

**Eastern and South Shore Nova Scotia
Lobster LFAs 31-33**

Background

Lobsters first entering the fishery in LFAs 31, 32, and 33 are probably in the range of 7-9 year old. Most males grow (molt) annually. Females molt annually until reaching sexual maturity when they switch to biennial molting. After two molts into legal size the frequency decreases. Lobster add about 50% to their weight at each molt. Size at female maturity is a full molt smaller in LFA 31 than in 32 or 33. Lobster movement in all three LFAs is confined to local deep-shallow seasonal migrations with little mixing between the grounds of adjacent fishing communities.

The lobster fishery is regulated as a trap-only fishery. The parlour trap came into use in the 1920s and wire construction replaced wood in LFA 33 in the 1980s. In LFA 31 and 32 wood or hybrid wood-wire construction still predominates. The inshore trap fishery is the only gear sector in these LFAs.

The fishery is not managed by TAC. Management objectives are to avoid waste of the harvested resource as well as realizing its potential yield in weight and value.

The Fishery

The inshore lobster fishery has been under regulation since 1873. Important current **regulations** are no new licenses, a trap only fishery, trap limits, fishing seasons, lobster minimum size, and a prohibition against retaining berried females. Division of the coast into Lobster Fishing Areas allows regulations to be adapted to local climatic conditions and allows the industry to supply markets with more sizes and during more months of the year.

Lobster Fishing Area	Trap limit	Min. size (mm)	Seasons	Number licences
31A	250	81	Apr. 29-June 30	149
31B	250	81	Apr. 19-June 20	
32	250	81	Apr. 19-June 20	166
33	250	81	last Mon. in Nov.-May 31	771

Recorded **landings** have underestimated actual landings. A 1993-94 survey of fishers and fishery officers (Nolan 1995, unpublished DFO rep.) disclosed underestimates of 15, 18, and 29% for LFAs 31, 32, and 33 respectively. For the 1995-96 season the method of collecting landings data was changed from sales slips obtained from buyers to monthly reports submitted by lobster fishers. The accuracy of the new method will not be known for at least a few years.

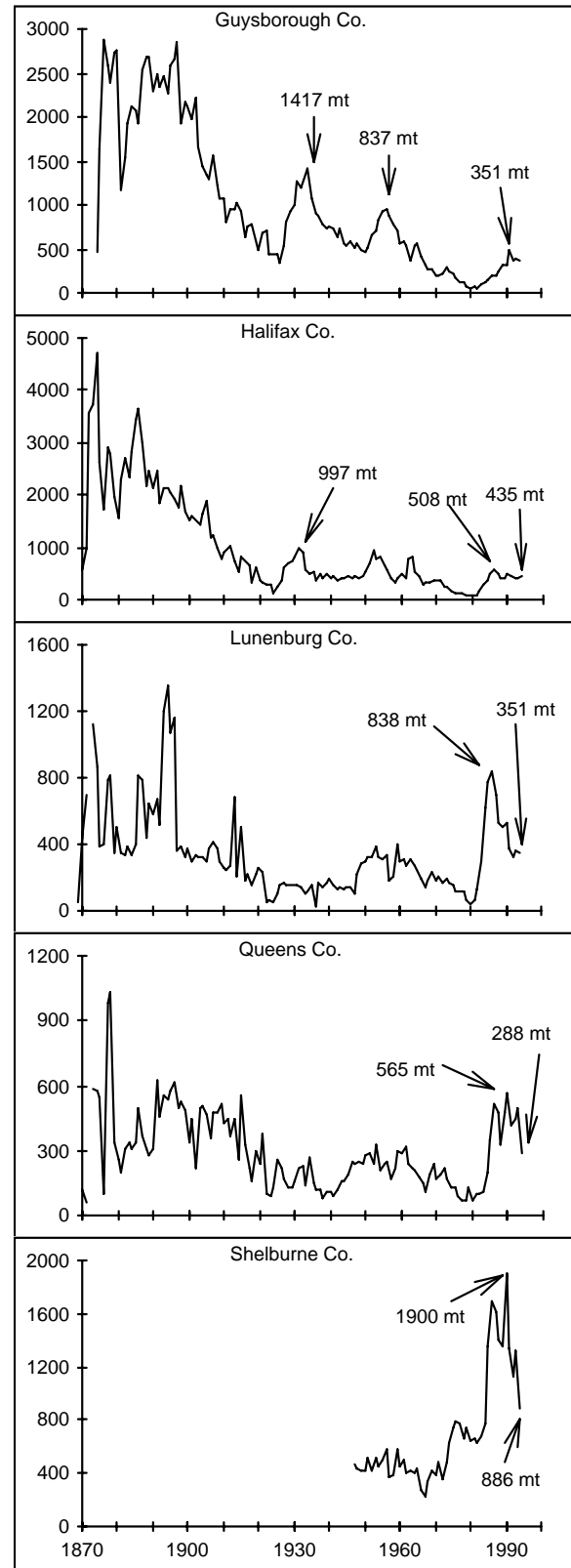
Landings from the mid-1970s to early-1980s were the lowest recorded in the history of the fishery for all LFAs. All three areas peaked about 1991, but only LFA 33 equaled any of the previous peaks achieved this century.

