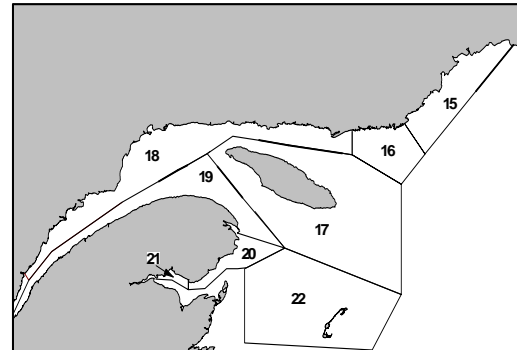
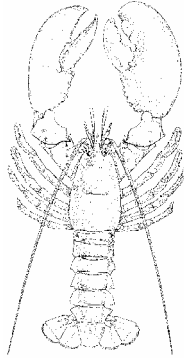




Quebec Region



Lobster on the North Shore (LFA 15, 16 and 18) and around Anticosti Island (LFA 17) in 2004

Background

American lobster (*Homarus americanus*) occurs along the west coast of the Atlantic Ocean, from Labrador to Cape Hatteras. Adult lobster prefers rocky substrates where they can take shelter, but can also live on sandy and even muddy bottoms. Commercial-size lobsters are generally found at depths of less than 35 m. On the North Shore and around Anticosti Island, females reach sexual maturity at large sizes (i.e. over 90 mm), compared with 82 mm around the Gaspé Peninsula and 79 mm in the southern Magdalen Islands. Males reach sexual maturity at a smaller size. Females generally have a two-year reproductive cycle, spawning one year and moulting the next. Females spawning for the first time can produce nearly 8,000 eggs, while large females measuring 127 mm (jumbo size) can extrude up to 35,000 eggs. Once released, the eggs remain attached to the females' swimmerets for 9 to 12 months, until the planktonic larvae emerge the following summer. The larvae's planktonic phase lasts from 3 to 10 weeks, depending on the temperature of the water. Following metamorphosis, postlarval lobsters (stage IV), which now resemble adult lobsters, drift down from the surface layer to settle on the sea floor. During the first few years of benthic life or until they reach approximately 40 mm, lobsters lead a cryptic existence, meaning that they live hidden in structurally varied habitat providing many shelters. Lobsters are estimated to reach minimum legal size (82 or 83 mm) after having moulted approximately 15 times since their benthic settlement. The lobster fishing areas on the Lower North Shore and around Anticosti Island are close to the northern limit of the lobster's range. These areas are characterized by colder waters, which very likely slow growth, reproduction and recruitment processes.

Summary

- In 2004, lobster landings on the North Shore accounted for 1% of total lobster landings in Quebec, and Anticosti Island landings accounted for 3%. In 2004, landings recorded in LFAs 15, 16, 17 and 18 totalled 11 t, 7 t, 94 t and 1 t, respectively, however this information is preliminary. Since the early 2000s, landings have been decreasing in these areas.
- In 2004, mean catch per unit effort (CPUE) for the Lower North Shore (LFAs 15 and 16) was 0.31 lobsters/trap in number, which is the same as that recorded in 2003, and 0.19 kg/trap in weight, which is slightly higher than 2003 levels and around the average for 1993–2003. The CPUEs of index fishers in LFA 15 were lower in 2004 than in 2003.
- The mean size of commercial-size lobsters on the Lower North Shore has increased by 5 mm, from 83.6 mm in 1997 (before minimum legal size was increased) to 88.9 mm in 2004. Size structures recorded since 1993 indicate high exploitation rates. The number of berried females is low. A recent study showed that females in this region reach sexual maturity around 94 mm.
- In 2004, the mean CPUE for Anticosti Island (LFA 17) calculated using

logbook data was 0.54 kg/trap. Differences were noted between the southern and northern halves of the island, with higher values recorded in the southern half. Logbooks were mandatory for the first time in 2004.

