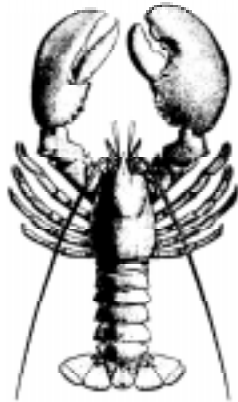
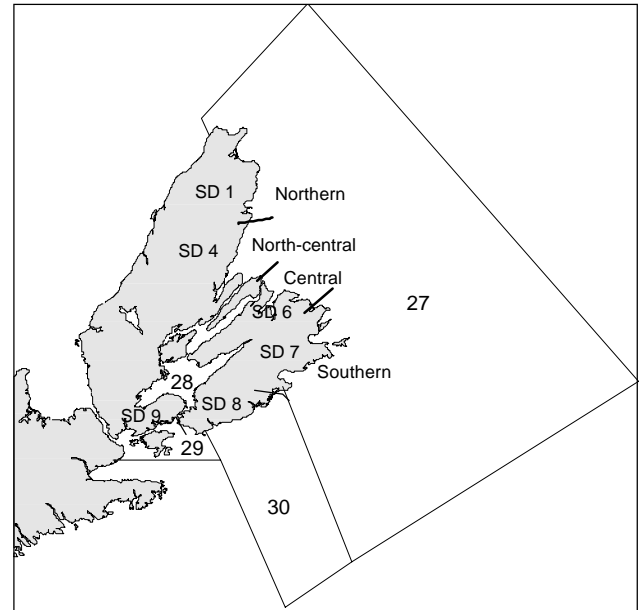


Maritimes Region



Eastern Cape Breton Lobster
(LFAs 27-30)



Background

In the waters off eastern Cape Breton, lobsters take 5-8 years to reach the legal size. Lobsters between 70 and 80 mm carapace length are called “canners”. A 70 mm lobster weighs about 0.3 kg (3/5 lb), while an 81 mm lobster weighs about .43 kg (close to a lb). Molting season is mid-July until early September. Canner lobsters will typically molt every year, larger lobsters less often, with a 1.4 kg (3 lb) lobster molting about every 3 years. Molting results in an increase in length of about 15% and in weight of 50%.

The size at which 50% of female lobsters are mature is lowest off northern Cape Breton (about 73 mm) and greatest off southeast Cape Breton (about 84 mm). The mature female mates after molting in midsummer. The eggs mature internally until they are extruded to the underside of the tail the following summer. The eggs remain attached for 10-12 months and hatch in July-August of the following year. The female then molts and begins the process again.

The free-floating larvae spend 4-6 weeks feeding and growing. Water temperature has a strong effect on how long this stage lasts. During this “planktonic” mode, the larvae may be transported away, or may remain close to their origin, depending upon currents and vertical swimming behavior. Many larvae perish.

After settling to the bottom and for the first several years, lobsters remain in or near their shelter to avoid the fish and other predators that feed on them. As they grow and have less chance of being eaten, they move about and spend more time outside the shelter. This is when they become more catchable by lobster traps.

Summary

- Landings and catch rates have declined for 5-8 years depending on LFA.
- Declines are most likely due to fewer lobsters.
- Exploitation rates are higher in the north than the south.
- 4-year conservation plan will double eggs per average lobster (E/R) in LFAs 27-30 combined.

The Fishery

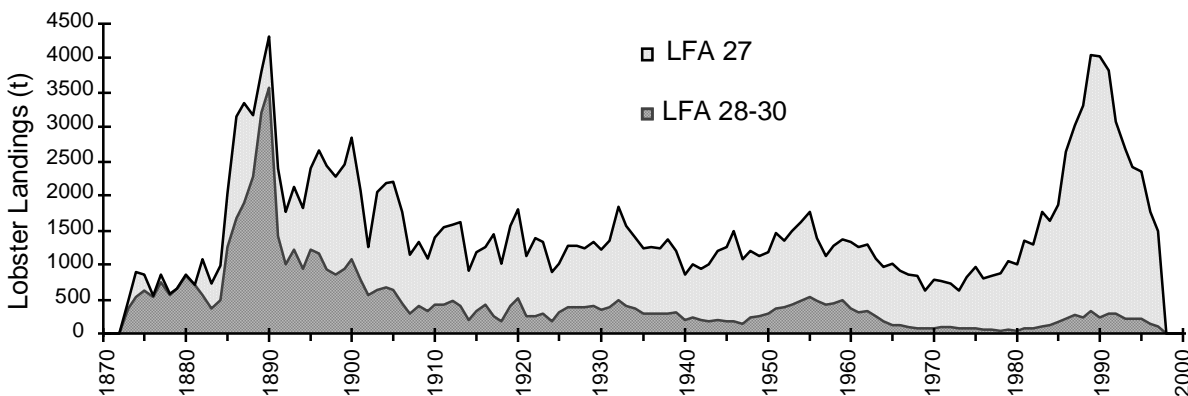
Management of the lobster fishery is based on effort controls, a minimum legal size (MLS) and a restriction on retention of egg-bearing females. For management purposes, eastern Cape Breton is divided into Lobster Fishing Areas (LFAs):

