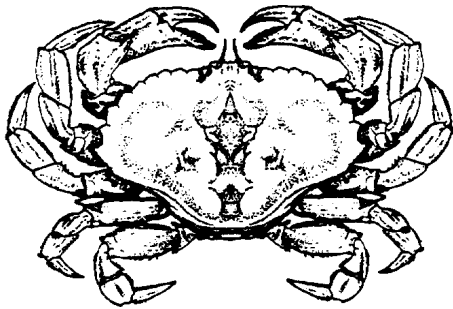




Quebec Region

Stock Status Report C4-02 (2002)



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. Other areas of harvesting are the northern part of the Gaspé and, to a lesser degree, the middle 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), creating an exclusively male-directed fishery. The number of licences and the number of traps are regulated. A global quota has been set for areas 12Y and 12Z, while individual quotas of 45.5 t have been issued for Magdalen Islands rock crab fishers.

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.

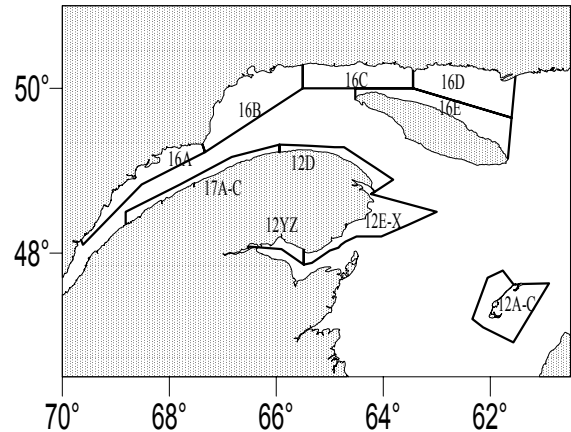


Figure 1. Rock crab fishing areas in Quebec.

Summary

- Landings of rock crab in Quebec were 1,320 t in 2001, some 90 t less than the peak achieved in 2000. Between 2000 and 2001, landings rose 6% in the Magdalen Islands, to 621 t, whereas for the Gaspé as a whole they fell by 17%, from 821 t to 682 t.
- In the Magdalen Islands, commercial yields have been high since the fishery started up in 1995, and they have held steady in the Gaspé since 1997. The size structure of the crabs caught has remained stable in all regions since harvesting began, and average size 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 that 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 10 months. 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 \leq 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 or six 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.

Resource management

The rock crab management plan is designed to control the development of the fishery and protect the reproductive potential of rock crab populations. The fishery is managed by fishing areas (Figure 1), 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 practise a directed fishery. In 2001 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 in areas 12A, 12B, 12B1 and 12B2, and 125 traps in Area 12C. These fishers were allowed to fish in one, or in some cases two, of the five

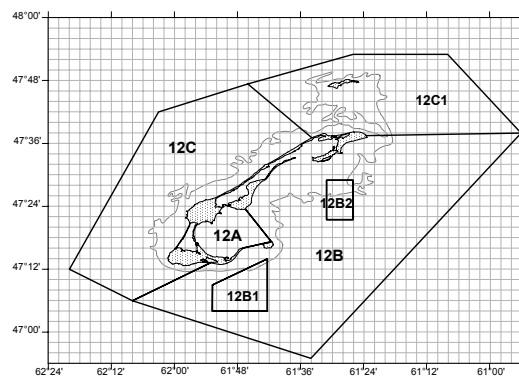


Figure 2. Rock crab fishing areas in the Magdalen Islands.