- Size frequency distributions observed around Anticosti Island in 2004 were different from those observed between 1998 and 2003, showing a sharp drop in large lobsters. This could be worrisome if the trend persists, in a context where recruitment is likely slower around Anticosti Island than elsewhere in southern waters.

Fishery management

The lobster fishery is managed by controlling fishing effort, regulating minimum legal size and protecting berried females. In 2004, there were 31 active fishers in LFA 15, 6 in LFA 16, and 3 in LFA 18 (Figure 1);

15 fishers were active on Anticosti Island (17B). One exploratory license was also issued in LFA 17A. The number of traps is limited to 250 on the North Shore and 300 on Anticosti Island. Although fishers may use traps that are bigger than standard traps, the number of large traps is limited to 175 on the North Shore and 210 on Anticosti Island. Escape vents on traps have been mandatory since 1994. In 2004, the size of the vertical opening of the escape vents was increased from 43 mm to 46 mm (LFAs 15 and 16), and to 47 mm in 2003 (LFA 17) and 2004 (LFA 18). The lobster fishery takes place in spring and lasts 10 (LFA 17) to 12 weeks (LFAs 15, 16 and 18). In 1998, minimum legal size was increased with a view to doubling egg production per recruit. Since 2003, minimum legal size has been 81 mm in LFAs 15 and 16, and 83 mm in LFAs 17 and 18. Between 1957 and 1997, minimum legal size was 76 mm.

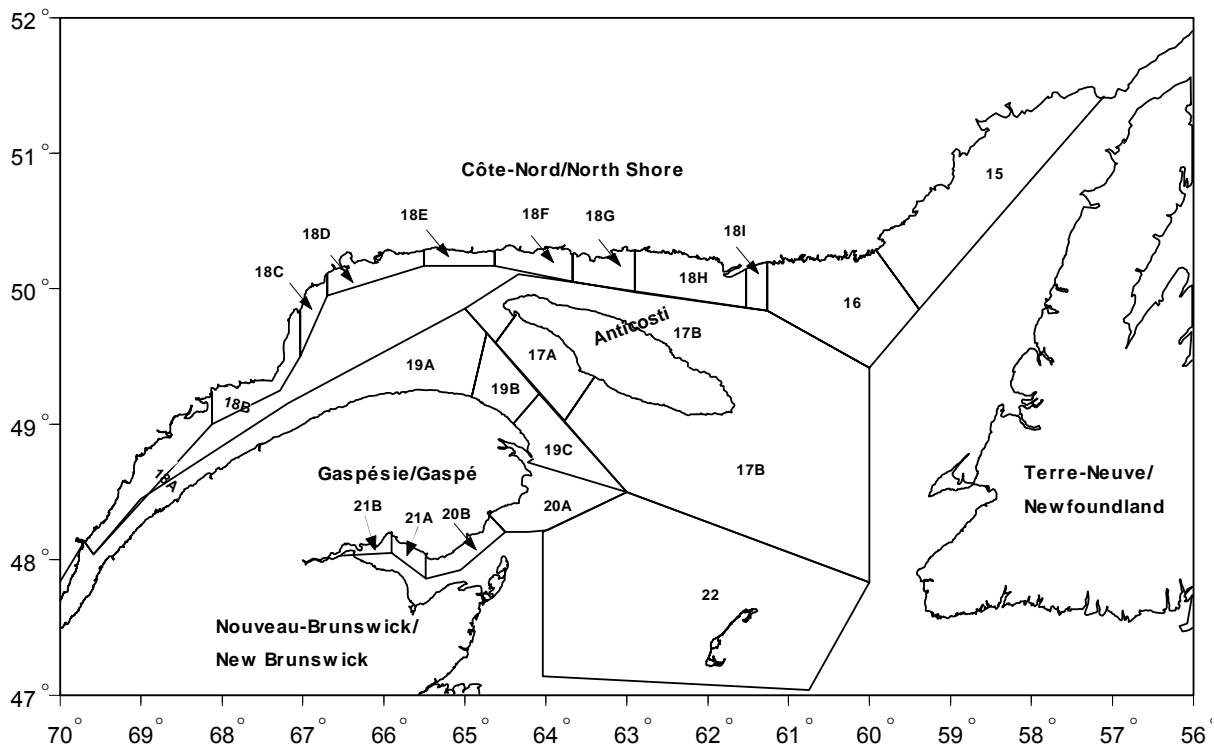


Figure 1. Lobster fishing areas (LFAs) on the Lower North Shore (LFAs 15 and 16), the Upper and Middle North Shore (LFAs 18, A to I), and Anticosti Island (LFAs 17A and 17B) in Quebec.

