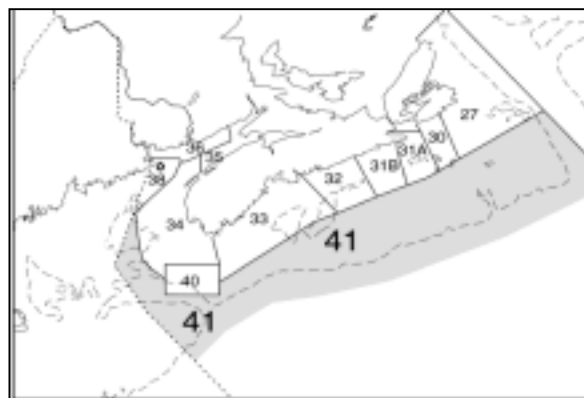


Offshore (LFA 41) Jonah Crab (*Cancer borealis*)



Background

Jonah crab, *Cancer borealis*, is found from Nova Scotia to South Carolina and in the Bermudas at depths ranging from intertidal to 800 m. In the waters off Nova Scotia the crabs are found primarily at depths of 50-300 m and temperatures of 8-14°C. The Jonah crab's substrate of preference ranges from rocky off the coast of Maine to sand and clay off Chesapeake Bay.

As with lobsters, the female broods her eggs on the swimmerets under the abdomen. The larvae develop through several plankton stages in the water column before settling to the bottom. Most male Jonah crabs are physiologically mature at 90-100 mm carapace width (CW) and most females mature at 85 mm CW. Maximum carapace width for males is approximately 180 mm with a weight of 0.9 kg. Females usually do not exceed 150 mm (CW) and 0.5 kg in weight.

Since the mid 1960's Jonah crab stocks have been exploited as a trap by-catch to the inshore and offshore lobster fishery. In the early 1980's an experimental Jonah crab fishery concentrating in LaHave and Emerald Basins on the Scotian Shelf lasted only two years. Average catch rates were 6.6 kg/th in 1983 and 13.3 kg/th in 1984 before poor economic conditions resulted in its closure. In 1995, a Jonah crab exploratory fishery was initiated as a by-catch to the offshore lobster fishery. This ongoing exploratory fishery is limited to eight offshore lobster fishing vessels and to the historical offshore lobster assessment areas. A single license was also issued to direct for Jonah crab in the NAFO 4W portion of LFA 41. Data on the fishing activities of this licence, are not included in this report.

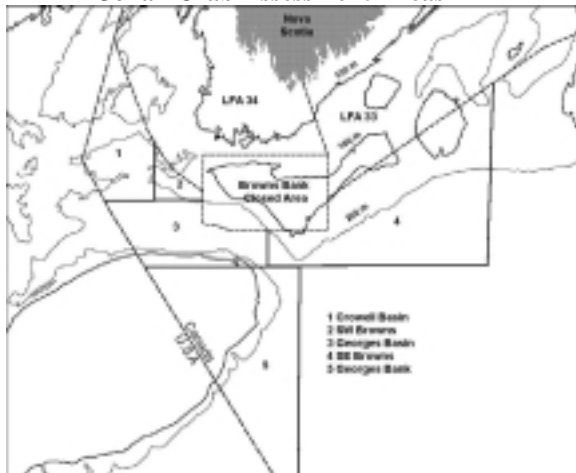
Summary

- Jonah crab landings since 1996-97 the first full year of fishing, varied between 707 and 697 t (>97 % of the yearly quota). Based on logbook analysis, when all areas are combined yearly catch rates peaked at 4.2 kg/th during 1995-96 and varied between 2.8 and 3.2 kg/th during the last three years.
- On Georges Bank, landings and yearly catch rates have declined from 322 t and 4.1 kg/th in 1996-97 to 47 t and 2.1 kg/th during 1998-99. Based on industry information, most of the decline in landings on Georges Bank can be attributed to the diversion of crab fishing effort to lobsters fishing due to higher lobster catch rates.
- On southeast Browns, landings peaked at 136 t during 1997-98 and declined to 99 t in 1998-99. Yearly catch rates were 2.3 kg/th during 1997-98 and 1.5 kg/th during 1998-99 the same as it was during 1996-97.
- Landings in Georges Basin (88 t) and southwest Browns (168 t) peaked during 1998-99. Yearly catch rates varied between 2.1 and 2.9 kg/th in both areas during the last two years.