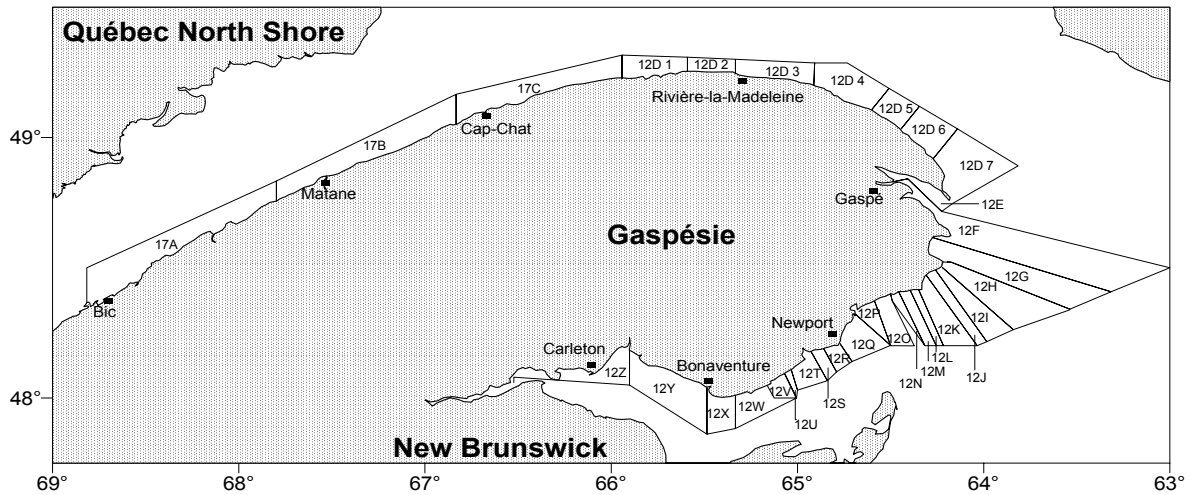


Figure 3. Rock crab fishing areas in the Gaspé.

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 (Figure 2). In the southern Gaspé, there were 29 active licences in 2001 involved in a competitive directed fishery. A quota of 375 tonnes was authorized for the entirety of areas 12Y and 12Z (Figure 3). In areas 17 and 12D, there were 13 licences, but no quotas have been established yet, since fishing pressure is very low. In the Gaspé, the number of traps per licence holder ranged from 40 to 150. All of the directed fishing licences are exploratory, and a minimum legal size of 102 mm (4 inches) is in effect. Females are thus excluded from the fishery, since they rarely attain that size. Fishers are required to use selective gear to minimize incidental lobster catches.

Stock status in 2001

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 4). 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; they totalled 7,312 t in 2000.

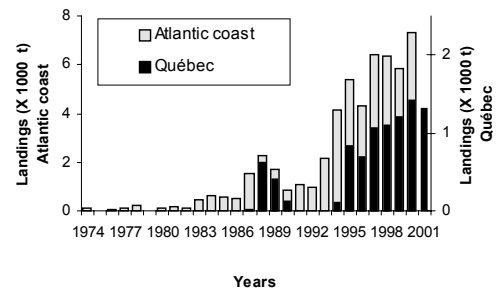


Figure 4. Rock crab landings (t) in Quebec and on the Atlantic seaboard, 1974 to 2001. The 2001 data are preliminary.

In Quebec, markets developed later, and the fishery did not really get under way until 1995, when 829 t of crab were landed. In 2001, landings totalled 1,320 t, about 92 t less than in 2000 but 108 t more than in

1999. Rock crab is harvested mainly in the Gaspé and the Magdalen Islands.

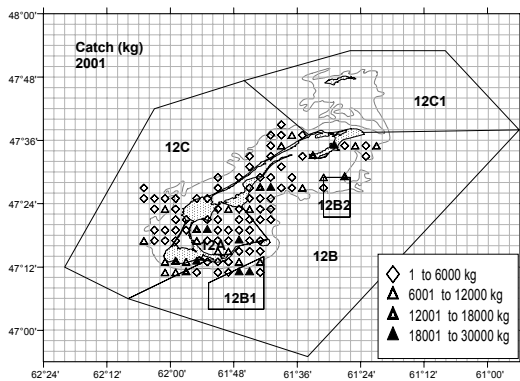


Figure 5. Distribution of catches in the Magdalen Islands, 2001.

