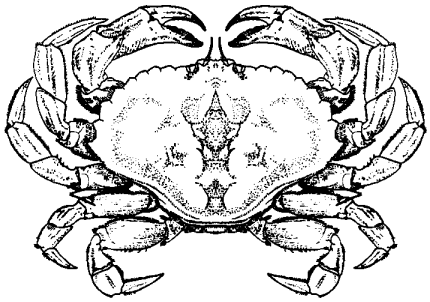
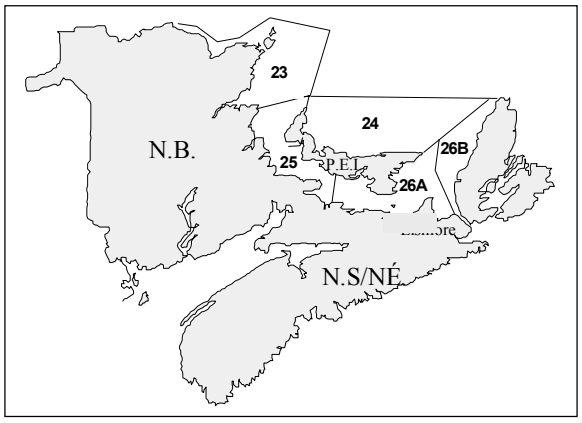




Southern Gulf of St. Lawrence Rock Crab (Lobster Fishing Areas 23, 24, 25, 26A and 26B)

Background

Rock crabs (Cancer irroratus) are distributed from the intertidal zone to a depth of 40 meters. They grow through the process of molting where the hard outer shell is periodically shed. The molting process will slow as rock crabs age and become sexually mature. On average, female and male rock crab mature at 57 and 75 mm, respectively. Female rock crabs carry eggs beneath the abdomen until hatch and larvae are released into the water column. Larvae are present between mid-June and mid-September until they settle out.

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 used 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 and used 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 crabs can not be kept during both the directed and by-catch fishery. A minimum legal carapace width for male rock crabs has been established 102 for the directed fishery and by-catch fishery except for LFA 26A and 26B where it is 105. Male rock crabs take approximately 6 years to reach commercial size.

The directed fishery fishing effort is also managed on the basis of a limited number of licenses, trap limits and season. There are presently 257 licenses in the directed fishery.

Summary

- Total recorded landings in the Southern Gulf of St. Lawrence reached 5,502 t in 2000. Increases occurred in all LFAs except 26B.
- The potential for increased by-catch landings during the lobster fishery is high, even with existing daily catch limits.
- Under the current management regime, there is a high potential for further increases in fishing effort.
- Although performance indicators are influenced by other factors, there is no immediate concern about the resource status in LFAs 23, 24, 25 and 26A
- Caution should be exercised in LFA 26B until decreasing yearly catch rates and changing seasonal trends in catch rates are understood.
- Given the developmental nature of the fishery it is not possible to provide an outlook of short-term landings.

The Fishery

The general **management regime** of the rock crab fishery in the Southern Gulf of St. Lawrence (sGSL) is characterised by two types of fishery: the directed fishery and the by-catch fishery. The by-catch (including the bait fishery) fishery is conducted by licensed lobster fishermen during regular lobster fishing activities. Rock crab licenses holders conduct the directed fishery. Both fisheries are managed with gear restrictions, fishing seasons and catch allocations. The rock crab fishing areas are the same as the Lobster Fishing Areas (LFAs).

For the by-catch fishery, lobster fishermen are required to abide by a daily rock crab by-catch limit ranging from 68 to 227 kg/day (150-500 lbs./day), depending on the fishing area. There is a minimum size (carapace width) for males and a prohibition on landing female rock crab.

The directed fishery is conducted under individual allocations for harvesters in all areas except LFA 24. The allocations are not based on a formal assessment of the biomass. Between 1998 and 2000, the total number of rock crab license holders increased in the sGSL from 168 to 257, resulting in increased effort in all LFAs except 26A.

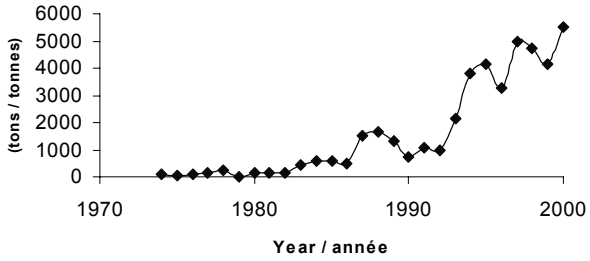
Trap limits vary between 90 and 150 per license depending on the LFA. Traps commonly used for the directed fishery include the 1.2 m (4') conical and the pyramidal trap. Trap designs are continually evolving with the objective of increasing trap efficiency.