Stock status

Stock status assessment is based on abundance indicators: landing totals taken from processing plant purchase slips, and catch rates for market-size lobsters obtained from at-sea samplings and mandatory logbooks (LFA 17B) or logbooks kept on a voluntary basis by index fishers (LFA 15). The assessment is also based on the size structures of lobster caught at sea, which are used to estimate exploitation rates. Since 1993, at-sea sampling has been carried out annually in the Tête à la Baleine (LFA 15) and La Romaine (LFA 16) sectors. At-sea sampling is not conducted in LFAs 17 or 18. The demographic structure of lobster harvested around Anticosti Island (LFA 17B) is obtained from a dockside monitoring sampling program (Rivière au Renard and Havre St. Pierre), which has been in effect since 1998.

Landings

Depending on the year, lobster landings on the North Shore account for 1% to 2% of total lobster landings in Quebec. Landings recorded in LFA 15 in 2004 totalled 11 t, compared with 24 t in 2003 (Figure 2). In LFA 16, landings totalled 7 t, compared with 8 t in 2003. Landings in LFA 18 totalled only 1 t in 2004. Landings are very low in LFA 18, and year-to-year fluctuations are attributable to changes in the number of active fishers. Landings recorded for Anticosti Island (LFA 17B) in 2004 totalled 94 t, compared with 114 t in 2003 (Figure 2). Although landings increased between 1990 and 1997, from 51 t to 184 t, they have been waning since 2000. In 2004, landings from Anticosti Island accounted for 3% of total landings in Quebec.

