

STOCK STATUS REPORT

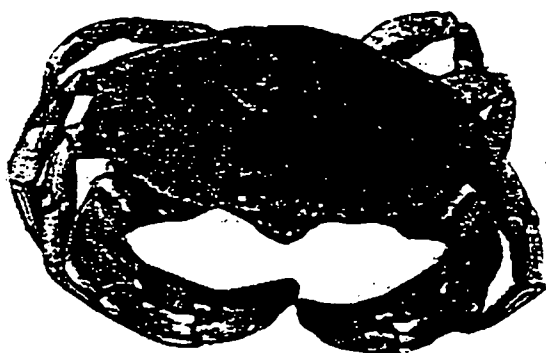
LAURENTIAN REGION

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DFO, Atlantic Fisheries, Stock Status Report 96/5

March 1996

QUÉBEC ROCK CRAB



BIOLOGY

The rock crab *Cancer irroratus* is a decapod crustacean that ranges all along the east coast of North America, from Labrador to South Carolina. This species is associated with a variety of bottom types, from rock to loose material. Commercial-sized crabs and, more generally, those with a cephalothorax width of over 50 mm live on sandy or muddy bottoms, while a smaller proportion of adults cohabits with certain other segments of the population on rocky substrates in a sympatric relationship with lobster. Egg-bearing females exhibit a

marked preference for soft substrates, in which they bury themselves and form aggregations.

Males and females differ greatly in terms of size. A standard measurement of size in rock crab is the carapace width (CW), inclusive of spines. While males may reach a carapace width of 140 mm, females rarely exceed 100 mm. Spawning takes place in the fall, after the females have moulted and their carapace is still soft. Since males moult in winter, by the time of the spawning period, their carapace has hardened completely, a process that takes two to three months. Females reach sexual maturity at a CW of roughly 60 mm, compared with the slightly larger size of 70 mm for males. Females lay eggs and carry them under their abdomen for nearly a year. A 60-mm female may carry as many as 150,000 eggs, in contrast with 500,000 for a 90-mm female. The larvae emerge the summer after spawning occurred, and remain in the water column generally from mid-June to mid-September. In the fall, they change into megalops and soon after begin their benthic phase.

Juveniles (under 15 mm) are found mainly at shallow depths on heterogeneous substrates, which provide better protection against predators and turbulence. There are few data on the growth of rock crab in the Gulf of St Lawrence. Data from more southerly regions suggest that rock crab reach commercial size at about age 5 and live for about 7 years.

The rock crab is an omnivorous species with a diet that points to a certain opportunism. Lobster has never been shown to be a significant part of the rock crab's diet. On the other hand, stomach content analyses of lobster have revealed that rock crab is an important prey item for lobster throughout their life cycle, even in the first larval stage.

MANAGEMENT SITUATION

Rock crab fishing is managed based on the same management units as lobster fishing (Figure 1). Rock crab are harvested by lobster fishermen during the lobster season: bycatches of rock crab are authorized. Outside the lobster season, rock crab are harvested in a directed fishery involving a limited number of licence holders. When the fishery for this new resource first opened, a management plan was established with conservation principles aimed at maintaining the population's reproductive potential and optimizing the stocks' yield. Rock crab fishing is regulated by the following measures:

1. limitation of the number of directed fishing licences
2. use of selective gear to minimize bycatches of lobster
3. limit of 150 traps per licence
4. landing of females is prohibited
5. minimum legal size of 102 mm (4") carapace width, inclusive of spines
6. preventive quota (TAC)
7. fishermen are required to keep logbooks.

In 1995, directed fishing for rock crab was carried out in the Gaspé (24 licences), in areas 20A, 20B and 21, and in the Magdalen Islands (6 licences). In the Gaspé, a TAC of 980 t was granted to rock crab fishermen and to lobster fishermen for bycatches of rock crab. In the Magdalen Islands, the TAC of 272 tons was divided equally between lobster and rock crab fishermen. The directed fishing season went from the end of the lobster season to the end of October. In some fishing areas and periods, the industry has set a minimum legal size larger than that provided for in the management plan, namely up to 114 mm (4.5").

