



ROCK CRAB OF THE COSTAL WATERS OF QUEBEC

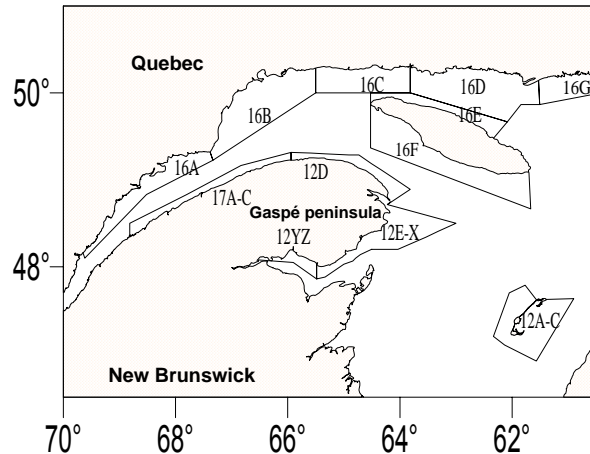
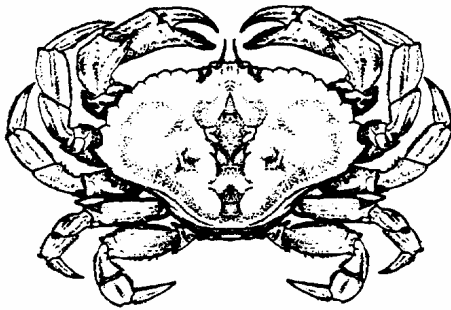


Figure 1: Rock Crab Fishing Areas in Quebec

Context

In Quebec, commercial fishing of rock crab began in 1988, but the fishery did not really begin to take off until 1995. From 1996 to 2002, the tonnage and value of landings gradually increased and then stabilized. The main fishing areas for rock crab in Quebec are the Magdalen Islands (12A–C), Chaleur Bay (12E–Z), the north shore of the Gaspé Peninsula (12D) and, since 2004, the Middle North Shore (16B–D).

As soon as the rock crab fishery began, a management plan was introduced to control the fishery's development and maintain the reproductive potential of rock crab populations. Rock crab is a major prey species for lobster; this interaction between the two species justifies very cautious management of the rock crab fishery to prevent any overfishing.

The minimum legal carapace width has been set at 102 mm (4 inches), creating an exclusively male-directed fishery. The number of licences and traps are limited, as is the crabbing season. An overall quota has been set for Areas 12Y and 12Z in Chaleur Bay, while individual quotas have been issued for fishers in the Magdalen Islands.

SUMMARY

- Landings of rock crab in Quebec increased gradually between 1996 and 2002, when they peaked at 1,761 t. After falling to 1,654 t in 2003, landings rose to 1,690 t in 2004, a 2% increase over 2003 (preliminary data). In the Magdalen Islands, landings were down 7% in 2004, compared with 2003, totalling 654 t. This decrease can be attributed primarily to a reduction in incidental catches. On the north shore of the Gaspé Peninsula, landings

remained relatively unchanged between 2003 and 2004, totalling 285 t in 2004. Landings in Chaleur Bay have generally remained stable since 2000 at over 600 t. Landings in this area reached 610 t in 2004. On the Middle North Shore, the first significant landings occurred in 2004 and reached 141 t.

- Catch rates have been relatively unchanged in all areas 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.
- The multiyear management plan for the Magdalen Islands will remain in force until 2006. The plan will maintain harvesting at moderate levels. It is recommended that harvesting not be increased in areas in the Gaspé and that refuges be established near or inside each of the areas. On the Middle North Shore, we recommend that this new fishery be developed using a prudent and gradual approach that is in line with the principles of a precautionary approach.

