

Rock crab of the inshore waters of Quebec in 2002

Background

In Quebec, commercial fishing of rock crab began in 1988, but the fishery did not really begin to take off until 1995. Since 1996, the tonnage and value of landings have gradually increased, so that the commercial importance of rock crab now equals and even surpasses that of several other species traditionally harvested in Quebec. The main fishing areas for rock crab are the Magdalen Islands, Chaleur Bay and the north shore of the Gaspé Peninsula.

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 rock crab fishers in the Magdalen Islands.

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 any overfishing.

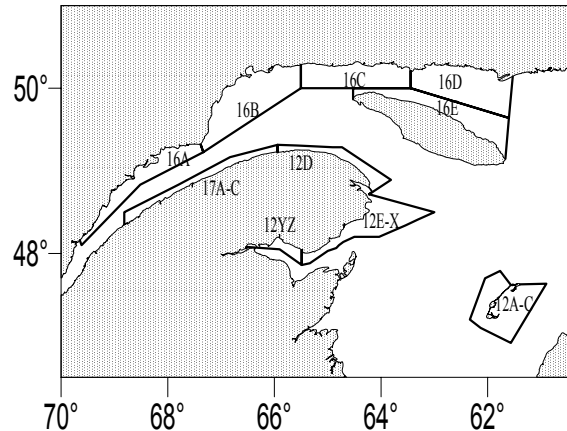


Figure 1. Rock crab fishing areas in Quebec.

Summary

- Landings of rock crab in Quebec have increased gradually since 1996. They reached a peak of 1,756 t in 2002, which was 230 t more than in 2001. From 2001 to 2002, landings in the Magdalen Islands increased by 15%, to 716 t, and landings on the north shore of the Gaspé rose dramatically, from 237 t to 365 t—an increase of 54%. During the same period, in Chaleur Bay, landings rose by 5%, to 675 t.
- In the Magdalen Islands, commercial yields have been high since the fishery started in 1995, and in the Gaspé, they have held relatively steady since 1997. In all areas, the size structure of the crabs caught has remained stable 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 the fishing effort directed at rock crab not be allowed to increase in the various fishing areas of Quebec. It is also

recommended that the fishing effort be kept well distributed within each area.

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 size greater than 50 mm (size corresponds to the carapace width), live on sandy or muddy bottoms, while a smaller portion of the adult population cohabits with individuals less than 50 mm on rocky substrates, in areas where lobster also occur. Berried female rock crabs show a marked preference for soft substrates, in which they can bury themselves and in which they form aggregations.

Male and female rock crabs grow to different sizes. Males can reach 140 mm, while 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 about 60 mm, while males do so at a slightly larger size (70 mm). The females lay their eggs, then keep them under their abdomens for nearly 10 months. A 60 mm female can lay 125,000 eggs, and a 90 mm specimen may lay as many as 500,000. The eggs hatch the summer after they are laid, 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 (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.

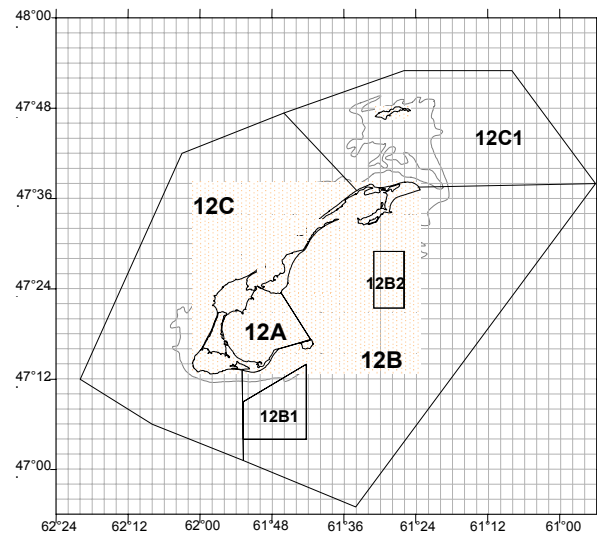


Figure 2. Rock crab fishing areas in the Magdalen Islands.