For the directed fishery, seasons are set outside the lobster fishing seasons and fishermen are required to participate in a Dockside Monitoring Program (DMP). Fishermen must also comply to a minimum size (carapace width) for males and a prohibition on landing female rock crab.

Total recorded **landings** of rock crab in the sGSL were relatively low from 1974 to 1986. Since the mid 1980s, landings have increased and reached 5,502 t in 2000.

Management Measures for the Rock Crab Directed Fishery in the Southern Gulf of St. Lawrence, from 1998-2000.

		Directed fishery					By-catch Fishery
LFA	Minimum Legal size (mm)	Trap Limit by Fishermen	Seasons	Total number licenses in 2000	Dock side Monitoring Coverage	Individual Allocation (t)	Daily by-catch limit (kgs.)
23	102	100	Aug. 7 – Oct. 21	56	100%	35	227
24	102	150	Jul. 3 – Oct. 31	21	25%	---	227
25	102	100	June 22 – Jul. 22 Oct. 14 – Nov. 18	75	100%	25 23	227
26A	105	90	Aug. 7 – Nov. 11	93	100%	24	227
26B	105	100	Sept. 7 – Nov. 11	12	100%	24	68



The directed fishery accounted for 85, 83 and 87% of the recorded landings in 1998, 1999 and 2000, respectively. The by-catch fishery accounted for the rest. The quantity of rock crab used as lobster bait is unknown.

Recorded Rock Crab Landings (t) by Lobster Fishing Area.

Year	LFA 23	LFA 24	LFA 25	LFA 26A	LFA 26B
1985	52	4	257	277	---
1986	29	47	141	286	---
1987	316	65	552	570	4
1988	154	128	776	603	3
1989	190	145	496	474	4
1990	108	2	361	274	---
1991	263	---	389	430	---
1992	72	3	355	551	0
1993	106	9	452	1,605	---
1994	640	16	946	2,438	11
1995	825	98	1,196	2,209	7
1996	628	47	797	1,775	9
1997	818	109	1,021	3,042	7
1998	935	28	1,034	2,714	10
1999	733	140	1,272	1,964	25
2000	1,461	227	1,418	2,372	24

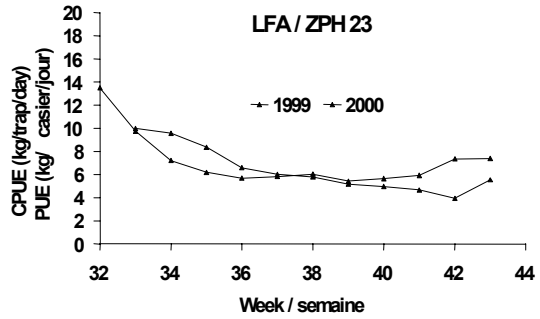
Annual Catch per Unit Effort (CPUEs) have increased between 1998 and 2000 in all LFAs except for 26B. The highest values were recorded in the central Northumberland Strait as reflected in LFA 25 and 26A.

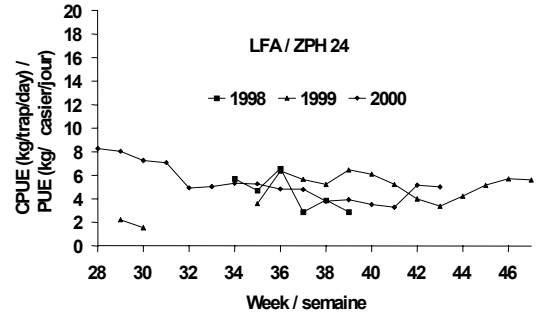
Mean Annual CPUEs (kg/trap/day) and 95% Confidence Intervals (in parentheses) of Rock Crab in the Directed Fishery for Lobster Fishing Areas 23, 24, 25, 26A and 26B.

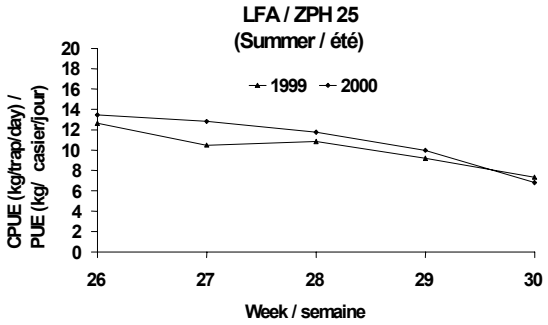
Year	LFA 23	LFA 24	LFA 25	LFA 26A	LFA 26B
1998	---	4.7	9.6	9.3	5.8
		(2.0)	(0.7)	(0.5)	(0.5)
1999	6.9	5.2	9.9	7.8	2.9
	(0.7)	(0.8)	(0.5)	(0.4)	(0.4)
2000	7.2	6.0	10.8	12.8	2.8
	(0.6)	(0.6)	(0.6)	(0.5)	(0.5)

