

### Gulf Rock Crab (*Cancer irroratus*)

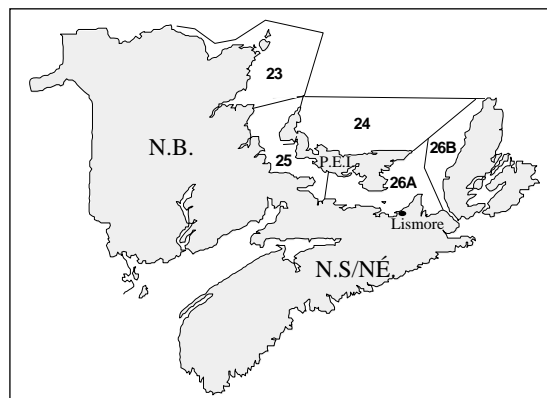
#### Background

Rock crab (*Cancer irroratus*) is a crustacean distributed from the intertidal zone to a depth of 40 meters. Rock crab grow through the process of molting where the hard outer shell is periodically shed. The molting process will slow as rock crab age and become sexually mature. Female and male rock crab mature on average at 57 and 75 mm respectively. Female rock crab carry eggs beneath the abdomen until their release into the water column. Larvae occur between mid-June and mid-September until they settle out. Male rock crab take approximately 6 years to reach commercial size.

The five rock crab fishing areas are identical to lobster fishing areas (LFA): 23, 24, 25, 26A, and 26B. These areas do not reflect the biology of rock crab but are utilised for management purposes. The rock crab fishery was initiated during the 1960's as a by-catch of the lobster fishery. The by-catch fishery includes rock crab landed for sale and rock crab crushed for use as lobster bait. A directed exploratory fishery began in 1974 but was limited until the late 1980's when expanding markets and increased value resulted in a substantial growth in effort.

Female rock crab are not permitted to be kept during both the directed and by-catch fishery. A minimum legal carapace width for male rock crab has been established at 102 mm for the directed fishery while there is presently no minimum legal size for the by-catch fishery.

The directed fishery is also managed on the basis of limited entry, trap limits and season. There are presently 150 licenses in the directed fishery and in 1995, 132 were active.



#### The Fishery

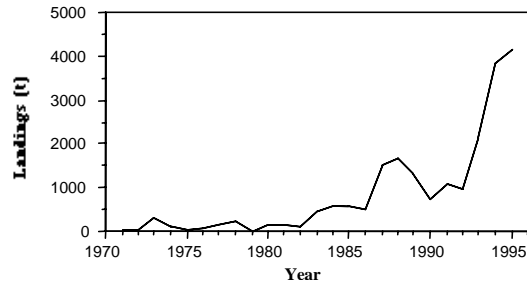
**Management:** The number of rock crab permits issued has been maintained at 150 (50 N.B., 50 N.S. and 50 P.E.I.) for the past five years. A participation clause is utilised to ensure that only active fishers are given permit renewals. Fishers are required to land 50% of the season average catch per fisher in their area with the exception of LFA 26A N.S. where fishers opted for a minimum catch (4,000 lbs from the port of Lismore, N.S. to Havre Boucher, N.S. and 10,000 lbs for the rest of the area).

Traps commonly used for the directed fishery include modified lobster traps, the 1.2 m (4') conical and the pyramidal traps. Trap limits vary between 100 and 150 depending on the LFA.

LFA	Trap limit	season	# of permits
23	125	Aug. 1-Oct. 31	37
24	150	July 4-Dec. 31	2
25 spring	125	May 1-July 30	34
25 fall	125	Oct. 12-Dec. 31	34
26A	100	Aug. 1-Nov. 15	74
26B	100	July 15-Dec. 31	3

The season opening for LFA 23, and 26A was delayed two weeks to Aug. 1 because of concerns relating to high mortality during hot weather and low meat yield during this time period.

**Landings:**



**Fig. 1. Rock crab landings for the southern Gulf of St. Lawrence from 1971 to present.**

Total landings were 4,144 t for 1995 reflecting an 8.5% increase over 1994 (Fig. 1). The value of the landings for 1995 was \$2.4 million compared to \$1.8 million in 1994. The directed fishery accounted for 73% of landings in 1995 and the by-catch fishery accounted for the rest. As landings are calculated from purchase slips, the quantity of rock crab used as lobster bait or killed and discarded by lobster fishers is unknown although some fishers reported using up to 20,000 lbs.