Resource management

The rock crab management plan is designed to control the development of the fishery and protect the reproductive potential of the rock crab populations. The rock crab fishery is managed

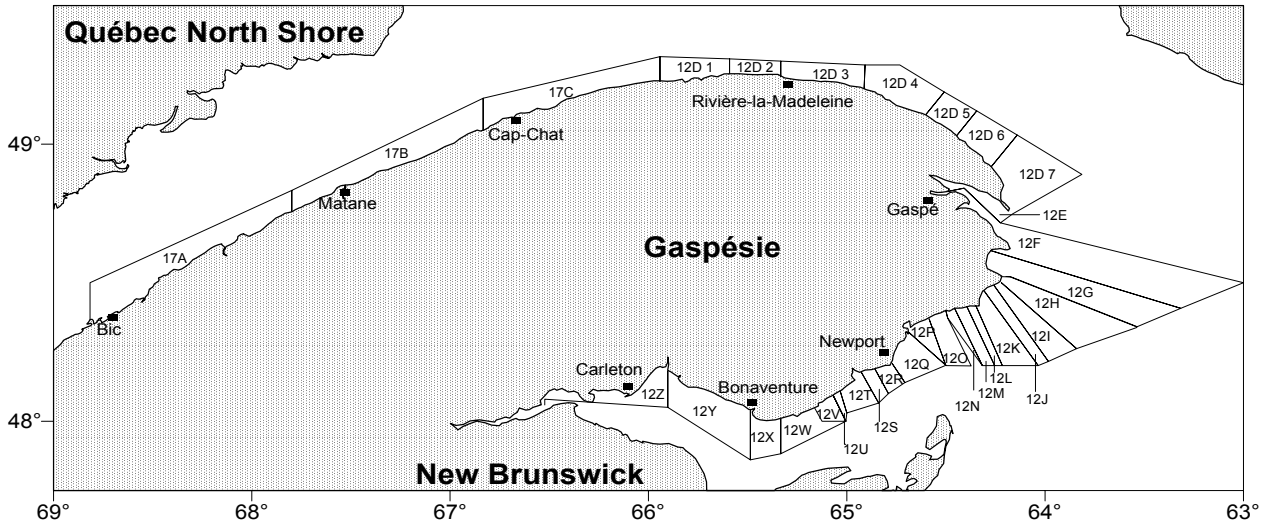


Figure 3. Rock crab fishing areas in the Gaspé.

through controls over fishing effort. The number of licences, the number of traps and the crabbing season are all limited. The fishery is also managed by fishing areas (Figures 1, 2 and 3), so that fishing effort can be distributed more evenly. Quotas are also set in many areas. Rock crab are harvested by lobster fishers during the lobster season, when rock crab is authorized as an incidental catch. Outside the lobster season, rock crab can be taken only by rock crab licence holders, who practice a directed fishery. For the moment, all of the directed fishing licences are exploratory, and a minimum legal carapace width of 102 mm (4 inches) is in effect. Females are thus excluded

from the fishery, because they rarely reach this size.

In the Magdalen Islands in 2002, 14 fishers held directed fishing licences, with individual quotas of 45.5 t. A global quota of 681 t was set, which included not only the individual quotas from the directed fishery, but also the by-catch of rock crab by lobster fishers. Each fisher could use up to 100 traps in areas 12A, 12B, 12B1 and 12B2, and up to 125 traps in area 12C (Figure 2). 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), closed to rock crab harvesting, was created in 2000 between areas 12C and 12B.

In the Gaspé in 2002, there were 12 licence holders in the northern fishing areas (17A to 17C) and 28 in the southern areas (12E to 12Z) (Figure 3). An annual quota of 375 tonnes was authorized for the entirety of areas 12Y and 12Z. There are no quotas in the other areas. The number of traps per fisher can range from 60 to 150.