DESCRIPTION OF THE ISSUE

Species Biology

The rock crab (*Cancer irroratus*) is found along the east coast of North America, from Labrador to South Carolina. This species is associated with various bottom types, ranging from bedrock to soft bottoms. Commercial-size crab and, more generally, those bigger than 50 mm (size corresponds to carapace width) live on sandy or muddy bottoms, while a smaller portion of the adult population share rocky bottoms, where lobster also occur, with individuals smaller than 50 mm. Berried female rock crabs show a marked preference for soft bottoms, where they can bury themselves and in which they form their aggregations.

Male and female rock crabs grow to different sizes. Males can reach 140 mm, while females rarely exceed 100 mm. Breeding occurs in the fall after the females have moulted and while their carapaces are still soft. Males moult in winter so that their carapaces have fully hardened by spawning season. Carapaces harden completely in two to three months. Females reach sexual maturity at about 60 mm, while males do so at a slightly larger size (≈ 70 mm). Females lay their eggs, then keep them under their abdomens for nearly 10 months. A 60 mm female can lay 125,000 eggs, while a 90 mm female can lay up to 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 regions further south suggest that rock crab may attain commercial size at about five or six years of age and live to about seven years.

The rock crab is omnivorous and displays a certain amount of 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 is a major prey for lobster throughout the lobster's life cycle, even from the earliest larval stage.

The Fishery

The rock crab-directed fishery management plan is intended to control the fishery's development and protect the reproductive potential of rock crab populations. The rock crab fishery is managed by controlling fishing effort. The number of licences and traps is limited, as is the crabbing season. The fishery is also managed by fishing areas (Figures 1, 2 and 3), so that fishing effort can be distributed more evenly. Quotas have also been set in the Gaspé (Areas 12Y–Z) and the Magdalen Islands (Areas 12A–C). A minimum legal carapace width of 102 mm is in effect. Females are thus excluded from the fishery, because they rarely reach this size. Rock crab is harvested by a variable number of lobster fishers during lobster season, when rock crab are an authorized by-catch. Outside the lobster season, rock crab can be taken only by rock crab licence holders who practise a directed fishery. The directed fishing season begins in July and ends in October. Directed fishing licences have been permanent in the Magdalen Islands since 2003, while in other areas, they remain exploratory. In the Magdalen Islands in 2004, 14 fishers held directed fishing licences for rock crab, with individual quotas of 45.5 t. An overall quota of 681 t was set, which included not only individual quotas from the directed fishery, but also the rock crab by-catch landed by lobster fishers. Each fisher was allowed to between 75 and 125 traps, depending on the area and the size of the traps used. The fishers were allowed to fish in one, or in some cases two, of the three areas. A control area (12C1), closed to rock crab harvesting, was created in 2000 between Areas 12C and 12B to protect a portion of the reproductive stock so that its natural processes could be monitored. In the Gaspé in 2004, there were 12 licence holders in the northern fishing areas (Areas 17A to 17C and 12D1 to 12D7) and 28 licence holders in the southern areas (Areas 12E to 12Z) (Figure 3). An annual quota of 375 t was authorized for the entirety of Areas 12Y and 12Z. There are no quotas in the Gaspé, where the number of traps per fisher ranges from 75 to 150. On the Upper and Middle North Shore (Areas 16A–D), 4 licences were issued per area, for a total of 16. On the Lower North Shore (Area 16G), 12 licences were issued. Each North Shore fisher was allowed to use 150 traps.

