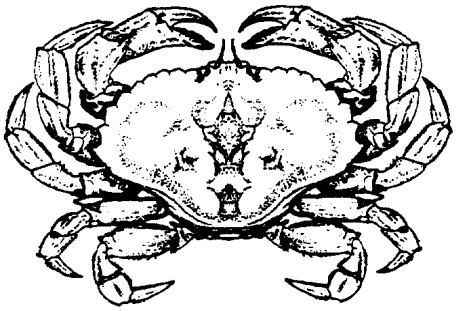

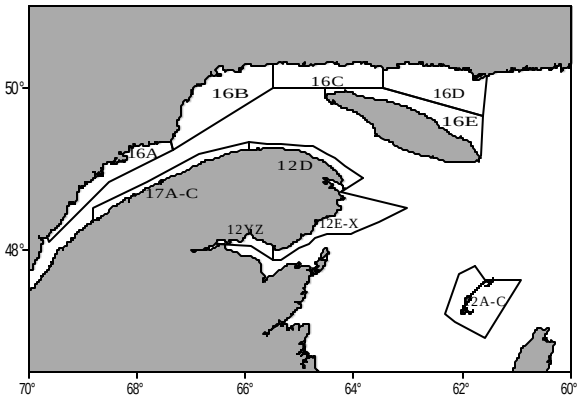

Rock crab of the inshore waters of Quebec

Background

Rock crab is considered an emerging species in Quebec. Commercial fishing of this resource started in 1988, but the fishery did not really begin to take off until 1995. The main areas fished are the Magdalen Islands and Chaleur Bay. At present, little rock crab is harvested in the northern part of the Gaspé and the North Shore.

As soon as the rock crab fishery began, DFO introduced a management plan to control its development and maintain the population's reproductive potential. The minimum legal carapace width has been set at 102 mm (4 inches), and landing of females is prohibited. The number of licences and the number of traps are regulated. Quotas have been set in a number of fishing areas.

Rock crab is a major prey species for lobster, and this interaction between the two species justifies very prudent management of the rock crab fishery to prevent overfishing.

Summary

- Landings of rock crab in Quebec peaked at 1,408 t in 2000, an increase of roughly 15 % over 1999. Increases were noted in all sectors except the northern part of the Magdalen Islands, where a slight decrease occurred. In 2000, landings totalled 585 t in the Magdalen Islands and 638 t in the southern sector of the Gaspé (areas 12 E to 12Z). In the northern part of the Gaspé (Area 12D) and in the Estuary (Area 17), the corresponding figures were 167 t and 15 t.
- In the Magdalen Islands, commercial yields have been high since the fishery started up in 1995, and yields have held steady in the Gaspé since 1997. In 2000, the size of the crab caught declined in Area 12B of the Magdalen Islands and in a number of areas of the Gaspé. The average size in the different areas of Quebec nonetheless remains well above the minimum legal size of 102 mm.
- To protect the rock crab and lobster populations, it is recommended that quotas not be raised and fishing effort directed at rock crab not increase in the different fishing areas of Quebec. It is also important to keep the fishing effort well distributed in each region.

Biology

The rock crab, *Cancer irroratus*, ranges all along the east coast of North America, from Labrador to South Carolina. This species is associated with various bottom types, ranging from rock to loose material. Commercial-size crab, and more generally those with a carapace width (CW) greater than 50 mm, live on sandy or muddy bottoms, while a smaller portion of the adult population cohabits with individuals less than 50 mm CW on rocky substrates, in areas where lobster occur. Berried females show a marked preference for soft substrates, in which they can bury themselves and in which they form aggregations.

Males and females grow to different sizes. Males can reach a CW of 140 mm, while the females rarely exceed 100 mm. Breeding takes place in the fall, after the females have moulted and while their shells are still soft. Males moult in winter, so in the spawning season their shells are fully hardened. Crab shells take from two to three months to harden completely. Females reach sexual maturity at a CW of about 60 mm, while males do so at a slightly larger size (CW 70 mm). The females lay their eggs, then keep them under their abdomens for nearly a year. A female with a CW of 60 mm can lay 125,000 eggs, and a 90 mm specimen may lay as many as 500,000. The eggs hatch the summer after they were produced, and the larvae remain in the water column from mid-June to mid-September. In the fall, the larvae metamorphose into tiny crabs (megalops) and begin their benthic life shortly thereafter. Juveniles (CW ≤ 15 mm) are found mainly at shallow depths on bottoms that offer shelter from predators and water turbulence. Growth data for rock crab in the Gulf of St Lawrence are sparse. Data from more southerly regions suggest that rock crab may attain commercial size at about five years of age and live to about seven years.