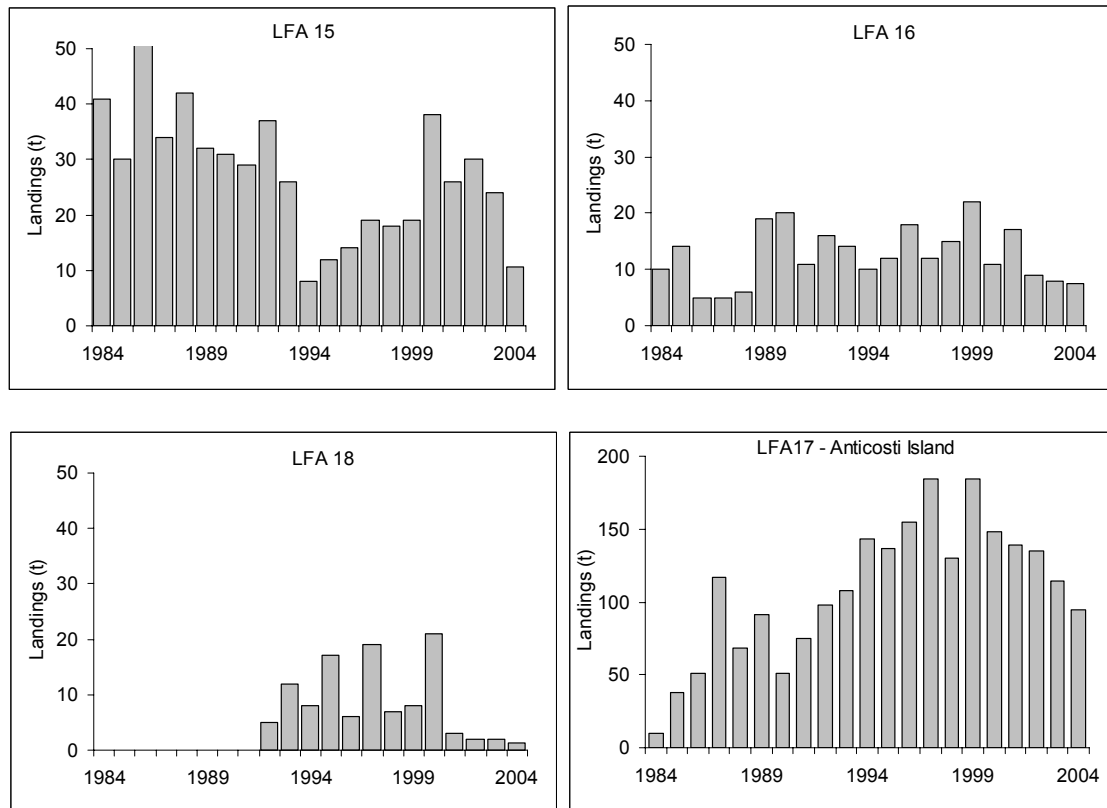


Figure 2. Lobster landings on the North Shore (LFAs 15, 16 and 18) and Anticosti Island (LFA 17B), 1984–2004.

The 2004 fishing season in LFA 15 was characterized by the coldest water temperatures on record since 1996. Data provided by index fishers also show that fishing effort in 2004 was weaker than that in the nine previous years. These factors can partly account for the decrease in landings.

Catch rates for commercial-size lobster

Catch rates represent the catch per unit effort (CPUE). Since 1993, CPUEs on the Lower North Shore (LFAs 15 and 16) have ranged between 0.19 and 0.43 lobsters per trap (Figure 3). In 2004, the mean CPUE was 0.31 lobsters per trap corresponding to a CPUE in weight of 0.19 kg/trap. Compared to the average for the 1993–2003 series, the CPUE in number was down by 6% but the CPUE in weight was 12% higher. The lowest CPUE value was recorded in 2002 and was attributable to very cold waters at the start of the fishing season, which could have impacted catchability.

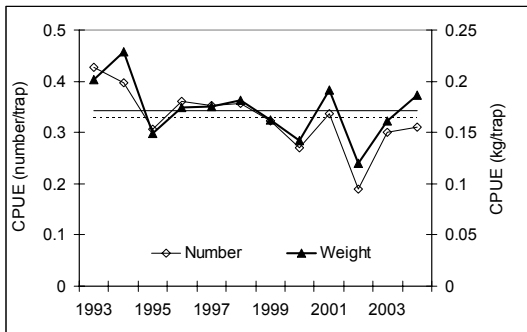


Figure 3. Catch rate (CPUE) in number and weight of commercial-size lobsters per trap for the Lower North Shore (LFAs 15 and 16), 1993-2004. The dotted line represents the mean CPUE in number and the solid line represents the mean CPUE in weight for 1993-2003. At sea sampling data.

In some years, index fisher CPUEs, which are more representative of the La Tabatière zone (LFA 15), reveal patterns that differ slightly from those obtained through at-sea

sampling. This could be attributable to local differences. The mean CPUE in 2004 was only 0.1 kg/trap, down 29% from the 1996–2003 series average of 0.14 kg/trap. Colder-than-average water temperatures in the La Tabatière zone in 2004 can partly account for the lower values.

The mean CPUE for Anticosti Island calculated using data from the logbooks of 11 fishers operating in LFA 17B was 0.54 kg/trap (Figure 4). Seasonal CPUE trends show a gradual decrease, suggesting stock depletion during the fishing season. Differences were noted in CPUE values for the southern and northern parts of the island, with the southern part recording higher values.

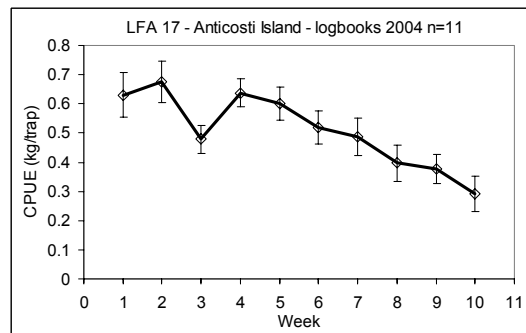


Figure 4. Mean weekly catch rates (CPUE) (\pm standard error) in weight of commercial-size lobsters per trap for Anticosti Island (LFA 17B) in 2004. Data from the logbook of 11 fishers.