**Landings (t)**

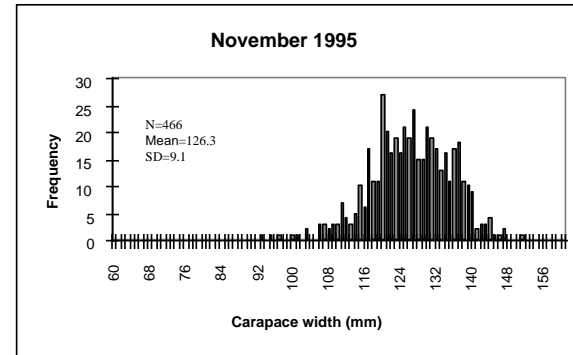
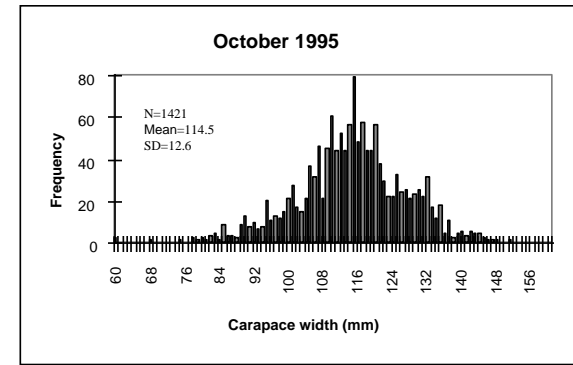
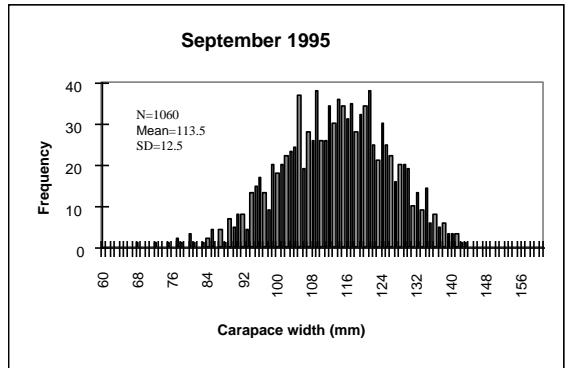
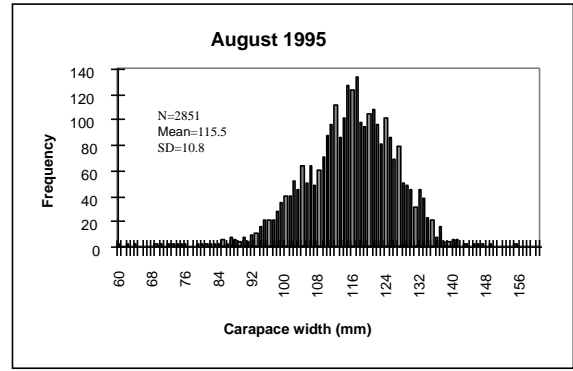
Year	71-80		1992	1993	1994	1995*
	Avg.	Avg.				
LFA 23	8	102	50	106	545	825
LFA 24	0	50	2	9	79	167
LFA 25	49	323	354	604	1281	1665
LFA 26A	40	305	551	1422	1902	1483
LFA 26B	49	74	1	0	11	4
Total			959	2141	3819	4144

\* preliminary

**Biological data:** In 1995, sea sampling were collected in area 26A only. The proportion of soft crab declined over the course of the fishing season. Crab were larger at the end of the season (Fig. 2).

The following table presents the percentage of soft shell rock crab observed during the sea sampling in Area 26A.

	August	September	October	November
N.S.	11.9%	11.4%	7.3%	0.0%
P.E.I.	29.9%	-	-	-



**Fig. 2. Monthly size frequency distribution for males rock crab sampled on N.S. vessels.**

**Resource Status**

**Catch rates:** Mean annual catch per unit of effort (CPUE) and total landings calculated from logbook data collected during the 1995 directed rock crab developmental fishery are presented in the following table:

LFA	Trap Hauls	Landings (t)	CPUE(kg/trap)
23	101,811	621.1	6.1
24	*	*	*
25	96,768	806.4	8.3
26A	177,411	1,338.5	7.5
26B	2,048	6.4	3.1
Total	378,038	2,772.4	7.3

Catch rates (kg/trap) for the 1995 directed fishery increased slightly in all areas compared to the 1994 season and were highest in the central Northumberland Strait (LFAs 25 and 26A).