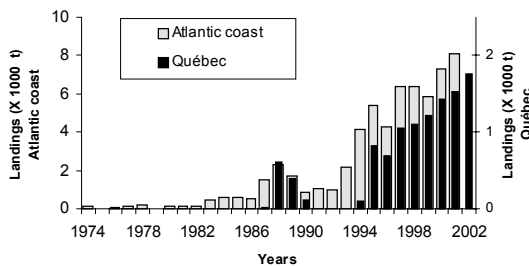


Figure 4. Rock crab landings in Quebec and on the Atlantic seaboard, 1974 to 2002 (2002 data preliminary).

Stock status in 2002

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 from 1974 to 1982, with landings ranging from 6 t to 227 t (Figure 4). Starting in 1983, however, interest in rock crab grew as markets developed. In 2001, recorded landings in Quebec and the Maritimes reached 8,100 t.

In Quebec, rock crab are harvested mainly on the Gaspé Peninsula and in the Magdalen Islands. Markets developed later, and the fishery did not

really get under way until 1995, when 829 t of crab were landed. Landings increased gradually, from 687 t in 1996 to 1,756 t in 2002. From 2001 to 2002, landings increased by 15% (230 t).

In the Magdalen Islands, landings reached a peak of 716 t in 2002, 15% higher than in 2001 (Table 1), and accounted for 41% of the Quebec total. All holders of directed fishing licences have been active since 1998, and the individual quotas were reached in 2002. The rock crab by-catch landed by Magdalen Islands lobster fishers totalled 95 t in 2002, more than 150% higher than the average for the years 1998 to 2001. Since the three main fishing areas (12 A-B-C) were established in 1997,