Catch composition

Following the increase in minimum legal size, changes were noted in the size composition of lobsters landed on the Lower North Shore (Figure 5). The mean size of commercial-size lobster has increased by 5 mm since 1997 on the Lower North Shore. It was 88.9 mm in 2004, compared with 83.6 mm in 1997, before minimum legal size was increased. Size structures are generally quite truncated, which is an indication of high exploitation rates. In 2004, no jumbo lobsters (≥ 127 mm) were observed. The

mean exploitation rate calculated for 1993–2003 was 73%. Exploitation rates are obtained by measuring the change in abundance between the first moult group recruited to the fishery and the second moult group one year later. The exploitation rate is calculated solely for commercial-size males. The mortality of females is lower, however, because they are protected when berried. The overall male-to-female ratio (M:F) for commercial-size lobster averaged 1.24:1.0 for 1993–2004.

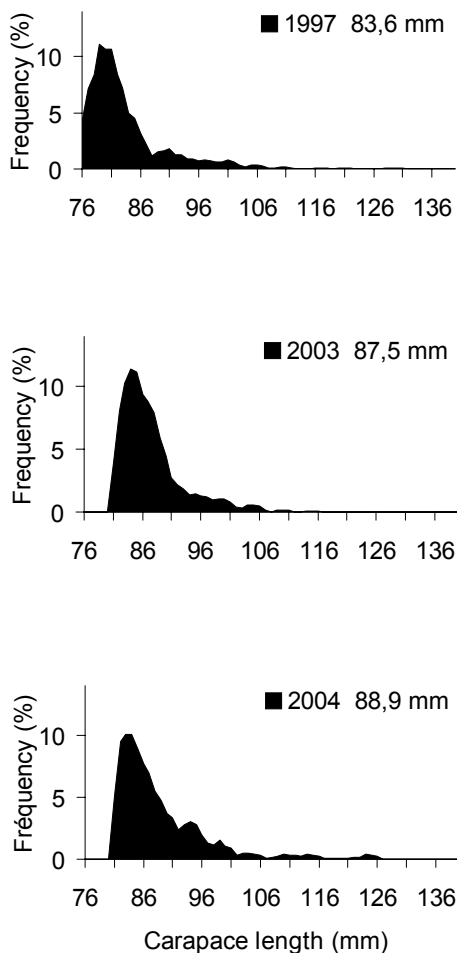


Figure 5. Size frequency distribution of caught lobsters (commercial fraction) in 2003 and 2004, compared with 1997, for the Lower North Shore (LFAs 15 and 16). The mean length of the lobsters caught is indicated.

Size structures observed on Anticosti Island differ from those usually observed in other LFAs (Figure 6). They are characterized by the occurrence of a number of modes, which is an indication of a low exploitation rate (20%). The proportion of jumbo lobsters (≥ 127 mm) is high. For example, in 2002, they accounted for 7% of the population in number in and 27% in weight. Mean lobster size is high, ranging from 92.3 to 102.1 mm between 1998 and 2003. Size frequency distributions observed around Anticosti Island in 2004 differed from those observed between 1998 and 2003 and indicated a sharp decrease in the number of large lobsters.

Berried females and egg production

Egg production per recruit was not calculated specifically for North Shore sectors. Nevertheless, because of the large size at sexual maturity and high exploitation rates, the situation might be similar, at best, to that in the Gaspé. The egg production level is thought to be low compared with a non-harvested lobster stock. Therefore, the application of a program for increasing minimum legal size based on a similar program in the Gaspé could double the egg-production-per-recruit relative to the level recorded when the minimum legal size was 76 mm.