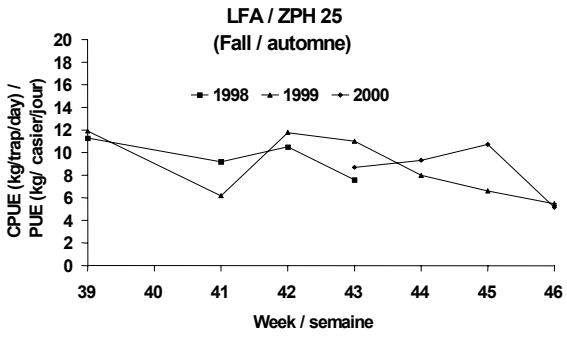
The seasonal trends in CPUE have remained relatively stable in LFA 23, 24 and 25 between 1998 and 2000. In LFA 26A similar seasonal trends were observed in 1998 and 1999, with the highest CPUEs being observed at the beginning of the season and decreasing thereafter. In 2000, CPUEs increased during the latter part of the season. CPUE trends in LFA 26B were lower in the early part of the season in 1999 and 2000 compared to 1998.

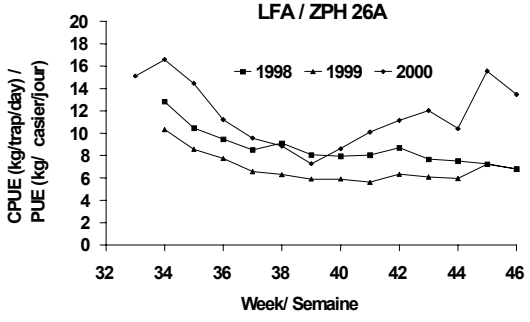
Fluctuations in CPUE could be the result of a change in market conditions or participation requirements, as some licenses were changed from "temporary" to "permanent" status between 1998 and 2000. Changes in trap efficiency could also be a factor in the increase. In many areas, it is still an expanding fishery; therefore fishermen are still learning and becoming more efficient.

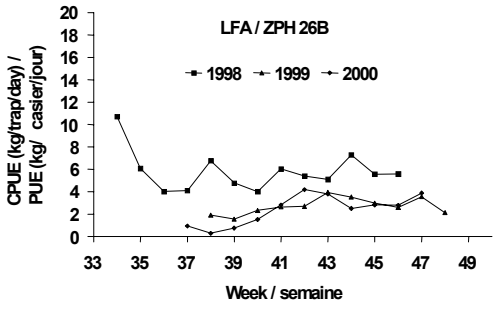












The fishing effort (trap hauls) in the directed fishery, has increased in LFAs 23, 24, and 25 between 1998 and 2000. It has decreased in LFA 26A and 26B during the same period. During the 2000 rock crab directed fishery, only 7% of the total allocation was reached for LFA 26B, compared to 90% for LFA 26A. In LFA 23 and 25, 56% and 60% of the total allocation was reached, respectively.

Fishing Effort (trap hauls) for the Directed Fishery.

LFA	23	24	25	26A	26B
1998	---	2,520	13,884	214,137	10,434
1999	69,053	30,208	103,868	210,997	8,616
2000	141,330	46,641	103,634	157,066	7,049

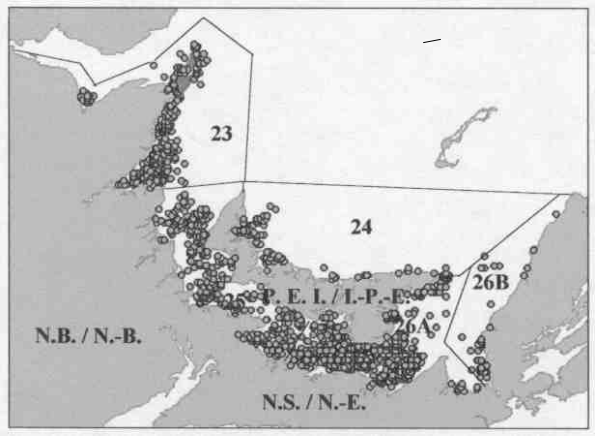
From 1998 to 2000, the number of fishermen reaching their **individual allocations** has increased in all LFAs except 26B. The percentages of fishermen reaching their individual allocations for 2000 was 23, 50, 61, and 0% for LFAs 23, 25, 26A and 26B respectively. There are no individual allocations in LFA 24.