The species is omnivorous and displays a certain opportunism in its diet. Lobster has never been shown to constitute a significant portion of the rock crab's diet, but analyses of lobster stomach contents indicate that rock crab represents a major prey for lobster throughout its life cycle, even from the earliest larval stage.

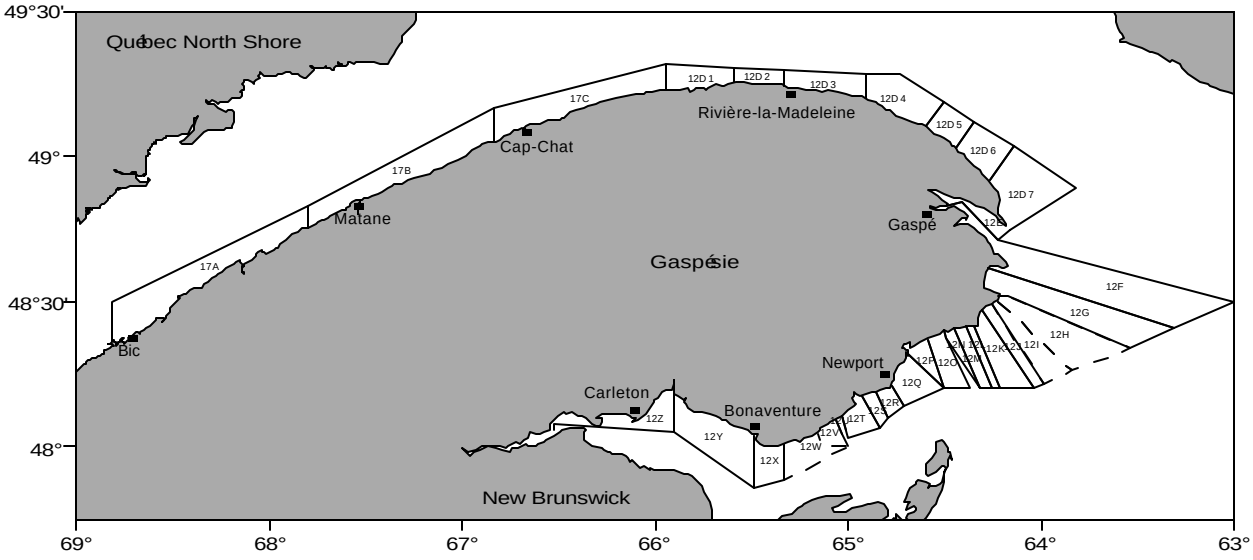

Figure 1. Rock crab fishing areas in the Gaspé.

Resource management

The rock crab management plan is designed to control the development of this new fishery and to protect the reproductive potential of the rock crab populations. The fishery is managed by fishing areas (Figures 1 and 2), so that the fishing effort can be distributed more evenly. Rock crab are taken by lobster fishers during the lobster season, when rock crab is authorized as an incidental catch. Outside the lobster season, the rock crab fishery is reserved for rock crab licence holders, who practice a directed fishery. In 2000, in the Magdalen Islands, 14 fishers held directed fishing licences, with individual quotas of 45.5 t. Each fisher was authorized to use up to 100 traps. These fishers were allowed to fish in one, or in some cases two, of the five existing fishing areas, two of which were exploratory (12B1-12B2). A control area (12C1), which was closed to rock crab harvesting, was created in 2000 between areas 12C and 12B. In the southern Gaspé, there were 29 active licences in 2000 involved in a competitive directed fishery. Quotas of 375 tonnes were authorized in areas 12E-P, 12Q-X, and 12Y-Z, with the number of traps per licence holder ranging from 40 to 150. In areas 17 and 12D, there were 10 licences, but no quotas have been established yet, since fishing pressure is very low. All of the directed fishing licences are exploratory, and a minimum legal size of 102 mm (4 inches) is in effect. Fishers are prohibited from landing females and are required to use selective gear to minimize incidental lobster catches.