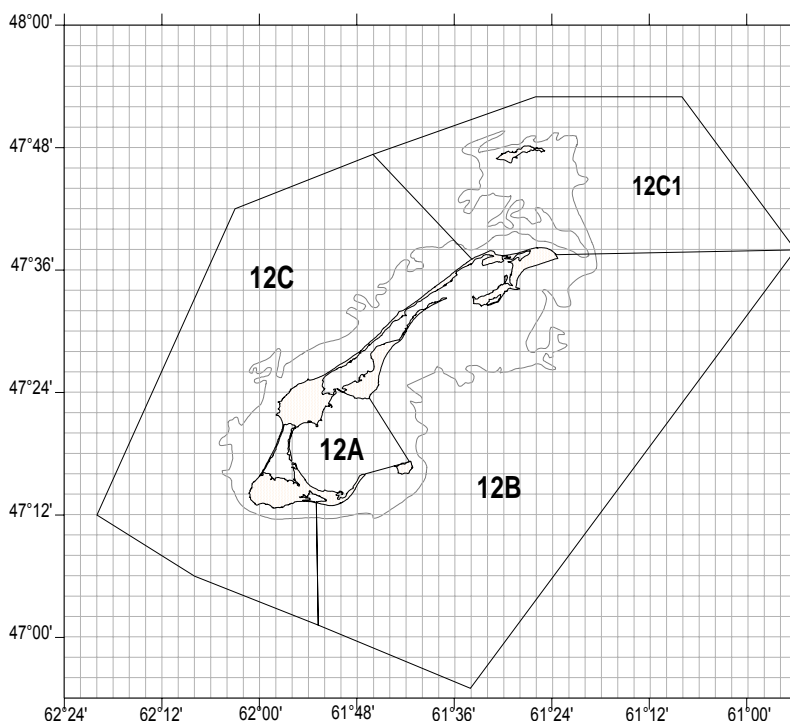


Figure 2. Rock Crab Fishing Areas in the Magdalen Islands.

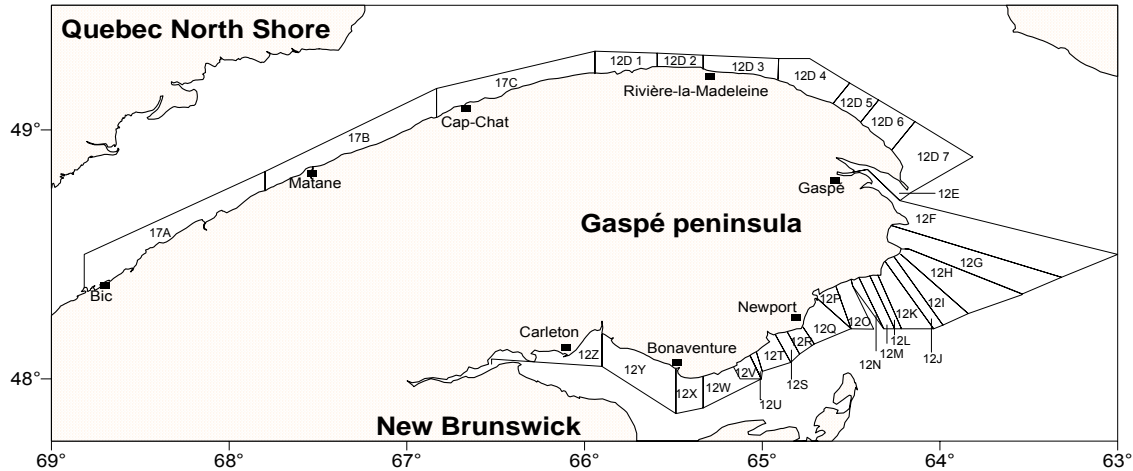


Figure 3. Rock Crab Fishing Areas in the Gaspé.

ASSESSMENT

Landings

In Quebec, rock crabs are harvested mainly off the Gaspé Peninsula and in the Magdalen Islands. The fishery only truly took off in 1995, when 829 t were landed. Landings increased gradually, from 687 t in 1996 to 1,761 t in 2002 and have remained stable ever since. In 2003 and 2004, landings totalled 1,654 t and 1,690 t, respectively. In 2003, Quebec landings accounted for 25% of the total Atlantic rock crab catch.