LFA	Season	Trap limit	MLS (mm)	No. licenses
27	May 15-Jul 15	275	70	539
28	May 9-Jul 9	275	81	18
29	May 9-Jul 9	275	81	79
30	May 20-Jul 20	250	81	20

In November 1995, the Fisheries Resource Conservation Council (FRCC) presented their report titled "**A Conservation Framework for Atlantic Lobster**" (FRCC,

1995). The FRCC concluded that the present fisheries were operating at high exploitation rates, harvesting primarily immature animals and did not allow for adequate egg production. The report recommended a new conservation framework, the establishment of seven conservation units (Lobster Production Areas), and increased egg production. A target of egg production per recruits (E/R) equivalent to 5% of that of an unfished population was recommended.

In response to the FRCC, new measures to double E/R in eastern Cape Breton were announced in April 1998. To be phased in over 4 years, they include a 5 mm increase in the minimum legal size and a maximum size of 127 mm CL on females. In 1998, CL was increased by 1.5 mm in each LFA.



Landings in LFA 27 remained fairly stable from 1947 until the mid 1980s when steady increases resulted in record high landings in 1990. 1997 landings were 15% lower than in 1996. The decline was not uniform throughout LFA 27, with the northern portion actually increasing in 1997. This continues a 7 year trend of larger declines in the southern portion of LFA 27.

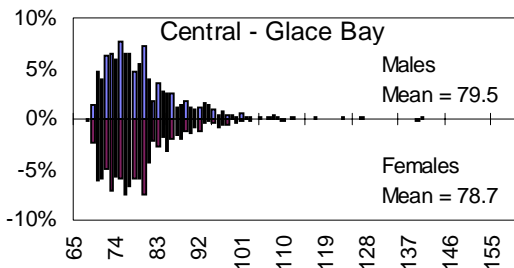
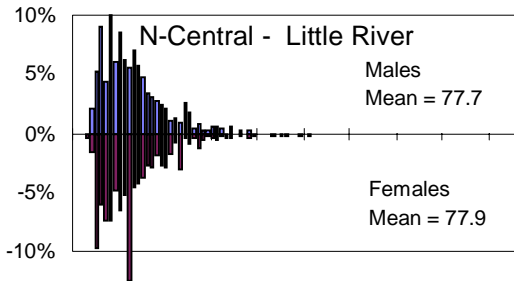
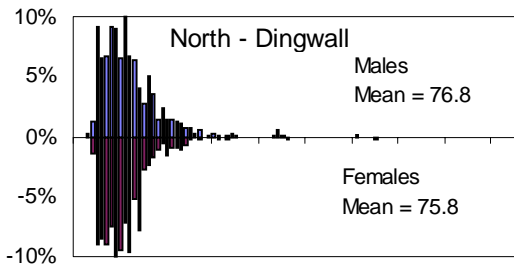
Total landings for LFAs 28-30 also increased in the mid 1980s, but did not approach the

historical highs of the late 1800s (>2500 t). After peaking from 1989-92, landings declined in each LFA. In 1997, landings declined by 13% in LFA 30, and 33% in LFA 29.

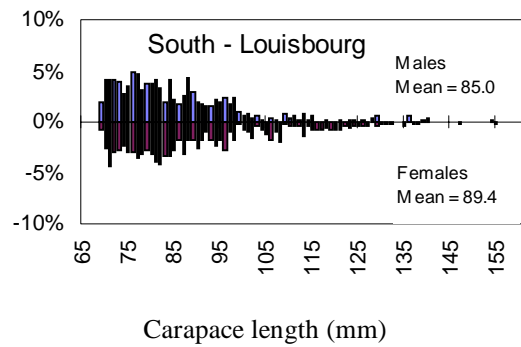
LFA	Landings (t)								
	1993	1994	1995	1996	1997*	10 yr averages			
	61-70	71-80	81-90						
27	2458	2190	2142	1616	1379	802	787	2313	
28	12	13	15	14	11	combined with LFA 29			
29	92	91	90	60	40	97	39	133	
30	132	130	126	90	78	94	31	77	
Total	2694	2424	2373	1780	1508	993	857	2523	