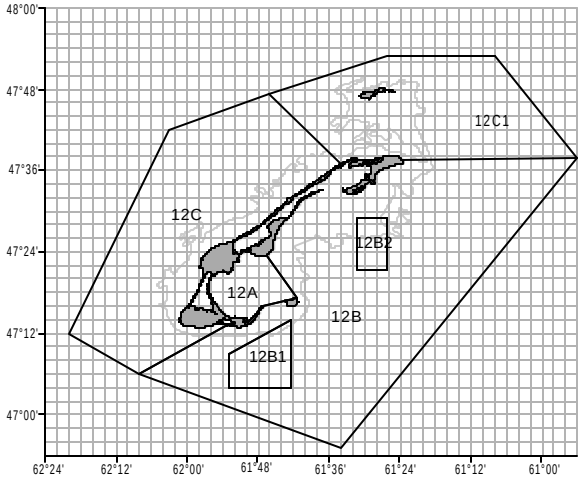

Figure 2. Location of rock crab fishing areas in the Magdalen Islands, 2000.

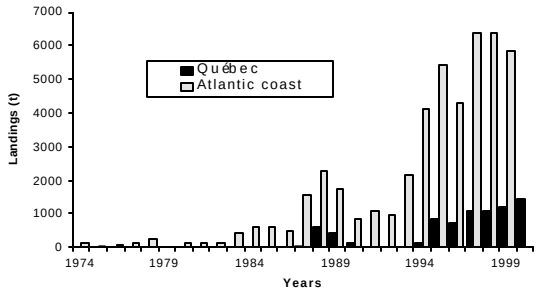

Figure 3. Rock crab landings (t) in Quebec and on the Atlantic Seaboard, 1974 to 2000.

Description of the fishery

Landings

Fishing for rock crab along Canada's Atlantic coast is relatively new. An experimental fishery began in the southern Gulf of St Lawrence in 1974. This fishery grew quite slowly between 1974 and 1982, with landings varying between 6 t and 227 t (Figure 3). Starting in 1983, interest in rock crab grew as markets developed. Since 1994, recorded landings in Quebec and the Maritimes have exceeded 4,000 t, and they totalled 5,836 t in 1999.

Table 1. Rock crab landings (t) in Quebec, 1995 to 2000.

Fishing area	1995	1996	1997	1998	1999	2000*
			Magdalen Islands			
12C (North)	51	0	135	186	197	180
12A-B-B1-B2 (South)	210	199	315	348	366	405
Total	261	199	450	534	563	585
			Gaspé			
17		2	8	16	16	15
12D		4	49	48	128	167
12E-P	39	21	56	84	125	171
12Q-X	221	148	184	152	164	170
12Y	161	163	165	146	108	145
12Z	148	151	143	120	112	152
Total	569	489	605	566	653	820
			North Shore			
Total			1	8	5	3
Total Québec	830	688	1056	1108	1212	1408

* Preliminary

In Quebec, markets developed later, and the fishery did not really get under way until 1988, when 829 t of crab was landed. In 2000, rock crab landings in Quebec totalled 1,408 t, or about 196 t more than in 1999 and 300 t more than in 1998. Since 1995, Quebec's rock crab fishery has been concentrated mainly in the Gaspé and the Magdalen Islands.

In the Magdalen Islands, landings totalled 585 t in 2000, 22 t more than in 1999 (Table 1) accounting for 41 % of the Quebec total. All holders of directed fishing licences had been active since 1998. Since the three main areas (12A-B-C) were established in 1997, fishing effort has been distributed throughout the Magdalen Islands. Catches are made mainly in Plaisance Bay (Area 12A), the western part of Area 12B, and the eastern and southern sectors of Area 12C (Figure 4), generally at depths of less than 20 metres. The fishing season takes place mainly from mid-August to early November. The proportion of rock crab by-catch in lobster fishers' catches was 6 % in 1998, 10 % in 1999 and 4 % in 2000.

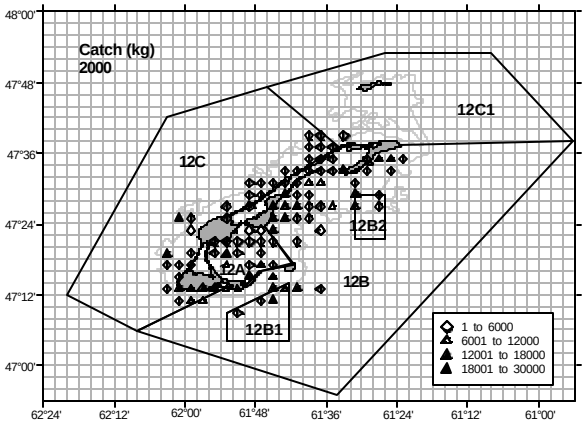

Figure 4. Distribution of catches in the Magdalen Islands, 2000.