Very few berried females were observed during at-sea sampling in LFAs 15 and 16. From 1993 to 2004, an average of only 24 berried females were sampled each year; CPUEs were low at 0.03 berried females/trap in 2004 (Figure 7). By contrast, the CPUE recorded in the Gaspé was four times higher at 0.12 berried females/trap. The CPUE has been on the rise since 1999. The mean size of the 33 berried females observed in 2004 was 84.7 mm.

Egg production per recruit was not calculated for Anticosti Island. As a result of low exploitation rates, we can presume that egg production per recruit is not as low as elsewhere and that overexploitation is not a

problem, even if the fishery partly depends on immature lobsters. At Anticosti Island, as on the Lower North Shore, lobster reach

sexual maturity at larger sizes than elsewhere in Quebec waters, i.e. around 92 mm and 94 mm respectively.

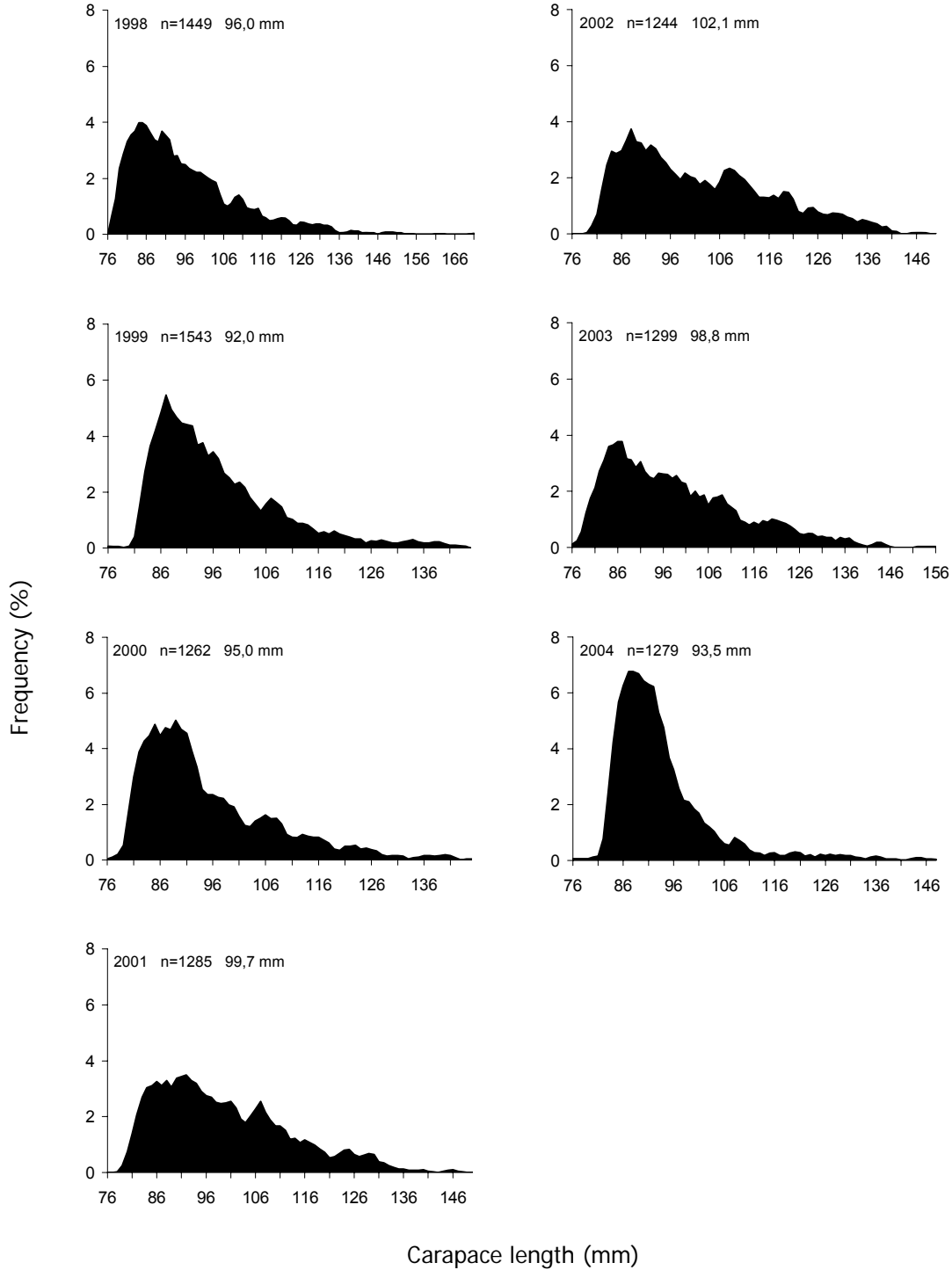


Figure 6. Size frequency distribution of commercial-size lobsters from Anticosti Island (LFA 17B) for 1998–2004. The mean length of the lobsters sampled is indicated.

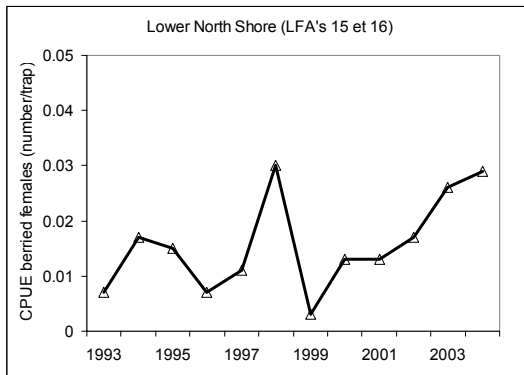


Figure 7. Catch rates (CPUE) of berried females for the Lower North Shore (LFAs 15 and 16), 1993–2004.

General outlook

Lobster fishing areas 15 and 16 are close to the northern limit of the lobster's range. These areas are characterized by much colder waters than in the Gaspé and the Magdalen Islands, which likely slows growth, reproduction and recruitment processes, thereby decreasing stock productivity. This type of context can make lobster populations even more vulnerable to overfishing.

To date, the increase in the minimum legal size has not resulted in major changes in Lower North Shore lobster stocks. However, the mean size of lobster caught and the abundance of berried females show increasing trends.