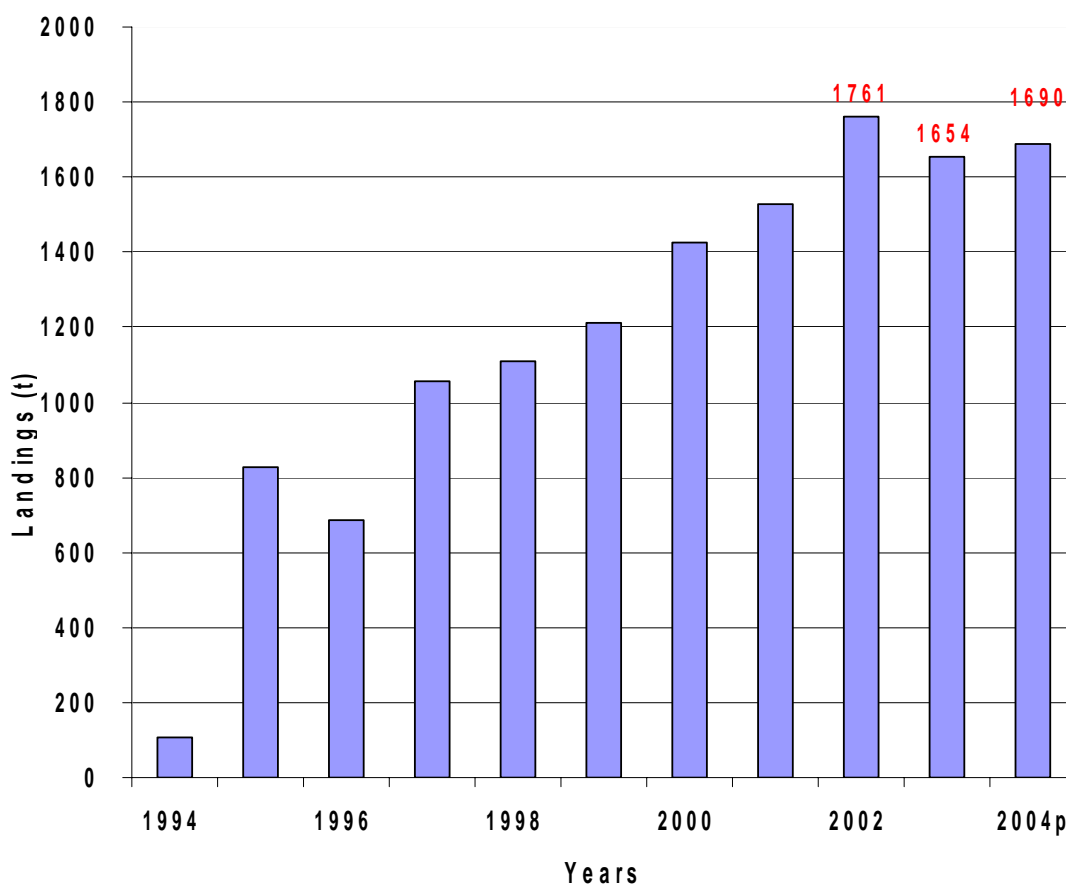


Figure 4. Rock crab landings (t) in Quebec, 1994 to 2004 (2004 data are preliminary).

In the Magdalen Islands, landings totalled 654 t in 2004, a decrease of 63 t from the record 717 t recorded in 2002 (Table 1), accounting for 39% of all Quebec landings. All holders of directed fishing licences have been active since 1998, and individual quotas have been reached since 2002. The rock crab by-catch landed by lobster fishers in the Magdalen Islands totalled 20 t in 2004, 76 t fewer than the record high of 96 t landed in 2002. Since the three fishing areas (12 A-B-C) were established in 1997, fishing effort has been better 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, generally at depths of less than 20 metres. The 2004 harvest took place mainly during the month of September.