In the Gaspé, landings rose from 653 t in 1999 to 820 t in 2000, a substantial increase of 25 % (Table 1). In 2000, they accounted for 58 % of the total rock crab catch in Quebec. Along the northern shore of the Gaspé Peninsula (Area 12D), the catches totalled 48 t in 1998, 128 t in 1999 and 167 t

in 2000. In areas 12E to 12Z (southern Gaspé) landings were stable between 1998 and 1999, amounting to slightly over 500 t, and in 2000 they rose to 638 t. More specifically, between 1999 and 2000, landings increased in areas 12E-P, held steady in areas 12Q-X and rose in areas 12Y-Z. Catches have held steady at about 15 t since 1998 in the area upstream from the northern Gaspé (areas 17A-C).

In the North Shore region, the catch totalled 8 t in 1998, 5 t in 1999 and about 3 t in 2000.

Catch rates

For all fishing areas in the Magdalen Islands, the average yields, based on logbooks, have varied little since 1997, remaining high at 12 to 16 kg per trap (Table 2). In 2000, yields were slightly higher than in 1999 in Area 12A (20 kg per trap compared with 16) and stable in Area 12B, at about 16.5 kg per trap, which is slightly lower than those in areas 12A-B. In exploratory areas 12B1 and 12B2, which are located in deeper water, the yields were 16 and 12 kg per trap respectively, in 2000.

In the Gaspé, yields computed from logbook data, although fragmentary, show an increasing gradient from the eastern part of the peninsula (12E-P) toward the head of Chaleur Bay (12Z). From 1997 to 2000, yields were quite stable in all areas. For example, in areas 12E-P, the yields were about 5 kg per trap (Table 2). In areas 12Q-X, they remained between 5 and 6 kg per trap; in Area 12Y, yields varied between 6 and 8 kg per trap; and in Area 12Z, between 10 and 12 kg per trap. It should be noted, however, that the yields observed since 1997 in Area 12Z are much lower than those recorded in 1995 and 1996, at the start of harvesting.

The average size of the rock crab landed in the Magdalen Islands has been large since fishing began in 1995. The size frequency distribution of crab taken in areas 12A and 12C has not changed since 1995. In 2000, the average size of crab in Area 12A was 122.5 mm (carapace width), whereas it was

Table 2. Rock crab yields (kg/trap) based on logbooks.

Zones	1995	1996	1997	1998	1999	2000
			Magdalen Islands			
12A	13,7	17,9	12,3	13,2	16,2	20,3
12B	15,2	17,6	15,3	13,5	16,3	16,7
12B1				18,5	12,7	16,0
12B2				8,6	7,6	12,2
12C	10,5		12,5	7,7	11,6	12,7
			Gaspé and North Shore			
17		2,0	1,8	7,0	6,8	5,8
12D			4,1	2,7	3,5	3,4
12E-P				4,7		5,6
12Q-X		7,2	5,6	5,5	5,1	5,4
12Y		9,3	8,1	6,2	6,1	8,1
12Z	14,8	16,1	10,6	10,6	9,7	11,7
16B				5,8		11,5

117 mm in Area 12C. In Area 12B, however, the crab caught in 2000 were generally smaller than in previous years. Between 1999 and 2000, the average size decreased from 124 to 120 mm CW (Figure 5).

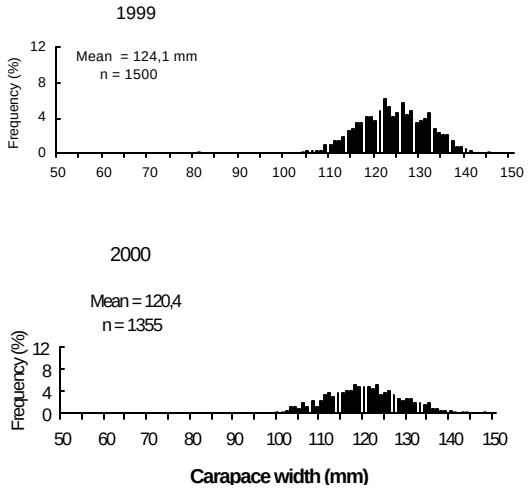

Figure 5. Size frequency distribution of crab caught in Area 12B of the Magdalen Islands, based on dockside sampling in 1999 and 2000.

In 2000, the average size of the crab landed in the Gaspé ranged from 108 to 116 mm CW depending on the fishing areas. From 1998 to 2000, the average size of crab taken in areas 17, 12D, 12 E-P, 12Q-X and 12Y declined (Figure 6). Only the individuals taken in Area 12Z were of sizes similar to those recorded in earlier years.