- In Crowell Basin, the yearly catch and effort peaked at 316 t and 70,694 trap hauls (th) during the 1997-98 season. During the 1998-99 season yearly catch and effort declined to 296 t and 64,220 th and catch rate increased slightly from 4.5 to 4.6 kg/th.
- Based on size measurements from sea sampling, no seasonal or annual trend was detected in the mean size of males and females.
- Biological and fishery information obtained to date indicates that a cautious approach should be taken to maintain a fishable stock.

The Fishery

LFA 41 Jonah Crab Assessment Areas



Through the years, the offshore lobster industry has periodically landed Jonah crab as a by-catch. In the latter part of 1995, an offshore lobster industry’s proposal to land Jonah crab as a by-catch to the lobster fishery was approved. The agreement, which is still adhered to today, limit eight offshore lobster fishing vessels to the historical offshore lobster assessment areas. They are limited to a male only Jonah crab fishery with a minimum size limit of 130 mm CW. The gear type used is an offshore lobster trap. A year long crab season was set to begin the 16th of October, the same as the offshore lobster

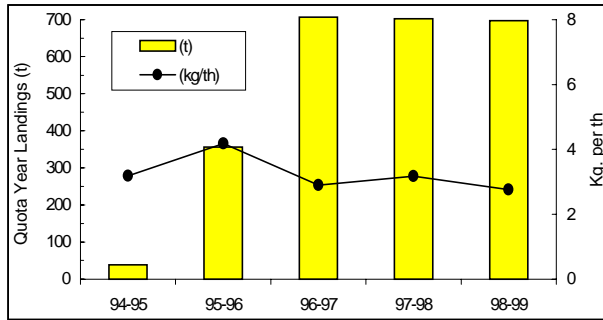
season. A quota for the offshore Jonah crab by-catch fishery was fixed so as not to exceed the 720 t quota set for offshore lobster. A program funded by industry provides samplers for the collection of biological samples at-sea for later analysis by DFO Science. The industry also provides fishery data through completed logbooks with catch and effort information to DFO Science. A single license was also issued to direct for Jonah crab in the NAFO 4W portion of LFA 41. Data on the fishing activities of this licence are not included in this report.

Offshore Jonah Crab Fisheries Statistics

Year	1994-95	1995-96	1996-97	1997-98	1998-99
Landings (t)	39	356	707	702	697
Trap hauls (th)	12, 101	85,288	244,048	221,385	253,051
Catch rates (kg/hr)	3.2	4.2	2.9	3.2	2.8

Quota year landings increased until the 1996-97 season when the quota was essentially reached at 707 t. During the next two seasons, landings varied from 702 t to 697 t. Yearly effort increased from 12,101 th in 1994-95 to 253,051 th during the 1998-99 season. The overall catch rate peaked at 4.2 kg/th during the 1995-96 season and has remained between 2.8 and 3.2 kg/th since then.

Jonah crab catch rates (kg/th) and quota year landings (t)