In the Gaspé, landings totalled 895 t in 2004, a slight 4% decrease (37 t) over 2003 (Table 1). In 2004, landings in the Gaspé accounted for 53% of the total rock crab catch in Quebec. Along the northern shore of the Gaspé Peninsula (Areas 17 and 12D), catches have risen steadily since 1996, peaking at 367 t in 2002, but then dropped to 291 t in 2003 for reasons having nothing to do with the resource's abundance. The 2004 catch remained close to this level, at 285 t. In the southern Gaspé (Areas 12E to 12Z), landings fell from 676 t in 2002 to 618 t in 2003, and 610 t in 2004. Despite these two successive drops, catches in these areas have generally remained stable since 2000.

On the North Shore, 141 t were landed in 2004. These were the first significant landings for the North Shore, and this result can be linked to the opening of a processing plant there. A directed rock crab fishery took place around Anticosti Island in 2001 only.

Table 1. Rock Crab Landings (t) in Quebec, 1995 to 2004.

Fishing area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004*
<i>Magdalen Islands</i>										
12C (North)	51	0	135	186	197	181	224	260	266	228
12A-B (South)	209	199	315	348	366	407	400	457	440	426
Total	260	199	450	534	563	588	624	717	706	654
<i>North Gaspé peninsula</i>										
17		2	8	16	16	15	19	40	29	17
12D		4	49	48	128	167	218	327	263	268
Total		6	57	64	144	182	237	367	292	285
<i>South Gaspé peninsula</i>										
12E-P	39	21	56	84	125	171	160	160	172	154
12Q-X	221	147	184	152	164	170	189	192	145	152
12Y	161	163	165	146	108	145	130	149	112	119
12Z	148	151	143	120	112	152	166	175	211	185
Total	569	482	548	502	509	638	645	676	640	610
<i>North Shore and Anticosti</i>										
16A-D			1	8	5	3	16	1	15	139
16E-F							2			
16G							2		1	2
Total			1	8	5	3	20	1	16	141
Total Quebec	829	687	1056	1108	1221	1411	1526	1761	1654	1690

* Preliminary data

Yield

In the Magdalen Islands, the highest yields since the beginning of the fishery in Areas 12A and 12B were recorded in 2004, averaging 26 kg/trap and 22 kg/trap, respectively. In Area 12C, yields have remained high at 17 kg/trap (Table 2).

In the northern Gaspé (more specifically, in Areas 12D1 to 12D7, the easternmost areas), the average yield rose to a record high of 9.6 kg/trap in 2004, while in the western part of this region (Area 17), the average yield was 5.5 kg/trap.

In the southern Gaspé, yields show an increasing gradient from the eastern tip of the Peninsula (12E-P) to the head of Chaleur Bay (12Z). From 1997 to 2004, average yields were stable in all areas. During that period, the average yield was between 5 and 6 kg/trap in Areas 12E-P and 12Q-X and varied between 6 and 8 kg/trap in Area 12Y. In Area 12Z, yields have ranged from 11 to 14 kg/trap since 2000.

On the North Shore (Area 16), the average yield was 6 kg/trap in 2004.

Table 2. Estimated Rock Crab Yields (kg/trap) Based on Logbook Data.

Fishing area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004*
<i>Magdalen Islands</i>										
12A	13,7	17,9	12,3	13,2	16,2	20,3	21,8	22,4	21,8	26,0
12B	15,2	17,6	15,3	13,5	16,3	16,7	18	17,1	20,1	21,9
12C	10,5		12,5	7,7	11,6	12,7	13,8	17,2	18,7	17,0
<i>North Gaspé</i>										
17		2,0	1,8	7,0	6,8	5,8	5,9	4,1	4,4	5,5
12D			4,1	2,7	3,5	3,4	5,9	8,7	8,0	9,6
<i>South Gaspé</i>										
12E-P				4,7		5,6	5	5,4	6,1	6,4
12Q-X		7,2	5,6	5,5	5,1	5,4	4,8	4,6	4,6	5,2
12Y		9,3	8,1	6,2	6,1	8,1	7,3	7,3	7,3	8,0
12Z	14,8	16,1	10,6	10,6	9,7	11,7	13,7	11,1	13,0	12,0
<i>North Shore</i>										
16A-D										6,1