*preliminary

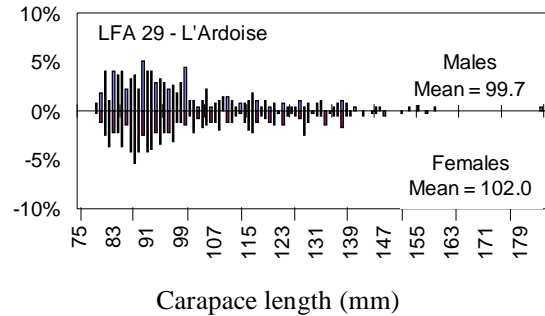
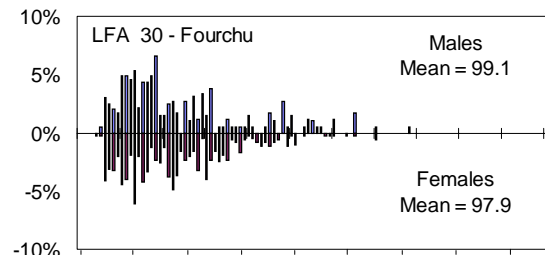
Size frequencies of the landed catch vary considerably within eastern Cape Breton, due to different minimum sizes and different removal rates. The graphs below (all from 1997) show the increase in size from the north to the south in LFA 27.



Carapace length (mm)



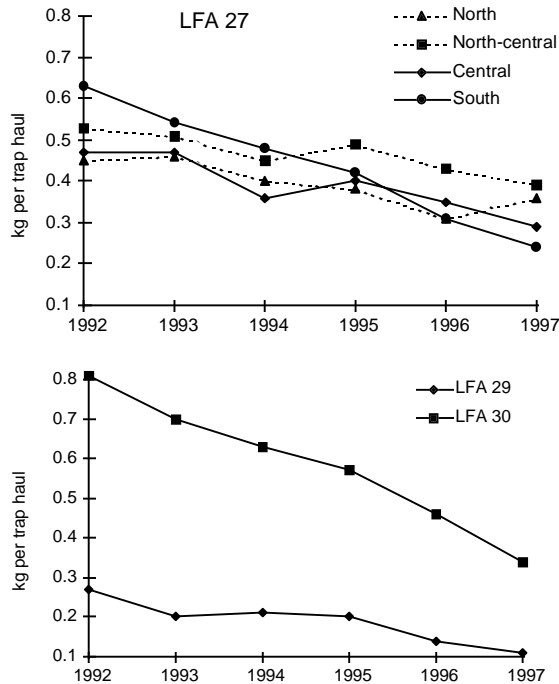
In LFAs 30-29 large lobsters (> 125 mm CL) are common (no 1997 data for LFA 28):



Carapace length (mm)

Resource Status

Trends in lobster **catch rate** (kg per trap haul) reflect changes in lobster landings. Catch rate has declined in all areas since 1992 (no logbooks for LFA 28):



Fishing mortality can be expressed as an instantaneous measure (**F**) or as an annual removal or exploitation rate. This parameter has been estimated using several methods. This year LCA (Length-based Cohort Analysis) resulted in lower estimates than such methods as Leslie analysis, which is based on the rate of catch rate decline during the fishing season. Average estimates of exploitation for 1993-1997 using LCA were: 53% (LFA 27 north), 23% (LFA 27 south), 29% (LFA 30) and 23% (LFA 29).

Other indicators of **exploitation rate** are the proportion of the total number of lobsters that are in the first molt group above the minimum legal size. In LFA 27 this amounts to 75% or greater in the northern subarea, and 20-40% in the south. For LFA 30 the proportion in the first molt group is 45-60%; in LFA 29, 55-70%.

Sources of Uncertainty

Estimates of fishing mortality need improvement. Although there is confidence

of the relative levels of mortality in the different areas, the absolute levels of **F** are imprecise.

While lower lobster abundance is believed to be the main cause of landing declines, annual changes in catchability need more study.

Regarding stock structure, linkages both within and outside of eastern Cape Breton during the planktonic larval stage are not well understood.

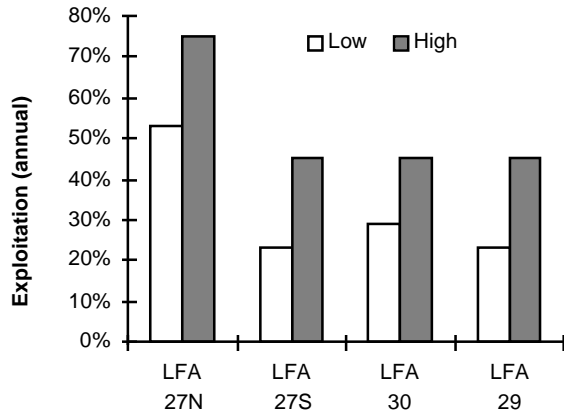
Outlook

Future landings and catch rates in the eastern Cape Breton lobster fishery (LFAs 27-30) remain uncertain. While there are some positive signs (increase in catch rate in the northern portion of LFA 27), concerns raised over the last several years (fishing mortality, low E/R, high effort) remain. A return to the high landings of the early 1990s is unlikely in the immediate future. Conservation measures to increase E/R will help ensure that a commercial fishery remains viable. Given suitable environmental conditions, the higher eggs per recruit will yield a greater number of recruits to the fishery.