LFA	Landings (t)						
	70-79	80-89	90-92	1993	1994	1995	1996*
31	123	240	375	284	240	193	165
32	127	163	302	279	262	219	199
33	458	1462	2211	1817	1724	1443	1781

*preliminary

The long-term history of landings is available only by county. Guysborough Co. (equivalent to LFA 31) sustained high landing from 1875-1900, followed by three successively lower peaks; landings are now about 15% of the 19th century average. Halifax County (75% in LFA 32 and 25% in LFA 33) has shown a similar trend to Guysborough, and is also now at about 15% of 19th century levels. Lunenburg and Queens Counties are similar to one another with gradual declines to about 1920, and low levels from then until 1980. The late 1980s-early 1990s had brief peaks equal to 18th century averages. Shelburne County is mostly in LFA 34, and the portion of landings in LFA 33 can be separated only since 1947. For this 50-year portion of the record the trend is similar to Lunenburg and Queens Counties.

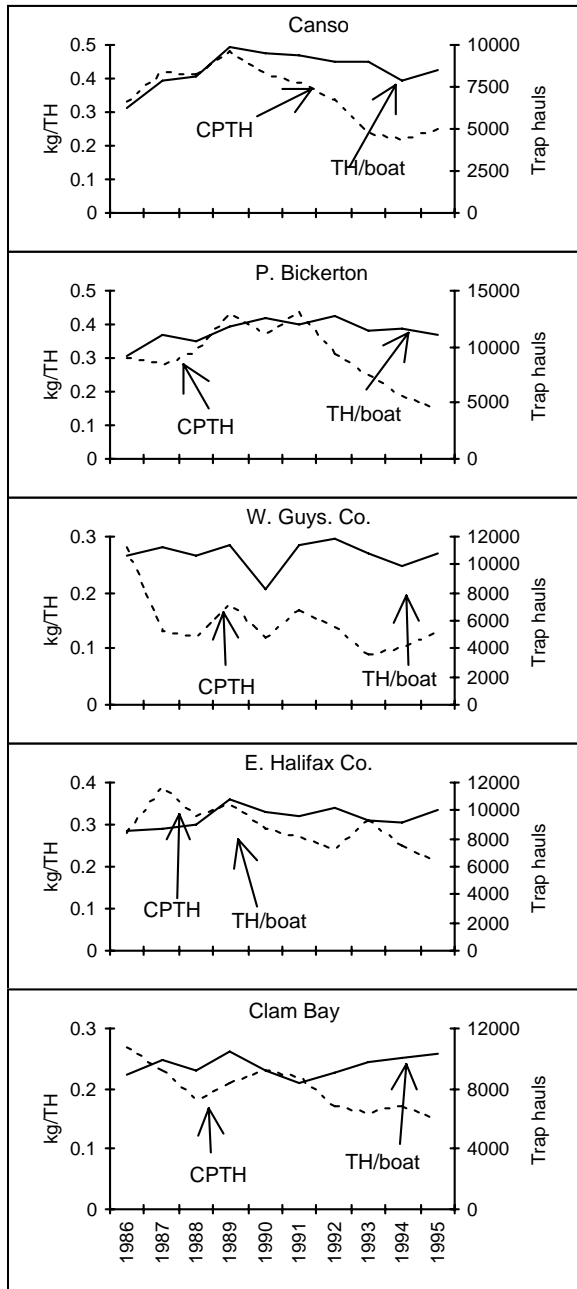
Long term landings (t) in five counties representing LFAs 31, 32, and 33.