* Preliminary data

Size Frequency Distribution

The size frequency distribution of rock crabs taken in the Magdalen Islands has varied little since 1997 in both southern (Areas 12A and 12B) and northern (12C) areas. The average size of rock crab in all of these areas has remained large ever since the beginning of the fishery in 1995 (Figure 5). In 2004, the average size was 124 mm in Areas 12A and 12B and 121 mm in Area 12C.

The average size of rock crab landed in the Gaspé in 2004 ranged from 111 mm to 119 mm, depending on the area. In Chaleur Bay (Areas 12E to 12Z combined), size frequency distributions have remained stable at approximately 111 mm since 2000 (Figure 6). Average sizes for rock crab landed in Areas 17 and 12D (northern sector) increased slightly from 2000 to 2003 and then remained stable between 2003 and 2004 at 119 mm.

On the North Shore, the average size of crabs landed ranged between 111 and 114 mm in 2004, depending on the area.

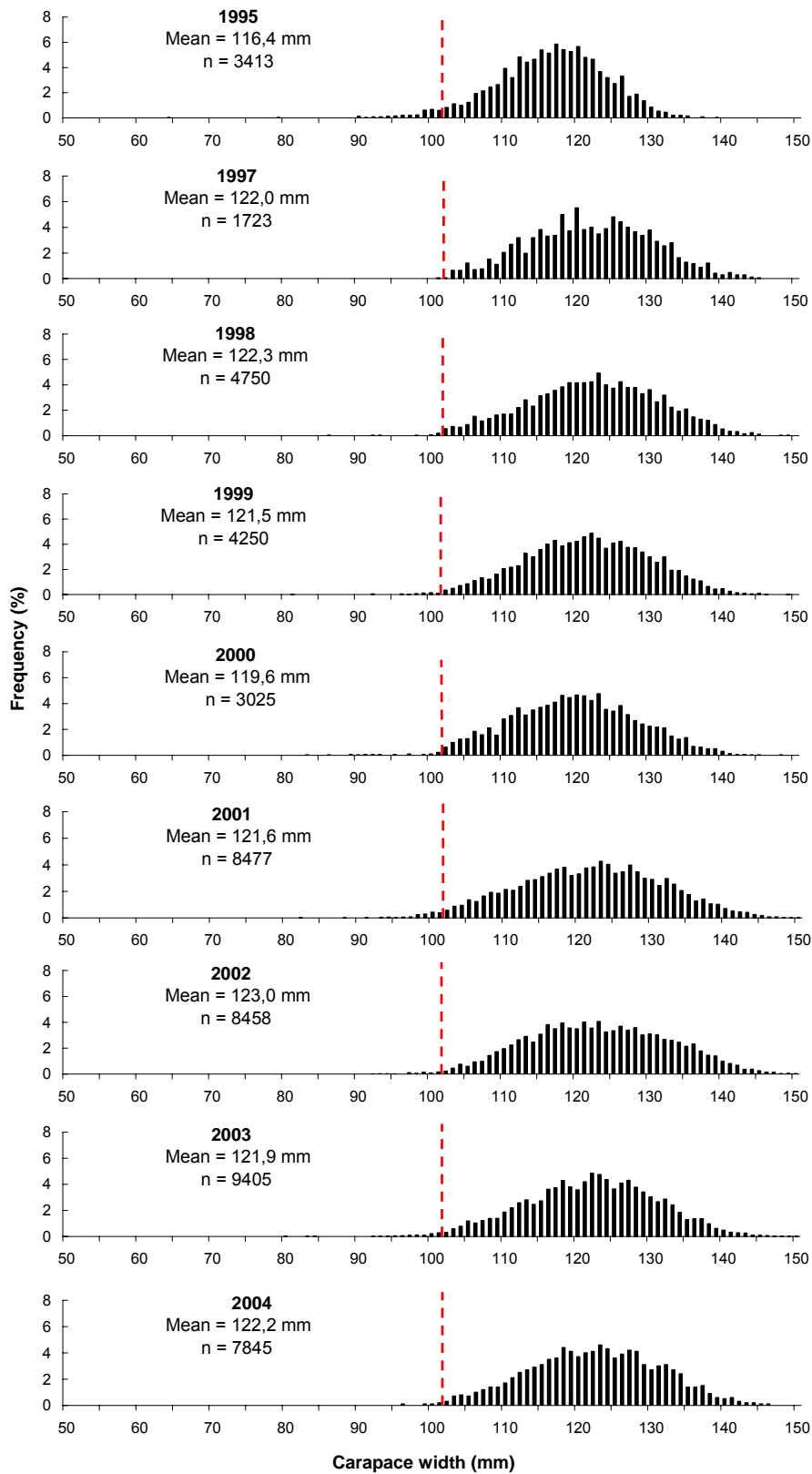


Figure 5. Size Frequency Distribution of Rock Crab Caught in the Magdalen Islands, 1995 to 2004. The dotted vertical line indicates minimum legal size.