Given a size of sexual maturity at around 94 mm, many immature females are still being harvested. While an increase in minimum legal size would theoretically cause egg production per recruit to double, it is conceivable that egg production in Lower North Shore lobster stocks remains fairly low. The cold water temperatures that characterize the area are not conducive to rapid larval development. Consequently, larval survival may be weaker there than elsewhere. All of these factors taken together indicate that Lower North Shore lobster stocks are likely vulnerable to recruitment overfishing. Consequently, it is

strongly recommended that the program for implementing an increase in minimum legal size be continued.

So far, Anticosti Island lobster stocks have seemed to remain stable with existing exploitation levels. Between 1998 and 2003, the demographic structure remained fairly steady. Anticosti Island is located in an area that is characterized by colder waters. The fishery might not be able to withstand high exploitation rates given slow growth and late sexual maturity. It is therefore essential to maintain low exploitation rates. The sharp decrease in the number of large lobsters in 2004 could be worrisome if the trend persists, in the context that recruitment is likely slower around Anticosti than elsewhere in southern waters.

For more Information

Contact: Louise Gendron
Maurice Lamontagne Institute
850 Route de la Mer
P.O. Box 1000
Mont-Joli, Québec
G5H 3Z4

Tel: (418) 775-0618
Fax: (418) 775-0740
E-Mail: gendronl@dfo-mpo.gc.ca

This report is available from the:

Regional Science Advisory Bureau

Quebec Region
Fisheries and Oceans Canada
Maurice Lamontagne Institute
P.O. Box 1000, Mont-Joli
Quebec, Canada
G5H 3Z4

Phone Number : 418-775-0825
Fax Number : 418-775-0740
E-Mail address : Bras@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas

ISSN 1480-4913 (Printed)
© Her Majesty the Queen in Right of Canada, 2005

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



Correct citation for this publication

DFO, 2005. Lobster on the North Shore (LFA 15, 16 and 18) and around Anticosti Island (LFA 17) in 2004. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/004