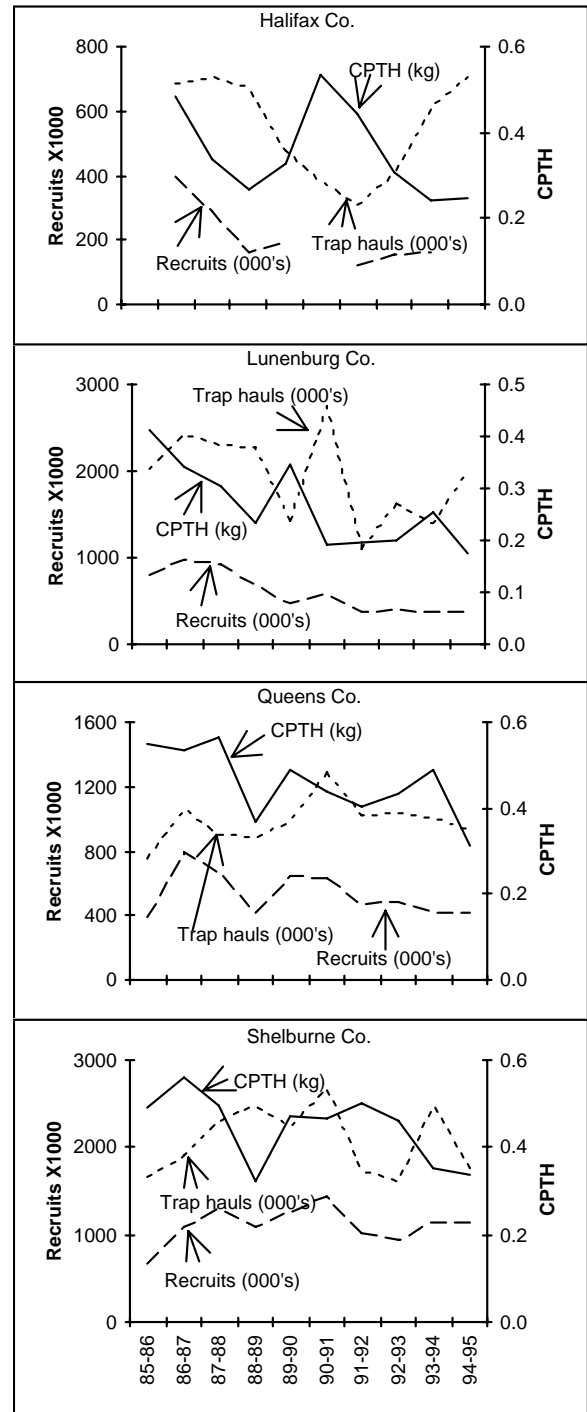
Resource Status

Statistics calculated annually from volunteer log books in LFAs 31-32 are: catch per trap haul in kg and effort as annual trap hauls per boat. For the five sampling areas representing LFAs 31-32, fishing effort has been nearly constant with no trend over the past 10 years, whereas catch per trap haul has shown a downward trend.

Catch per trap haul (CPTH) and effort (trap hauls per boat) for LFA's 31 and 32.



Catch per trap haul (CPTH), total effort in trap hauls, and number of fishery recruits by county in LFA 33.