In the Magdalen Islands, landings totalled 621 t in 2001 — 33 t more than in 2000 (Table 1) —accounting for 47% of the Quebec total. All holders of directed fishing licences have 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 5), 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 8% in 1999, 4% in 2000 and 6% in 2001.

In the Gaspé, landings were 682 t in 2001, a substantial decrease of 139 t from the peak achieved in 2000 but still superior to annual landings from 1995 to 1999 (Table 1). In 2001, landings in the Gaspé accounted for 52% of the total rock crab catch in Quebec. Along the northern shore of the Gaspé Peninsula (Area 12D), catches have progressively risen since 1998, from 48 t in that year to 218 t in 2001. In the southern Gaspé (areas 12E to 12Z), landings were stable between 1998 and 1999 at just over 500 t, then rose to 638 t in 2000, then fell to 445 t in 2001. Between 2000 and 2001, the

Table 1. Rock crab landings (t) in Quebec, 1995 to 2001.

Fishing area	1995	1996	1997	1998	1999	2000	2001*
<i>Magdalen Islands</i>							
12C (North)	51	0	135	186	197	181	224
2A-B-B1-B2 (South)	210	199	315	348	366	407	397
Total	261	199	450	534	563	588	621
<i>Gaspé</i>							
17		2	8	16	16	15	19
12D		4	49	48	128	167	218
12E-P	39	21	56	84	125	172	134
12Q-X	221	148	184	152	164	170	143
12Y	161	163	165	146	108	145	78
12Z	148	151	143	120	112	152	90
Total	569	489	605	566	653	821	682
<i>North Shore and Anticosti</i>							
Total (16A-16E)			1	8	5	3	17
Total Québec	830	688	1056	1108	1212	1412	1320

*Preliminary data

strongest variations were recorded in areas 12Y and 12Z with declines of 45% and 40% respectively. These reductions are to be explained by the arrival of new fishers replacing more experienced fishers. Since 1998 landings have held steady at 15 to 19 t in the area upstream from the northern Gaspé (areas 17A-C).

For the entire North Shore and Anticosti Island, catches in 2001 reached their highest total (nearly 17 t) since the fishery began.

Catch rates

For all fishing areas in the Magdalen Islands, average yields based on logbooks have remained high since 1995 (Table 2). From 2000 to 2001, small increases of between 1 and 2 kg per trap were observed in the three main areas (12A, 12B, 12C). The average yield observed in Area 12C has remained slightly below those in areas 12A and 12B. In exploratory areas 12B1 and 12B2, which are located in deeper water, yields were 13 and 14 kg per trap respectively in 2001.

In the Gaspé, yields drawn from logbook data show an increasing gradient from the eastern part of the peninsula (12E-P) toward the head of Chaleur Bay (12Z). From 1997 to 2001, yields were quite stable in all areas. For example, in areas 12E-P, they were about 5 kg per trap (Table 2); in areas 12Q-X, they remained between 5 and 6 kg per trap; and in Area 12Y they varied between 6 and 8 kg per trap. In Area 12Z, yields ranged between 10 and 12 kg per trap between 1997 and 2000, and the preliminary results for this area suggest a similar or slightly higher average yield in 2001.

Size structure

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 the Magdalens (areas 12A, 12B and 12C together) has not changed since 1997 (Figure 6). In 2001, the average size of crab in Area 12A was 121 mm CW (carapace width), in Area 12B 123 mm, and in Area 12C 119 mm.