Year	LFA 23	LFA 24	LFA25	LFA26A	LFA26B
1994	5.5	2.3	8.3	7.1	2.4
1995	6.0	*	8.2	7.5	3.1

Highly variable catch rates at the start and end of the fishing season are attributed to small data sets as many fishers participate in other fisheries. However, the sharp decline in the catch rate for LFA 26A during the first two weeks of the season may reflect changes to the participation clause for permit renewal (Fig. 3). Many fishers in LFA 26A N.S. stopped fishing when they reached 10,000 lbs, the minimum catch required for permit renewal. Fishers expressed concern that if all licenses had remained active throughout the season that the CPUE would have continued to drop.

In 1995, not all permit holders exercised the maximum fishing effort permitted. Logbooks indicated that at least 20% of the permit holders were not active or put minimal effort into the fishery. Yet in some areas the present fishing effort may significantly reduce the available biomass. An exploitation rate of about 40% was estimated from a Leslie analyses for LFA 26A.

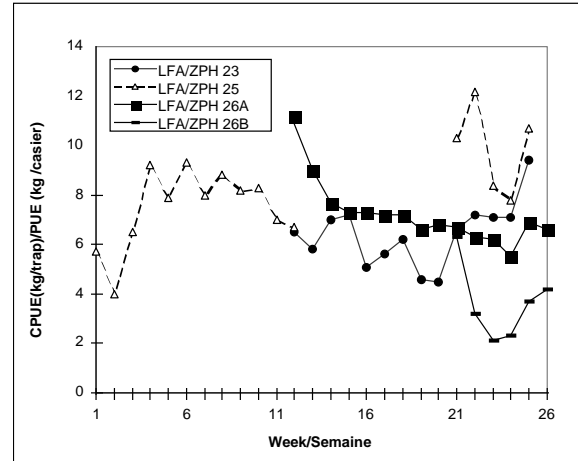


Fig. 3. Catch rates in the 1995 rock fishery by LFA.

**Ecosystem:** Lobster and rock crab share the same habitat and food supply to a certain extent. Lobster are known to feed on small rock crab but it is assumed that the directed rock crab fishery is not affecting this food source as only large crabs are fished. However, the removal of juvenile rock crab including females to be crushed for lobster bait is counter productive to the fishery, since future recruitment may be reduced.

**Outlook**

**Management considerations**

A cautious approach must be taken with this fishery. The numerous unknowns concerning the fishable biomass of rock crab in the southern Gulf of St. Lawrence make it difficult to provide advice. Declining in-season catch rates and an estimated exploitation rate of 40% suggest a high level of fishing effort in some areas. A safe management strategy would require that the fishing effort be evenly distributed in all areas with known populations of crabs.

Considering the lack of information on the by-catch fishery, fishing mortality on small and female crabs, which can be used as bait, and the discrepancy between fisheries statistics and logbook data, (due to the landing of the by-catch fishery) increasing the number of permits in 1996 is not recommended.

**The fall fishing season**

In 1995, processors indicated that the meat yield was low and that the season should be delayed to September 1. Our studies support this observation. Shell hardness and meat yield are correlated: soft crab yield 9.4% meat compared with 12.8% for hard crab. Sea samples showed that the percentage of soft

shell diminished between August and October. To achieve maximum yield, rock crab should not be fished in July and August due to high percentage of newly-molted crab.

### ***Minimum size***

Part of the industry is asking that the minimum size be increase to 112 mm (4 1/2'') to improve the meat yield. Moriyasu *et al.* (1985) observed that the maturity of males is attained at 75 mm carapace width. The present minimum size of 100 mm gives male crab the chance to mate at least once before capture. By increasing the minimum size to 112 mm, the CPUE would diminish in all areas. This is more important in Area 23, where the majority of the crab sampled at two major landing ports were between 100 and 112 mm.

### ***For More Information***

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### ***Reference***

Moriyasu, M., P. Mallet, D. Poirier, and I. Comeau. 1985. Study of the rock crab (*Cancer irroratus*) as a by-catch in the southern Gulf of St. Lawrence lobster fishery. Research report for DFO contract (09SC-FP630-4-2583), 43p.