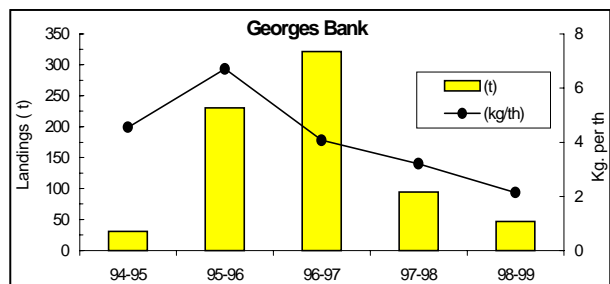
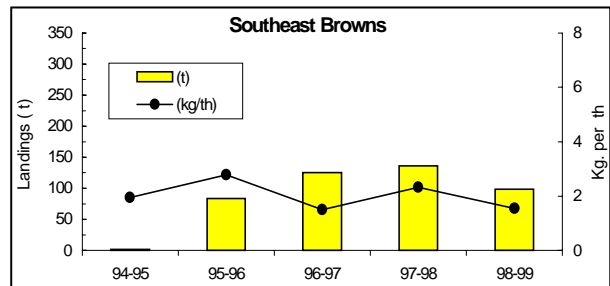
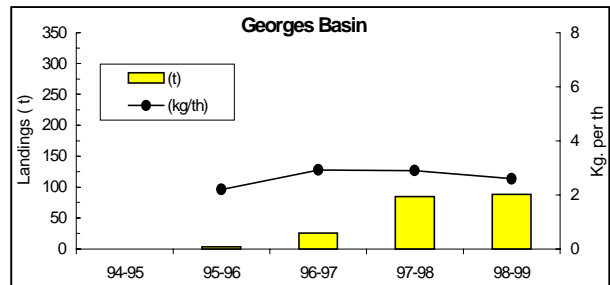
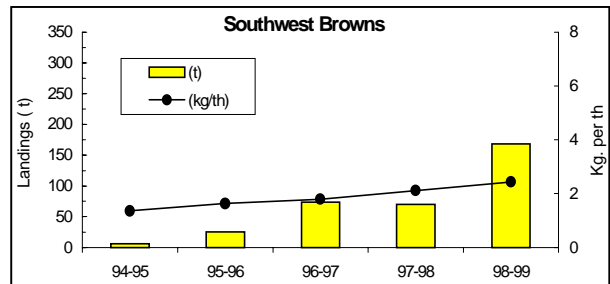
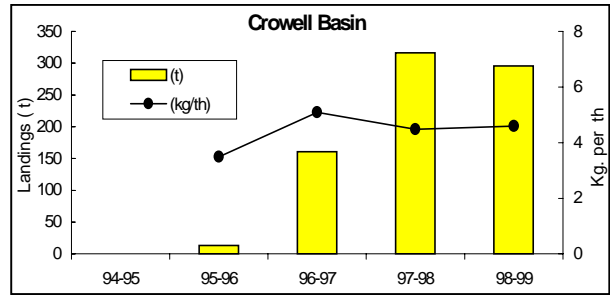


Resource Status

There are no fishery-independent surveys for this species, and this assessment is based on catch rates and size composition data from the commercial catch. Traps are highly selective, and crustacean catchability is affected by a variety of factors. The catch rate has not been standardized for fishers, trap type, area, season and if lobsters were caught in the same traps. Standardization would be difficult because the important variables are available for only a small subset of the data. Some of the variation in the catch rate and size composition probably results from factors other than the abundance of Jonah crab.

Logbooks and dockside monitoring documents were used to provide catch and effort information from which catch rate was estimated. All trips were dockside monitored. Monthly sea samples, collected in each offshore assessment area, provided information on size distribution of both males and females. Landings and catch rates were calculated based on all trips that reported crab landings regardless of the amount of lobster by-catch during those same trips.

Jonah crab catch rates (kg/th) and landings (t) by assessment areas for each quota year.



Comparing individual assessment areas, over the last five fishing seasons, indicates that the most obvious decline in landings has occurred on Georges Bank and to a lesser extent on southeast Browns. The yearly landings, (322 t) and fishing effort (79,155 th) peaked on Georges Bank during the 1996-97 season. Subsequently, during the next two seasons, yearly landings and effort declined to 47 t and 21,899 th. Based on Industry information, most of the decline in landings on Georges Bank can be attributed to the diversion of crab fishing effort to lobsters fishing due to higher lobster catch rates. Yearly catch rate also decline by over threefold from 6.7 kg/th during the 1995-96 season to 2.1 kg/th during the 1998-99 season.