Conclusion and recommendations

The rock crab fishery in Quebec has grown significantly since 1995, even though certain areas still receive very little fishing effort. In 2000, rock crab landings in Quebec reached a peak of 1,408 t. The main areas being fished are still the Magdalen Islands and Chaleur Bay. There is still very little rock crab fishing taking place in the other sectors—the northern part of the Gaspé and the North Shore region.

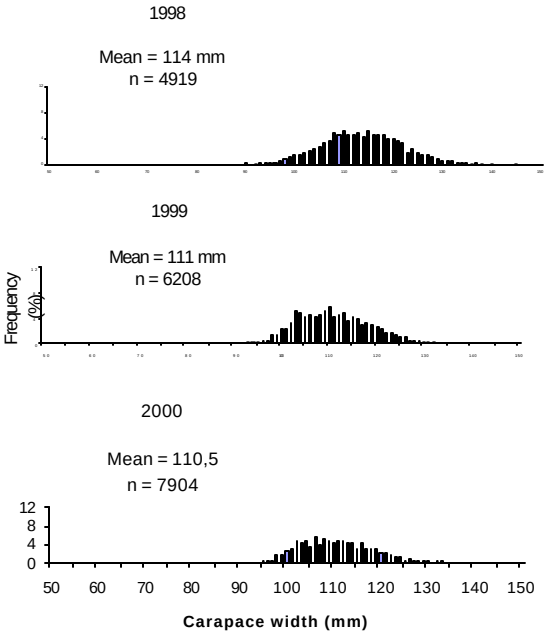

Figure 6. Size frequency distribution of rock crab caught in the southern Gaspé (areas 12 E to 12Z), 1998 to 2000.

The intensity of the fishing effort to date in the Magdalen Islands does not seem to have had any impact on the rock crab or on its main predator, the lobster. Commercial yields have held steady and size structures have remained similar since 1997 in areas 12A and 12C. However, in 2000, a decline occurred in the size of the crab landed in Area 12B. The reduction in the size of the crab caught may be the result of a depletion of large crab and/or the mass influx of new cohorts into the fishery. Whatever the cause, careful monitoring will be necessary to ensure that the decline in crab size is not caused by overharvesting of the resource. As a measure to protect lobster, it is recommended that overall fishing intensity not be increased in this sector. The overall quota should therefore stay the same in 2001. It is also important to maintain the existing fishing areas so as to distribute the

fishing effort throughout the Magdalen Islands.

The yields have been stable in the Gaspé since 1998, despite a considerable increase in landings. However, the size of the crab taken has declined during this period. As a result, it is recommended that the number of licences and the number of traps not be increased in this sector. Based on what is known at present, the quotas set at the start of the rock crab fishery in areas 12 E-P and 12 Q-X are too high and do not meet the resource protection objectives that existed when they were established. It is recommended that these quotas be cancelled and that resource protection be ensured by controlling fishing effort. We strongly recommend that fishers be required to complete and hand in logbooks.

Not enough data are available to determine stock status on the North Shore (areas 16 A to 16 E). Hence, it is impossible to say whether a substantial increase in the fishing pressure in these areas would be well advised. However, we recommend that the fishery along the northern and southern shores of Anticosti Island be developed gradually and cautiously, as was done in the Magdalen Islands.

In light of the worries expressed by many parties concerning the possible impact of rock crab harvesting on lobster, we wish to stress again the need to develop the rock crab fishery slowly and cautiously. Harvesting of rock crab will reduced the abundance of large crab in these waters. This decreased abundance should not have any immediate negative impact on lobsters, since lobster do not prey on crab of this size. Negative impacts on lobster could be expected only if the numbers of small crab, on which lobster do feed, were to fall to the point that lobster found them harder to come by. This situation could arise if recruitment overfishing occurs. Such overfishing can be prevented, however, by maintaining a minimum legal size greater than sexual maturity size, so as to protect reproductive potential, and by controlling development of this young fishery, so as to keep exploitation rates moderate. The two species interact sufficiently to justify tight, cautious management of the rock crab fishery to prevent any overfishing.

Our knowledge of the rock crab's ability to withstand fishing pressure over the long term is still only partial. This fishery will have to be monitored closely in order to assess the state of the resource and the impacts of fishing operations on the populations. The logbook system is essential for determining resource status, and it is therefore imperative that the fishers fill these logs out.

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