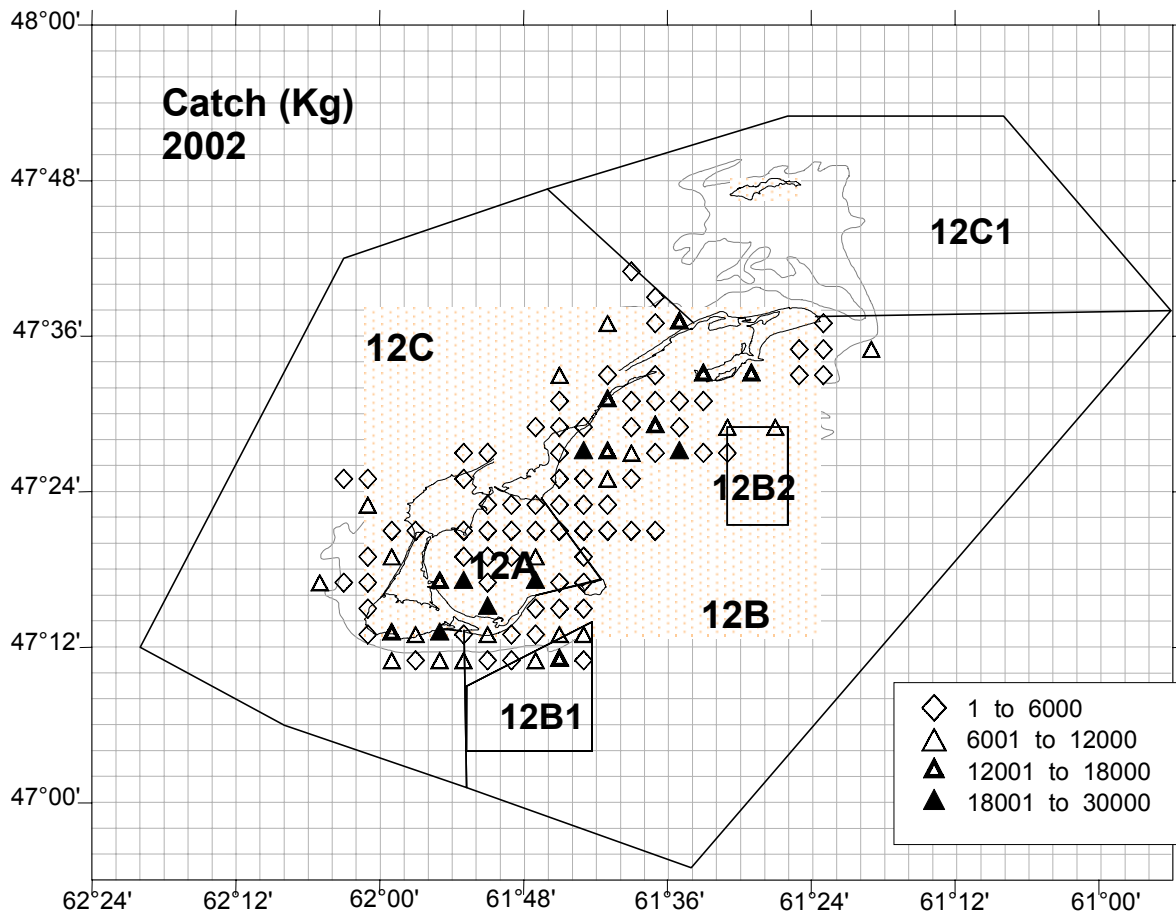


Figure 5. Distribution of catches in the Magdalen Islands.

Table 1. Rock crab landings (t) in Quebec, 1995 to 2002.

Fishing area	1995	1996	1997	1998	1999	2000	2001	2002*
<i>Magdalen Islands</i>								
12C (North)	51	0	135	186	197	181	224	259
12A-B-B1-B2 (South)	209	199	315	348	366	407	400	457
Total	260	199	450	534	563	588	624	716
<i>North Gaspé</i>								
17		2	8	16	16	15	19	40
12D		4	49	48	128	167	218	325
Total		6	57	64	144	182	237	365
<i>South Gaspé</i>								
12E-P	39	21	56	84	125	171	160	159
12Q-X	221	147	184	152	164	170	189	192
12Y	161	163	165	146	108	145	130	149
12Z	148	151	143	120	112	152	166	175
Total	569	482	548	502	509	638	645	675
Total Gaspé	569	488	605	566	653	820	882	1040
<i>North Shore and Anticosti</i>								
Total			1	8	5	3	20	0
Total Québec	829	687	1056	1108	1221	1411	1526	1756

* Preliminary data

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.

In the Gaspé, landings totalled 1,040 t in 2002, up 18% (158 t) from 2001 (Table 1). In 2002, landings in the Gaspé accounted for 59% of the total rock crab catch in Quebec. Along the northern shore of the Gaspé Peninsula (areas 17 and 12D), catches have risen gradually since the fishery opened in 1996. They reached a peak of 365 t in 2002. This represented a substantial increase (128 t, or 54%) over 2001. In the southern Gaspé (areas 12E to 12Z),

landings ranged from 482 t to 569 t over the years 1995 to 1999. They rose to 638 t in 2000, but have increased only slightly since then. The figure for 2002 was 675 t.

For the entire North Shore and Anticosti Island, no directed rock crab fishery took place in 2002.

Catch rates

In fishing areas 12A and 12B in the Magdalen Islands, average yields calculated from logbook data have remained stable since 1995 (Table 2). Since 2000, the highest yields (≥ 20 kg/trap) have been seen in Area 12A. In Area 12C, the yields have been increasing gradually since 1998, and in 2002, the average yield was similar to that in Area 12B: 17.2 kg/trap. In exploratory areas 12B1 and 12B2, which are located in deeper water, yields were

16.4 kg/trap and 15.5 kg/trap, respectively, in 2002.

In the northern part of the Gaspé (more specifically, in areas 12D1 to 12D7, inclusive), the average yield rose from 5.9 kg/trap in 2001 to 8.7 kg/trap in 2002 (Table 2). The highest catch rates in 2002 were observed in the easternmost of these fishing areas.