In Crowell Basin, the yearly catch and effort peaked at 316 t and 70,694 th during the 1997-98 season. During the 1998-99 season yearly catch and effort declined to 296 t and 64,220 th and catch rate increased slightly from 4.5 to 4.6 kg/th.

On southwest Browns yearly landings (168 t) and effort (69,206 th) reached its highest during the 1998-99 season. Yearly catch rate was also at its peak at 2.4 kg/th.

In Georges Basin yearly catch (88 t) and effort (33,975 th) peaked during the 1998-99 season. Yearly catch rate declined slightly from 2.9 to 2.6 kg/th.

On southeast Browns, yearly landings peaked during the 1997-98 season at 136 t, however, during the 1998-99 season yearly landings declined by 27% while effort increased by 8.5%. Yearly catch rate (2.3 kg/th) also declined from its peak during 1997-98 to 1.5 kg/th during 1998-99.

At-sea sampling provides detailed information on crab size structure in the traps. All crabs retained in individual trap

hauls are measured (carapace width, CW in mm), and examined to determine species, sex, molt condition and egg development stage for berried crabs. As the exploratory offshore Jonah crab by-catch fishery was evolving, emphasis was placed in sampling each fishing area and at time periods when high fishing activity occurred. In some instances, samples were combined into one monthly sample, when these were samples that were taken during the same month in the same area.

As this fishery is directing for male crab only, at-sea sampling provided limited information on females and even less on berried females. Jonah crabs were caught at depths ranging from 110 to 311 m. Monthly mean carapace width for male and female Jonah crabs varied between fishing areas and time of year. Minimum and maximum size of Jonah crabs sampled varied between 41 and 222 mm CW for males and 40 to 188 mm CW for females. The monthly mean size varied between 128 to 148 mm CW for males and between 105 and 126 mm CW for females. There was no detectable trend in mean size for both males and females in any of the fishing areas.

The percentage of males > 130 mm CW in the catch remained high (> 70%), with few exception. The percentage of commercial-size males seemed to be the highest in Crowell Basin and Georges Bank. However no trend could be observed.

Sources of Uncertainty

The Jonah crab by-catch fishery is a relatively new fishery. New areas have been explored and the fishery is still expanding. The introduction of the Jonah crab by-catch fishery has resulted in more widespread fishing activity within the traditional offshore lobster assessment areas. Interpretation of Jonah crab catch rates is difficult since much

of the fishing activity revolve around the timing of the more lucrative lobster fishery. The crab fishery has complicated assessments as trips can be directed for crab or lobsters or both. The amount of effort and the fishing areas in which the effort is directed depends on the availability of crab, the markets and the proportion of the TAC remaining.

Outlook

During the last two years, there are concerns of a substantial increase in effort in the Crowell Basin, and southwest Browns areas by both offshore Jonah crab (LFA 41) and adjacent inshore Jonah crab exploratory fishery (LFA 34). In addition, during the past several years, the inshore lobster fishery harvested significant amounts of Jonah crab, landed as a by-catch. As well, processing plant information indicated a large amount of Jonah crab by-catch landed that was not reported by the inshore lobster fishermen.

While most of the more productive fishing grounds are exploited, marginal fishing grounds with lower catch rates are being explored. Changes in catch rates or effort may not be indicative of what the fishery can sustain. The decline in catch rate on Georges Bank can be partly attributed to a lower quality of fishing effort. During the last two year Jonah crab on Georges Bank has been fished more as a by-catch than a directed fishery as it was in previous years. Biological and fishery information obtained to-date indicates that a cautious approach should be taken to maintain a fishable stock. The catch rates, behavior of the fishery, and the size structure of the stock should continue to be monitored through logbooks, dockside monitoring and sea sampling.

As effort increases in the midshore exploratory Jonah crab fishery (LFA 34) and as Jonah crab by-catch increases during the lobster fishing season in the adjacent inshore

lobster fishery, the Jonah crab bycatch in the midshore lobster fishery needs to be monitored and controlled.

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