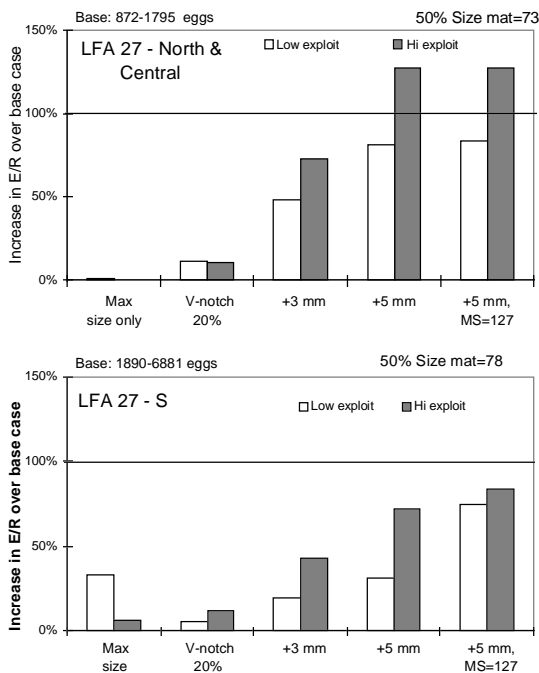
Management Considerations

Egg-per-recruit and yield-per-recruit estimates are based on the Idoine-Rago model. This model is sensitive to fishing mortality.

Because LCA yielded lower estimates of exploitation than other methods, the E/R model was run with 2 exploitation rates for representative ports in LFA 27 (north and south), 30 and 29:

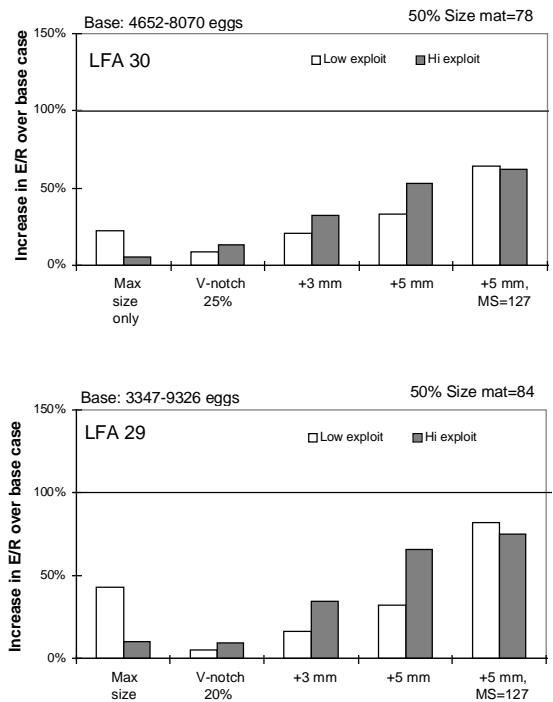


The E/R model was run with several potential conservation measures that could increase E/R. The increases in E/R over the current level were greatest for a minimum size increase, particularly if exploitation is high, as in LFA 27 north and central areas.



For the southern portion of LFA 27, E/R would nearly double with a 5 mm size increase and a maximum size of 127 mm CL on females. The increased minimum size options are the only ones that resulted in increased yield per recruit as well as E/R.

For LFAs 29-30, the model indicates that current E/R is high compared to other LFAs. This is a result of their relatively low sizes at maturity and exploitation rates. As a result the 1998 plan will increase E/R in LFAs 29-30 by 65-80%, rather than 100% (a doubling). Earlier runs of the model indicated the 1998 plan would double E/R within LFAs 29-30; the most recent runs were done with more standardized inputs for molt frequency and growth increments.



Given the large size of LFA 27 relative to LFAs 29 and 30, if E/R increases by slightly more than 100% in LFA 27, and LFAs 29-30 increase by 70%, E/R in eastern Cape Breton as a whole will double.

Despite general agreement by industry for the need to change, there was no agreement on the FRCC target and as a result, doubling of egg per recruit was selected.

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