Based on volunteer logs and port samples in LFA 33, catch per trap haul (CPTH) in kg, number of recruits captured by the fleet (thousands), and fleet effort in trap hauls (thousands) are calculated. In the four counties of LFA 33, trap hauls and catch per trap haul have been erratic (perhaps due to the small number of log books). The number of recruits (81-92 mm

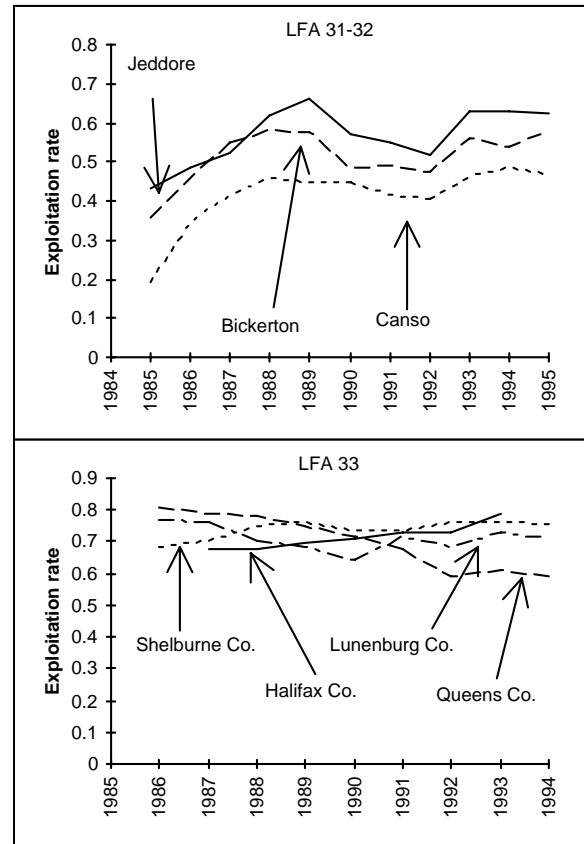
carapace length) captured by the fishery is a smoother trend, downward in Halifax, Lunenburg, and Queens counties, and no trend since 1987-88 in Shelburne Co.

Number of index fishers for the South Shore and Eastern Shore												
Port/LFA	Season											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
LFA 31-32												
Canso	-	1	3	3	4	4	4	4	4	4	4	4
Bickerton	1	-	2	3	3	4	4	4	6	6	6	6
Guys Co. W	-	1	1	3	1	2	2	1	1	1	-	-
Halifax Co. E	-	1	1	2	2	3	3	4	7	8	8	8
Clam Bay	1	2	4	3	1	2	3	2	4	7	9	9
LFA 33												
Halifax Co.	3	2	3	3	5	3	2	7	4	6	6	4
Lunenburg Co.	4	3	3	3	3	3	3	2	4	3	4	4
Queens Co.	4	2	3	3	3	4	4	4	3	5	3	4
Shelburne Co.	2	3	3	3	2	3	3	3	1	6	6	8

Exploitation rates were calculated from the number of lobsters in the catch in the first and second molt post recruitment, and the molt frequency in the first molt class. This molt frequency was set at 1.1 years based on tagging studies. Estimated exploitation rates are consistently lower in LFAs 31-32 than 33, perhaps because of a lower stock density in the former areas. When fishing low stock densities, fishers reach a break-even level where cost of fishing equals the value of the catch at a lower exploitation rate than when they fish stocks with a high density. As stocks decline it will be interesting to note whether exploitation rates decline.