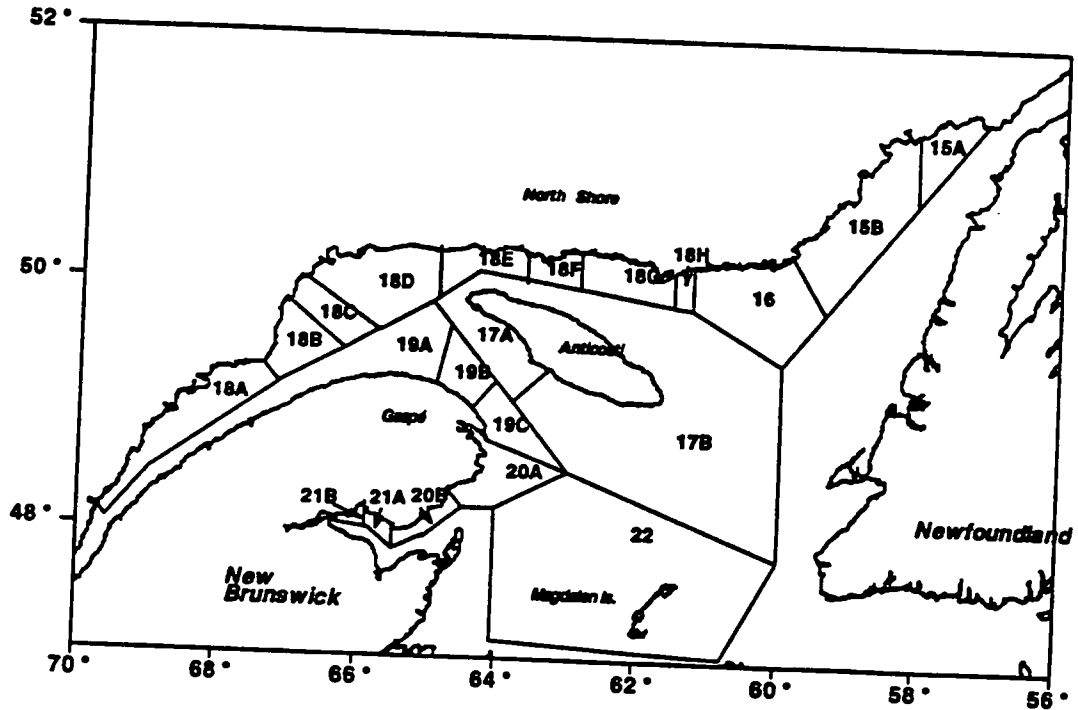


Figure 1. Rock crabs fishing areas in Québec

STOCK STATUS IN 1995

Landings

Harvesting of rock crab along the Atlantic coast of Canada is a fairly recent activity. The species' small size, its hard carapace and low meat yield made it for a long time less attractive to the industry. In the southern Gulf of St Lawrence, fishing for rock crab started on an experimental basis in 1974 (Figure 2).

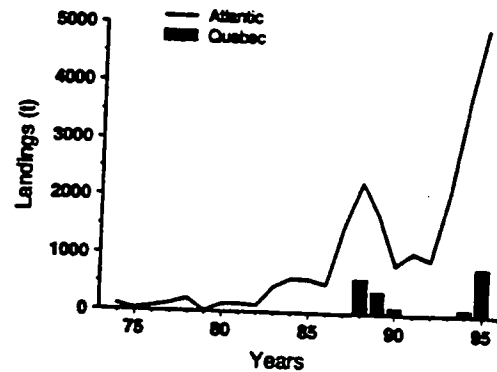


Figure 2. Landings of rock crab in Québec

The fishery grew slowly between 1974 and 1988, with landings ranging from 6 t to 227 t. Since 1983, however, interest in rock crab has grown as markets for the species have expanded, and in 1994 the total catch for New Brunswick, Nova Scotia and Prince Edward Island was 4,025 t.