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

Fishing area	1995	1996	1997	1998	1999	2000	2001*
<i>Magdalen Islands</i>							
12A	13,7	17,9	12,3	13,2	16,2	20,3	21,8
12B	15,2	17,6	15,3	13,5	16,3	16,7	18,0
12B1				18,5	12,7	16,0	13,3
12B2				8,6	7,6	12,2	14,3
12C	10,5		12,5	7,7	11,6	12,7	13,8
<i>Gaspé</i>							
17		2,0	1,8	7,0	6,8	5,8	5,6
12D			4,1	2,7	3,5	3,4	5,6
12E-P				4,7		5,6	5,0
12Q-X		7,2	5,6	5,5	5,1	5,4	4,8
12Y		9,3	8,1	6,2	6,1	8,1	7,4
12Z	14,8	16,1	10,6	10,6	9,7	11,7	15,8
<i>North Shore</i>							
16B				5,8		11,5	12,9

Preliminary data

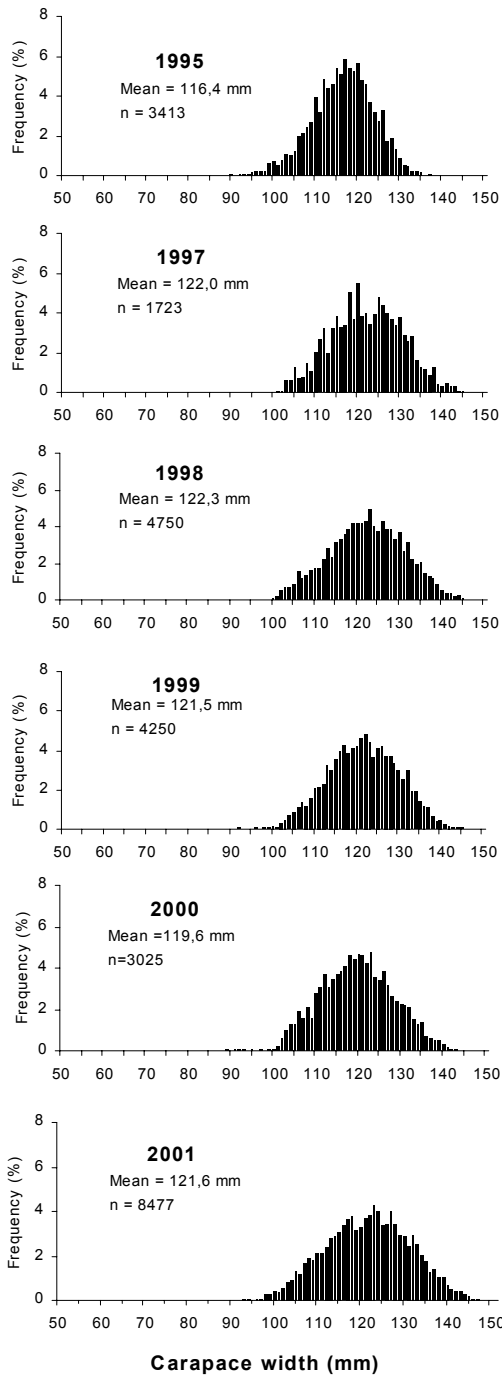


Figure 6. Size frequency distribution of rock crab caught in the Magdalen Islands, based on dockside sampling, 1995 to 2001.

In 2001, the average size of the rock crab landed in the Gaspé ranged from 108 to 117 mm CW depending on the fishing area. In each area, size frequencies have remained stable since fishing began. Figure 7 shows the size frequency distribution for the southern Gaspé (areas 12E to 12Z inclusive)