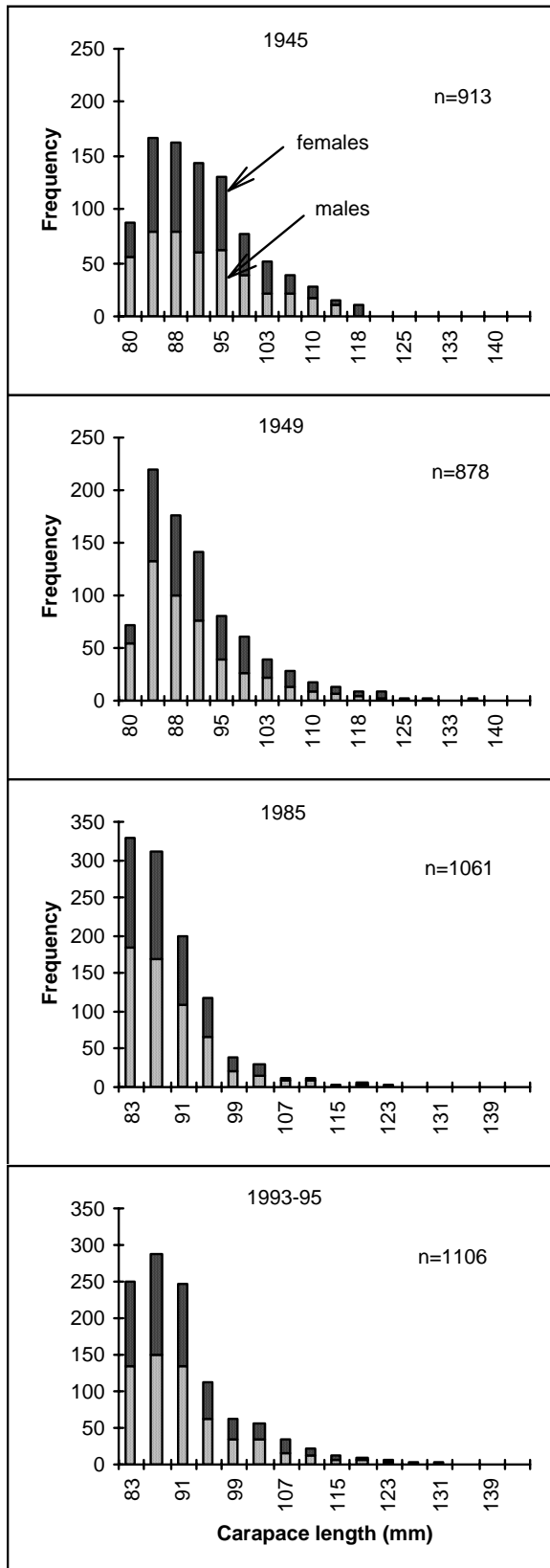
Size frequencies for Port Mouton, Queens County, do not show large changes over the past 50 years. For example, in December samples of catches, lobsters greater than 110 mm CL were a consistently low 6, 6, 2, and 4% of the catch in 1945, 1949, 1985, and 1993-95 respectively. Thus, high exploitation in not a recent occurrence.

Exploitation rates for LFA's 31-32 and LFA 33 expressed as 3-year running averages. Each line represents one sampling port.



More **egg production** could provide higher fishery yields. Much higher landings in LFAs 31 and 32 at the end of the last century demonstrated a large habitat carrying capacity. In LFA 33 high landings from the last century and again during the past 10 years suggest large, unused habitat carrying capacity there also. Man-made changes to the physical environment have been small in all three LFAs. Changes in the predator or prey assemblages that might affect the habitat carrying capacity are unknown, but factors often mentioned, groundfish and kelp, are out of phase with lobster abundance. Climate change could conceivably affect carrying capacity, but Nova Scotia is in the center of the lobster's range so the species should be well adapted. If density dependence has not limited lobster survival at much higher densities than presently found, then the habitat is underutilized by lobster, and more egg production would, on average, result in higher fishery yields. Sizes of female maturity and exploitation rates suggest that about 50% of females are able to spawn before capture in LFA 31, and only 8% in LFAs 32 and 33.

Lobster size frequencies from December port samples in Port Mouton, Queens County.



Uncertainties in determination of egg production include catchability of different size classes, natural mortality, and temporal and spatial changes in size of female maturity. However, if one accepts the above argument that higher egg production will on average produce more fishery recruits, then it is not necessary to know absolute values of egg production. Uncertainties are not sufficient reason to delay implementation of measures to increase egg production. To the contrary, a start at increasing egg production will provide a welcome incentive to improve the calculations.

Outlook

Preceding the peak of the last decade, all of LFAs 31,32, and 33 experienced their lowest catches since the the start of the fishery in the 1870s. The high catches demonstrated the habitat’s capacity to support a large stock, and the low catches the vulnerability of the stock to collapse. There has been no recent changes in management to increase the sustainability of the lobster stocks. Therefore, a return to low and variable landings of the 1920-1980s period seems likely. We again recommend to the fishing industry and to DFO management that they adopt measures, such as those supported by FRCC, to increase egg production.

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