In Québec, commercial fishing began in the late 1980s, and in 1988 landings reached 615 t. Catches declined every year after that, however, and harvesting operations continued on a small scale until 1994, when landings of 105 t were recorded. In 1995, rock crab fishing was carried out in the Gaspé and, for the first time, in the Magdalen Islands, and landings for Québec as a whole totalled 841 t. Bycatches of rock crab made during the lobster season accounted for 13% of the total catch. The preventive quotas were not attained in either region.

Table 1 Landings (t) of rock crab in Québec

Year	1988	1989	1990	1991	1992	1993	1994	1995
	615	400	120	3	1	0	105	841

In the Gaspé, landings of 587 t of rock crab were recorded. Lobster fishermen took 12.4% (73 t) of the total catch, while a total of 514 t of rock crab was harvested in the directed fishery. Fifteen fishermen participated actively in the directed fishery in the Gaspé, out of a total of 24 licence holders. The fishery was open from July 9 to October 30, but was interrupted temporarily between early August and early September because of a lack of buyers (Table 2).

Table 2 Landings of rock crab in the Gaspé in 1995

		20A	20B	21
Bycatches	Number of fishermen	1	20	12
	Landings (t)	0.2	31.6	40.8
Directed fishery	Number of fishermen	5	6	4
	Landings (t)	24.5	205.6	283.5
Total (t)		24.7	237.2	324.3
Quota (t)		980		

In the Magdalen Islands, landings of 255 t of rock crab were recorded, with bycatches by lobster fishermen making up 39.2% (100 t) of the total catch (Table 3).

Table 3 Landings of rock crab in the Magdalen Islands in 1995

		Area 22
Bycatches	Number of fishermen	117
	Landings	100 t
Directed fishery	Number of fishermen	6
	Landings	154.8 t
Total (t)		254.8
Quota (t)		272

In the directed fishery, landings of rock crab totalled 155 t. The six licence holders for this fishery were active during the season, which ran from July 10 to October 13. As in the Gaspé, crab purchases stopped during August.

Abundance indices

Abundance indices for rock crab were calculated based on data from logbooks, activity reports and dockside sampling. The abundance of the species appears to vary greatly among the regions. The indices compiled during the directed fishery showed a significant increase in the abundance of rock crab along the Gaspé coast, from east to west. In Area 20A, the catch per unit of effort (CPUE) for commercial-sized crab calculated from activity reports and dockside sampling data ranged from 2.15 to 5.19 kg/trap. In Area 20B, the yields observed varied between 5.71 and 7.6 kg/trap, compared with a range of 8.3 to 20.8 kg/trap for Area 21. Average yields as computed from logbooks (Area 21) were 13.0 kg/trap during the season.

In the Magdalen Islands, the yields measured during dockside sampling ranged from 12.4 to 19.8 kg/trap for the directed fishery. Average yields calculated for the whole season from logbook data amounted to 13.5 kg/trap, which is similar to the figure obtained for the Gaspé, in Area 21. The yields were nonetheless much higher in the southern (Baie de Plaisance) as opposed to the northern part (along the Dune du Nord) of the Magdalen Islands. Rock crab appear to be more abundant in areas with large expanses of sand. Trends in catch rates over the season for the directed fishery were identified by using the logbooks completed by two Gaspé fishermen (Area 21) and the six Magdalen Islands fishermen. In the Gaspé, the catch per unit of effort (CPUE) remained fairly stable during the season, averaging 13.0 kg/trap, except during the week of September 24, when the yield stood at 17.7 kg/trap. In the Magdalen Islands,

the yields were higher in September and October (average of 15.6 kg/trap) than in July and August (average of 11.7 kg/trap). These seasonal variations are consistent with earlier observations indicating that rock crab aggregate to a greater extent in the fall.