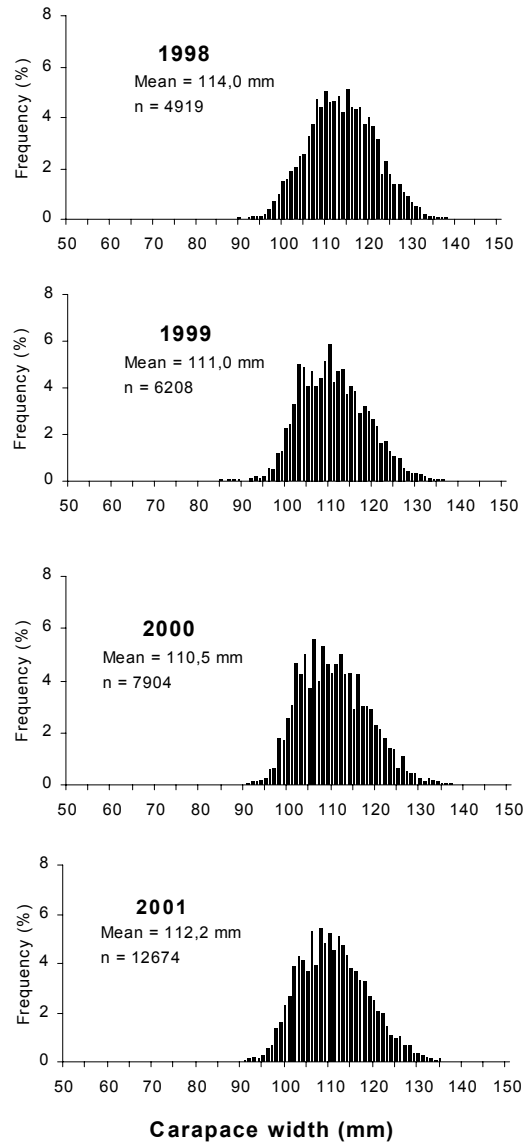


Figure 7. Size frequency distribution of rock crab caught in the southern Gaspé (areas 12E to 12Z), based on dockside sampling, 1998 to 2001.

since 1998.

Report and recommendations

The rock crab fishery in Quebec has grown significantly since 1995, even though certain areas still receive very little fishing effort. After reaching a peak of 1,412 t in 2000, rock crab landings in Quebec fell off slightly to 1,320 t in 2001. The main areas being fished are still the Magdalen Islands and Chaleur Bay, but since 1998 an increasing percentage of landings have been from the northern part of the Gaspé. There is still very little rock crab fishing on the North Shore.

The intensity of the fishing effort to date in the Magdalen Islands does not seem to have had any perceptible impact on the rock crab or its main predator, the lobster. Commercial yields have held steady and size structures have not changed since 1997 in the main areas of 12A, 12B and 12C. However, the rock crab fishery is relatively recent, and it is not possible to make a judgement on the resource's capacity to sustain the current exploitation rate over the longer term. As a measure to protect the rock crab and lobster, it is recommended that overall fishing intensity not be increased in this sector. The global quota should therefore stay the same in 2002. It is also important to maintain the existing fishing areas so as to distribute fishing effort throughout the Magdalen Islands.

In the Gaspé, the stock status indices changed little in 2001 from the previous year: there was only a slight increase in the average size of crab caught. The size of commercially harvested rock crab and yields calculated from logbooks show that harvesting has left the stocks stable since the fishery began. However it is still too early to determine the populations' capacity to support sustainable exploitation.

Cautious, consistent management to protect the rock crab and lobster populations is essential. It is therefore recommended that the existing resource protection measures be maintained for 2002, so as not to increase the fishing pressure in the various areas of the Gaspé.

Not enough data are available to determine stock status on the North Shore (areas 16A to 16E).

Conclusion

In light of the concerns expressed by many parties regarding the possible impact of rock crab harvesting on lobster, we wish to stress once again the need to develop the rock crab fishery slowly and cautiously. Harvesting of rock crab will reduce the abundance of large crab in these waters. This decreased abundance should not have any immediate negative impact on lobster, 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 imposing control measures 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 regularly to assess the status 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 fishers fill these logs out properly.

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For more information:

Jean Lambert
Maurice Lamontagne Institute
850 route de la Mer
Mont Joli, Quebec
G5H 3Z4
Tel (418) 775-0717
Fax (418) 775-0740
E-mail: lambertj@dfo-mpo.gc.ca

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Regional Stock Assessment Office,
Department of Fisheries and Oceans,
Maurice Lamontagne Institute,
P.O. Box. 1000, Mont-Joli,
Quebec, Canada
G5H 3Z4

Email: Stocksrl@dfo-mpo.gc.ca

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