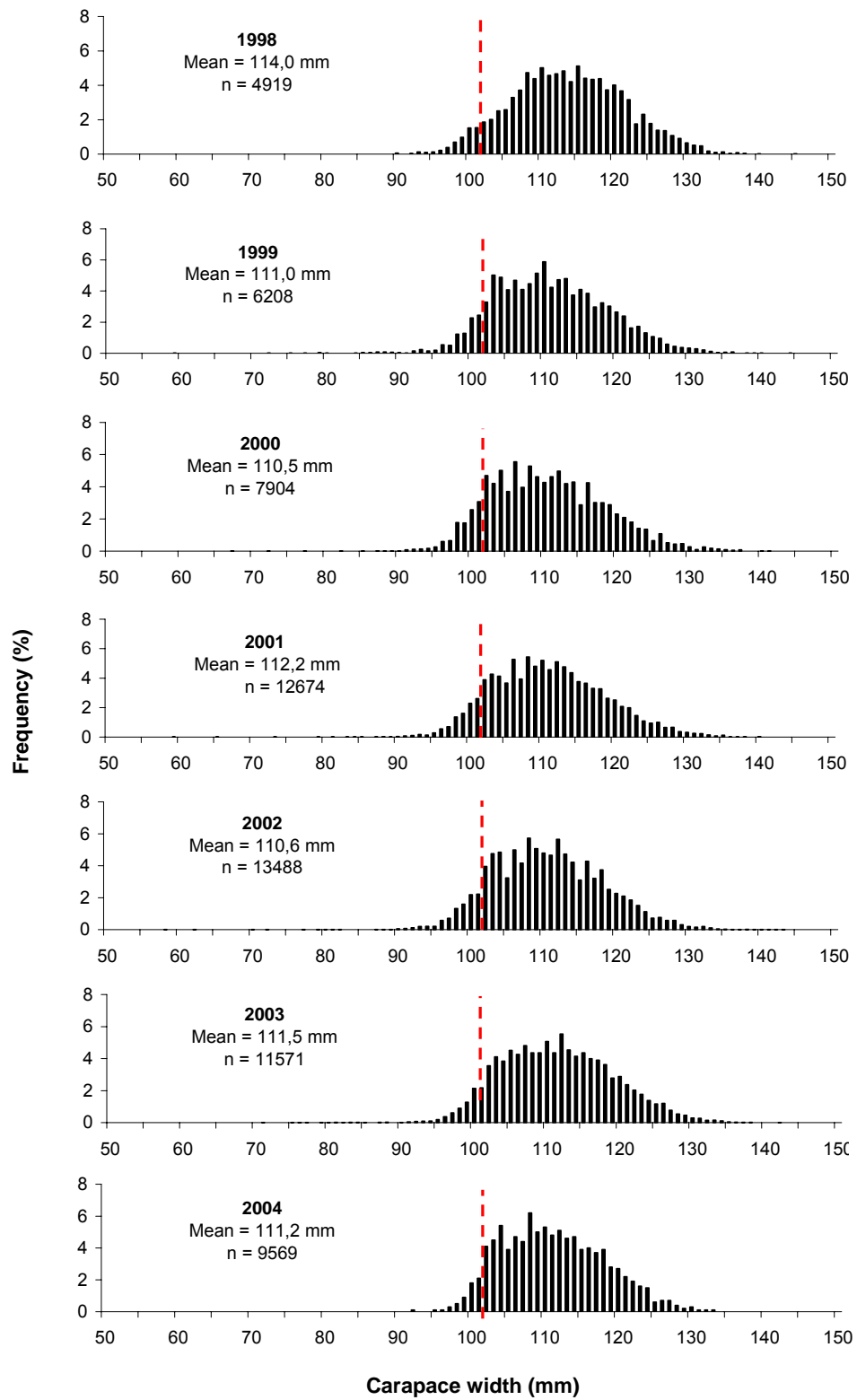


Figure 6. Size Frequency Distribution of Rock Crab Caught in the Southern Gaspé (Areas 12E to 12Z), 1998 to 2004. The dotted line indicates minimum legal size.

CONCLUSIONS AND ADVICE

The rock crab fishery in Quebec has grown significantly since 1995. Annual landings increased steadily from 1996 to 2002, peaking at 1,761 t. Landings for 2004 totalled 1,690 t. Most fishing activity continues to take place in the Magdalen Islands and Chaleur Bay. There is still very little rock crab fishing on the North Shore, despite a strong increase in landings in 2004.

In the Magdalen Islands, it is recommended that the current rock crab fishery management plan, valid to 2006, remain unchanged. This plan recommends that fishing intensity in the Magdalen Islands' various fishing areas should not increase and that the overall quota, including incidental catches made during the lobster season, should be maintained at 681 t until 2006.

Stock status indicators for the northern and southern Gaspé suggest that current harvesting levels are stable. However, the rock crab fishery is new, and its long-term effects on the productivity of populations are still unknown. Only after monitoring the status of stocks for another few years will we be able to make a better assessment of the resource's capacity for sustaining current harvest levels in the longer term. For this reason, it is recommended that the intensity of rock crab fishing in Gaspé fishing areas not be increased. In accordance with a recommendation of the National Committee on the Development of Emergent Species (Gendron and Robinson, 1994), it was suggested that refuges be established in each area of the northern Gaspé to protect a portion of the spawning stock and allow the natural processes of rock crab populations to be monitored. For the same reason, it would be advisable to convert into refuges the areas in the southern Gaspé where there is currently no rock crab fishery.

Not enough data are available to determine stock status on Quebec's North Shore (Areas 16A to 16G). We recommend a prudent and gradual approach to the development of this fishery, in line with the principles of a precautionary approach and sustainable development.

OTHER CONSIDERATIONS

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 in order to ensure a sustainable harvest. 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 does not prey on crab of legal size (102 mm or more). 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 carapace width greater than the size at sexual maturation to protect reproductive potential, and by implementing control measures to keep harvesting levels 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 limited. The fishery will have to be monitored regularly to assess the status of the resource and the impacts of fishing operations on rock crab populations. The logbook system is essential for determining resource status. It is therefore imperative that fishers keep proper logs.

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ISSN 1480-4913 (Printed)

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CORRECT CITATION FOR THIS PUBLICATION

DFO, 2005. Rock Crab of the Coastal Waters of Quebec. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/030.