In the southern Gaspé, the yields show an increasing gradient from the eastern part of the peninsula (12E-P) toward the head of Chaleur Bay (12Z). From 1997 to 2002, the yields were stable in all areas. For example, they were about 5 kg/trap in areas 12E-P and 12Q-X and ranged from 6.1 to 8.1 kg/trap in Area 12Y. In Area 12Z, yields have fluctuated between 9.7 and 11.7 kg/trap since 1997, except in 2001, when they reached nearly 14 kg/trap.

Size structure

The average size of the rock crab landed in the Magdalen Islands has been large ever since fishing began in 1995. The size frequency distribution of crab taken in the Magdalens (areas 12A, 12B and 12C combined) has shown very little variation since 1997 (Figure 6). In 2002, the average size was 123 mm in Area 12A, 124 mm in Area 12B and 121 mm in Area 12C.

The average size of the rock crab landed in the Gaspé in 2002 ranged from 110 mm to 119 mm, depending on the fishing area. In each area, size frequencies have remained stable since the fishery began. Figure 7 shows the size frequency distribution for the southern Gaspé since 1998.

Table 2. Rock crab yields (kg/trap) in the Magdalen Islands and the Gaspé from 1995 to 2002 (data from logbooks).

Fishing area	1995	1996	1997	1998	1999	2000	2001	2002*
<i>Magdalen Islands</i>								
12C (North)	51	0	135	186	197	181	224	259
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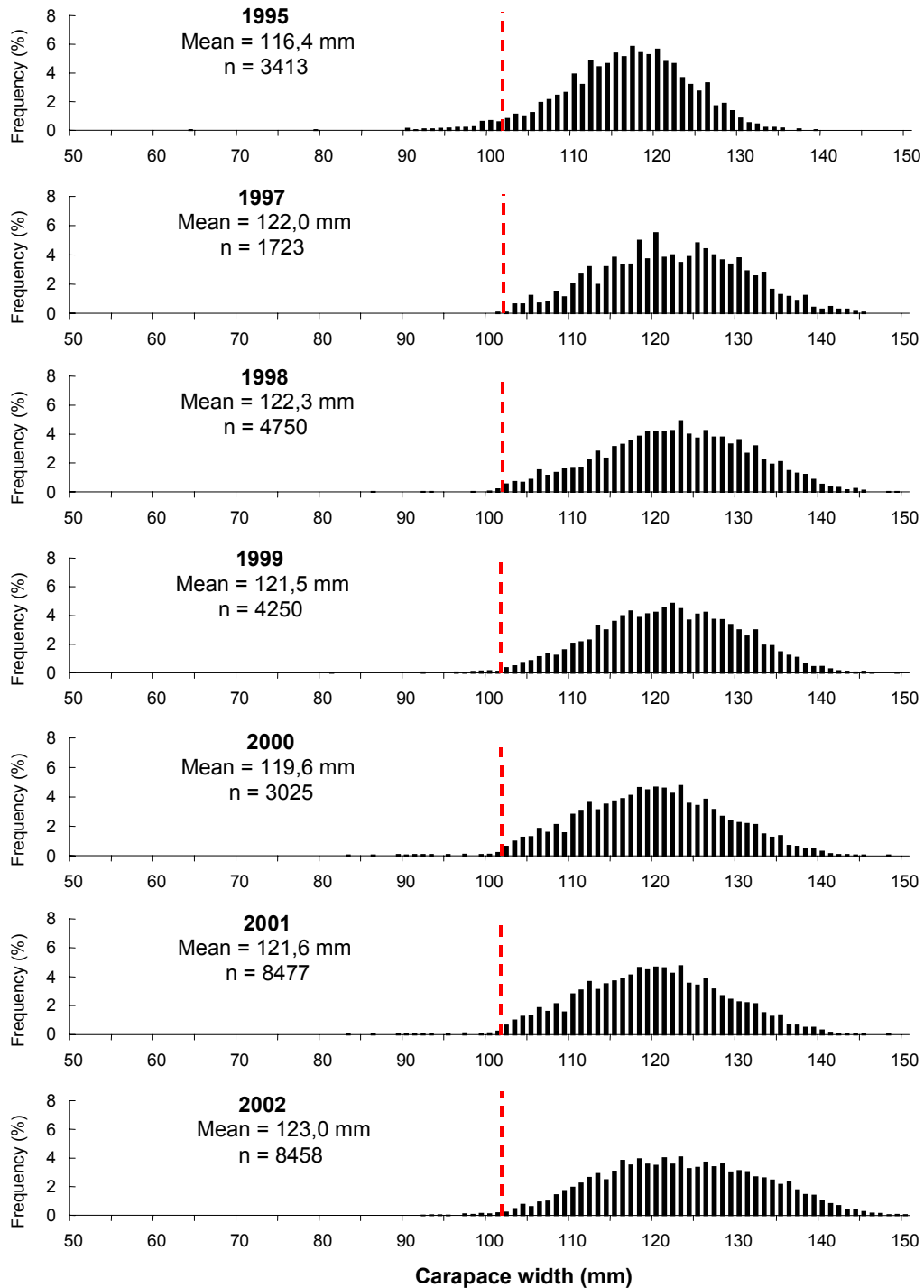