LFA / ZPH	**Allocation achievement between 1998-2000**
23	3-23%
24	N/A
25	32-50%
26A	26-61%
26B	14-0%

In 1998, there was no **fishing effort location information** for the directed fishery in LFA 23 and information for LFAs 24, 25 and 26B was sporadic. During the 1999 and 2000 fishing seasons, the majority of the fishing activity was located in the Northumberland Strait area of LFAs 25 and 26A, and the Miramichi Bay area of LFA 23. Some additional location information was recorded in the Baie des Chaleurs area of LFA 23 during the 2000 fishing season. Changes observed in fishing location information were heavily influenced by improved reporting

over the three year period. In the future, fishing location information might indicate changes in fishing strategies due to possible depletion of traditional fishing grounds, fishing competition and/or that fishermen are actively searching for new rock crab grounds.

Distribution of Fishing Effort for the 2000 Rock Crab Directed Fishery in the Southern Gulf of St. Lawrence.



Landings from the rock crab **by-catch fishery** have fluctuated over the last several years. By-catch landings are influenced by market conditions and closely linked to the performance of the lobster fishery.

Resource Status

The rock crab resource assessment is based on four performance indicators: 1) the seasonal and annual fluctuations in Catch per Unit of Effort (CPUE) and effort 2) the distribution of fishing effort, 3) the number of fishermen reaching their maximum individual catch allocation and, 4) the annual landing fluctuations of the by-catch fishery. All data used for this assessment were obtained from a mandatory logbook program initiated in 1998 for the rock crab directed fishery. At the present time there is no fishery-independent surveys.

Currently, there are no trends in these indicators that cause concern about the resource in LFAs 23, 24, 25 and 26A. In LFA 26B, CPUE has dropped markedly over the period since 1998. Overall effort has dropped by about 30% and in-season trends in catch rates are changing.

These performance indicators may not entirely reflect changes in resource abundance, as the time series are still very short. It is also known that changes in the management regime and market forces are continuing to influence catch and effort trends. As the time series lengthen and the management and market regimes stabilize, reliability of the indicators should improve.

Ecosystem Considerations

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. Caution is required in managing this resource sustainably.

Sources of Uncertainty

The expanding fishery, market demand, and competition between fishermen heavily influence fluctuations in CPUEs. Changing management measures also have an impact on catch rates. Therefore, fluctuations in CPUEs may not only reflect fluctuations in the rock crab biomass and need to be interpreted with caution.

In the sGSL, the maximum potential effort in the by-catch fishery is equivalent to that of the 3200 lobster license holders. However, not all lobster license holders are involved in this by-catch fishery. As a result, the effective fishing effort can fluctuate annually, leading to uncertainty.

The quantity of rock crab used as bait for the lobster fishery in the sGSL is not known.

The fishing and crushing of juvenile rock crabs and females for the use of lobster bait is known to occur in the lobster fishery. If unchanged, this practice could become a major impediment to the sustainability of the rock crab fishery in some areas.

The lack of data on fishing locations in certain areas hinders the ability to use effort distribution information as a performance indicator. As fishermen become familiar with the data collection program, this situation should improve.

Outlook

Given the developmental nature of the fishery, it is not possible to provide an outlook of short-term landings.

In addition, caution should be exercised in LFA 26B until decreasing yearly CPUEs and changing seasonal trends in CPUEs are understood.

Management Considerations

The ability of the rock crab resource to withstand the current level of fishing pressure over the long term is unknown. In the sGSL, with the current management regime, there is still potential for an increase in fishing effort on the rock crab resource as increasing numbers of fishermen reach their individual maximum allocation during the directed fishery. There is also the possibility of an increase in rock crab by-catch landings during the lobster fishery, even with daily limits in place.

A cautious approach must be taken with this fishery. The numerous unknowns concerning the fishable biomass of rock crab in sGSL and the general population dynamics make it difficult to assess the stock situation accurately. The ability to assess the stock status may improve when the fishery management regime has stabilized (i.e. the number of licenses remains constant for several years).

For more Information

Contact:

Fernand Savoie
Aquatic Resources Division
Gulf Fisheries Centre
P.O. Box 5030
Moncton, NB E1C 9B6

Tel: (506) 851-6049
Fax: (506) 851-2147
E-Mail: SavoieF@dfo-mpo.gc.ca

References

Savoie, F. 2002. Rock Crab (*Cancer irroratus*) Fishery science review for the southern Gulf of St. Lawrence from 1998 to 2000. Can. Sci. Adv. Sec. Res. Doc. 2002/006.

This report is available from the:

Maritime Provinces
Regional Advisory Process
Department of Fisheries and Oceans
P.O. Box 1006, Stn. B203
Dartmouth, Nova Scotia
Canada B2Y 4A2
Phone number: 902-426-7070
Fax number: 902-426-5435
e-mail address: myrav@mar.dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas

ISSN 1480-4913

La version française est disponible à l'adresse ci-dessus.

Correct citation for this publication

DFO, 2002. Southern Gulf of St. Lawrence Rock Crab (Lobster Fishing Areas 23, 24, 25, 26A and 26B). Sci. Stock Status Report C3-04(2002).