During the directed fishery, dockside sampling of catches was done three times in Area 20A, four times in Area 20B and only once in Area 21, namely in August. Fishing appears not to have significantly modified the size composition of catches over the season. In Area 20A, the average size of rock crab (> 100 mm) rose from 110.5 mm in July to 113.1 in October. The average size of the single sample taken in August in Area 21 was 108.4 mm. In the Magdalen Islands, where four samples were collected during the directed fishing season, the same trend was noted: the average size of the crabs (> 100 mm) was 116.4 mm in July and 119.4 mm in October. The higher average size recorded for Magdalen Islands crab may be due to the fact that buyers there were interested in crabs with a CW of at least 114 mm (4.5").

The effects of harvesting on the populations were not revealed by the analysis of the abundance indices obtained during the directed fishery and by the examination of the size composition of the catches. In the Gaspé, CPUE values were fairly stable throughout the directed fishing season. Dockside sampling data even showed a slight increase in yields as the season progressed. In the Magdalen Islands, a moderate rise in CPUE was observed during the season. Analysis of the size composition data did not reveal a marked decline in the number of large crabs over the season. The level of

fishing effort expanded during 1995 translated into a low or moderate rate of exploitation of stocks. The level of exploitation did not, at least not during this first harvesting season, deplete the accumulated biomass of virgin stocks.

ECOLOGICAL PERSPECTIVE

A number of fishermen are wondering what impact rock crab harvesting may have on lobster stocks. As a result of rock crab fishing, the abundance of large rock crab will diminish; however, this should not have an adverse effect on lobster, since they do not feed on the large crabs. A decrease in the crab population could actually benefit lobster by freeing up space and providing a feeding niche that lobster can exploit. According to information available at present, deleterious effects could occur only if the quantity of small crabs--those that lobster eat--decreased to the point that they would become less accessible to lobster. Laboratory observations have shown that a decrease in the amount of rock crab in the diet of lobster could cause a decrease in lobsters' muscle growth and gonad development. The reduced availability of rock crab might also extend the foraging period of lobster, thus making them more vulnerable to predation. Nonetheless, it is not possible to estimate the level of abundance of rock crab required in order to avert such impacts and, at present, there is no indication that rock crab may be limiting for lobster or other predators. Our current knowledge of the population dynamics of rock crab, does not permit us to determine what impact harvesting will have on the species' recruitment. The risks of a reduction in the number of small crabs could be greater however if there

were no measures to limit harvesting of the parental stock. There is a great deal of uncertainty regarding the population dynamics of rock crab and lobster. However, the two species interact to a sufficient extent that a strict and cautious approach to managing the rock crab fishery is justified in order to prevent any overfishing.

CONCLUSION

The rock crab fishery is still in an expansion phase. In 1995, only 21 fishermen participated in the directed fishery, and a number of them devoted less than the maximum effort allowed. In fact, in the Gaspé, fishermen expended only a third of the permitted effort, while Magdalen Islands fishermen used about a fifth of their harvesting potential. Exploiting an accumulated biomass and fishing in many different new spots allowed fishermen to maintain high catch rates. Yields can be expected to decline once the accumulated biomass will be harvested, at which point the fishery will be dependent on the stock's production. In light of the limited historical data that are available, we recommend that no new licences be granted for the current fishing areas and that the preventive quota set in the Gaspé be maintained at the same level. Furthermore, we recommend that the overall quota be divided equally among the three subareas (20A, 20B and 21) to prevent overfishing locally, as well as to avoid placing any unnecessary constraints on fishing in sectors where the resource appears to be more productive. In the Magdalen Islands, the status quo should be maintained, at least during the start of the second year of operations. In addition, it is essential that fishermen who participate in the directed fishery

complete logbooks, since this measure, combined with the planned program to sample catches at sea, will permit better monitoring of stock status.

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