Figure 6. Size frequency distribution of rock crab caught in the Magdalen Islands, based on dockside sampling, 1995 to 2002 (dotted vertical line indicates minimum legal size).

Report and recommendations

The rock crab fishery in Quebec has grown significantly since 1995. Annual landings have risen steadily since 1996

and reached a peak of 1,756 t in 2002—a 15% increase over 2001. The northern Gaspé has seen remarkable growth in landings, which rose from 237 t in 2001

to 365 t in 2002. Most of the fishing, however, continues to take place in the Magdalen Islands and Chaleur Bay. There is still very little rock crab fishing on the North Shore.

In the Magdalen Islands, the intensity of the fishing effort to date does not seem to have had any perceptible impact on rock crab populations. Commercial yields have held steady and size

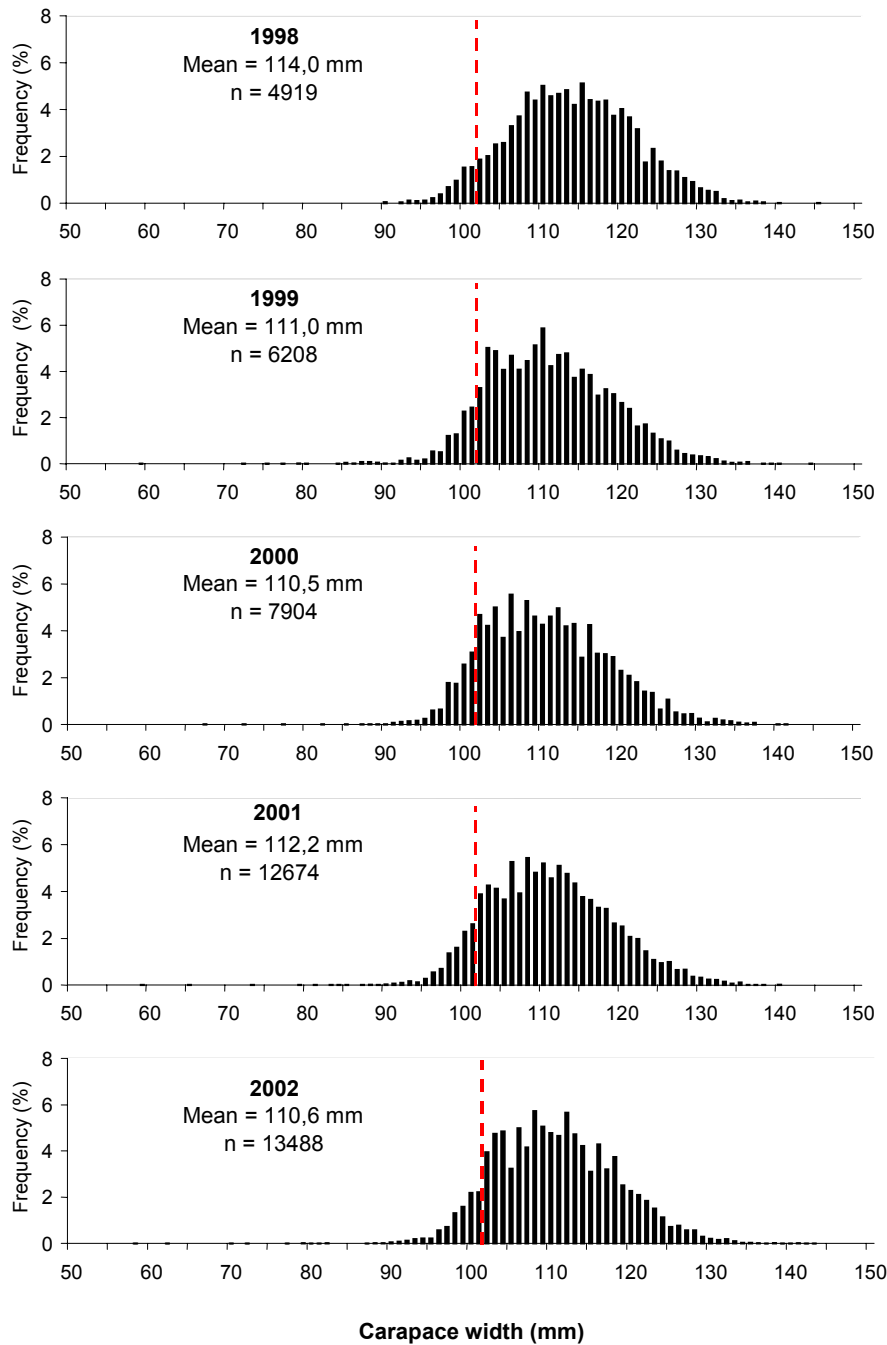


Figure 7. Size frequency distribution of rock crab caught in the southern Gaspé (areas 12E to 12Z), based on dockside sampling, 1998 to 2002 (dotted line indicates minimum legal size).

structures have not changed since 1997 in the main fishing areas (12A, 12B and 12C). However, this rock crab fishery is still relatively new, and the overall quota was reached for the first time in 2002. The only way to get a better assessment of the resource's ability to support the current exploitation rate over the longer term would be to continue monitoring the status of the stocks for a few more years. To protect both the rock crab and lobster, it is recommended that fishing intensity in each of the main fishing areas in the Magdalens not be increased and that the global quota of 681 t (including rock crab by-catch by lobster fishers) be kept unchanged through 2006.

In the Gaspé, the indicators of the stocks' status have shown little variation since the fishery began in 1995. However, over the past few years, exploitation has risen sharply in the northern Gaspé. The size of commercially harvested rock crab and the yields calculated from logbooks show that harvesting has left the populations stable since the fishery began. However, it is still too early to determine the populations' capacity to support the same fishing intensity over the longer term, especially in those areas where the fishing effort is greatest.

Cautious, consistent management to protect the rock crab and lobster populations is essential. It is therefore recommended that the fishing effort in the various fishing areas of the Gaspé be not be allowed to rise from now through 2006. In accordance with a recommendation of the national committee on the development of emergent species (Gendron and Robinson, 1994), it is suggested that

plans be made to establish refuges in each fishing area of the northern Gaspé in order to protect a portion of the spawning stock and allow the population's natural processes to be observed. For the same reason, it is suggested that those areas in the southern Gaspé where there is currently no rock crab fishery be converted into refuges.

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 occurred. It should be possible to prevent such overfishing, however, by maintaining a minimum legal size greater than the size at sexual maturation, so as to protect reproductive potential, as well as control measures to keep exploitation rates moderate. The two species interact sufficiently to justify tight, cautious management of the rock crab fishery so as 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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