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Canadian Atlantic Fisheries
Scientific Advisory Committee

CAFSAC Research Document 83/55

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Comité scientifique consultatif des
pêches canadiennes dans l'Atlantique

CSCPCA Document de recherche 83/55

Review of snow crab resources in western
Cape Breton (area 1 and 7) for 1982

by

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ABSTRACT

In 1982, the stock of snow crab exploited in Cape Breton area 1 was estimated at more than 2 000 t, at the start of the fishing season. The total catch was 953 t. During the last five years, the annual production was stable at approximately 1 300 t. There was a constant increase in the size of the crabs since 1979.

In area 7, the landings of 824 t reported by Cape Breton fishermen reached the highest level ever reported for this area, reflecting an increase in effort. No statistics were available on the catch made by the offshore fleet. Catch rates are lower than in area 1.

RESUME

En 1982, la taille du stock de crabe des neiges, dans la zone 1 du Cap Breton, a été estimée pour le début de la saison de pêche à plus de 2 000 t. Les débarquements ont atteint 953 t. Au cours des cinq dernières années, la production annuelle s'est maintenue à approximativement 1 300 t. La taille des crabe a constamment augmenté depuis 1979.

Les débarquements de 824 t. rapportés par les pêcheurs du Cap Breton pour la zone 7 constituent un niveau record et reflètent une augmentation de l'effort. Les statistiques des prises effectuées par la flotte hauturière n'étaient pas disponibles. Les rendements étaient inférieurs à ceux de la zone 1.

INTRODUCTION

Following the assessment of area 1 Cape Breton snow crab stock (Elner, 1982) presented last year, CAFSAC advised that a TAC of 1 000 t be imposed in 1982 and 1983 (CAFSAC Adv. Doc. 82/2). This catch level was expected to correspond to a 50% exploitation rate and to remove the equivalent of the annual production, which has been fairly constant in the last four years. These recommendations were based on the hypothesis that production would be similar in 1982 and 1983. The essential management goal of stock stability, set for this area, would then be achieved.

Much less is known about area 7 snow crab stock, which is contiguous to the southern border of area 1. No biomass estimates using Leslie's technique were possible due to a generally stable CPUE throughout the fishing season and unrecorded catches (Elner, 1982). CAFSAC advised for 1982 to restrict the catch and fishing effort to previous years' levels.

This document presents an updated review of the catch and effort statistics and of the size structure of the western Cape Breton snow crab population for 1982. Basic information on the history and status of the fishery were presented by Elner (1982).

MATERIAL AND METHODS

In area 1 (Figure 1), the fishing season opened on July 14 and lasted 2 months. In area 7, after trial fishing trips made in July and August, the fishery started around August 19. Information on catch and effort, gathered from log books, was obtained for almost every fishing trip made by Cape Breton fishermen in 1982. The data were compiled weekly by area, and the results were analysed with Leslie's fishing success method (Ricker, 1975; Bailey, 1983). Size distributions of the crabs landed were obtained from port sampling of the catches.

RESULTS

Area 1

The fishing effort distribution in area 1 is illustrated on Figure 2 together with the corresponding CPUE's. The shaded area is an approximation of the fishing grounds since the locations of fishing were reported according to a grid system. The fishery is concentrated in the gully (> 90 m), mostly in the vicinity of Chéticamp and Pleasant Bay where most of the fishermen are landing.

As in the previous years, the CPUE shows a constant decline with cumulative catch, except for the last four weeks (Table 1). During that last period, only 13 trips were apparently made and the catch rates dropped to approximately 40 kg/trap haul. These catch rates are unexpectedly low compared to the trend in the catch rates of the five preceding weeks. More than 95% of the landings were made during these five weeks.

Two Leslie analyses were performed on the results of the first five weeks (Figure 3), one with only the data from the fishing trips with a soak time of 1 day, and the other with all data combined. The objective was to evaluate the effect of different soak times on the results of the analysis. It was evident from the data that the catch rates are different for different soak times (Table 1). The estimates for initial biomass are 2 282 t (1 861 - 3 119 t) and 2 132 t (1 613 - 3 702 t) with 1-day and total soak times data respectively. A total catch of 953 t corresponds to respective exploitation rate estimates of 41.8% (30.6 - 51.2%) and 44.7% (25.7 - 59.1%).

The average size of the crabs landed in August 1982 was 116 mm. Historical data show a constant increase since 1979 when the average size was 106 mm (Figure 4). The weekly size distributions (Figure 5) show that there was a reduction in 1982 of the relative proportion of smaller commercial crabs (95-110 mm) in the landings compared to 1981 (Figure 6). A peak in the histograms of 1982 is often apparent near 120 mm.

Area 7

The catch statistics from the log books of area 7 in 1982 (Table 2) indicate a total catch of 824 t, the highest ever recorded for this area. No official statistics are available yet. Information on the catches made by offshore vessels could not be obtained either, as the sale slips don't mention the area of fishing and as no log records from these vessels were reported.

The Leslie's graph of CPUE against cumulative catch shows high catch rates in the first four weeks and a stable rate during most of the season until the last two weeks when the CPUE was low (Figure 7). Regressions made on selected data from the middle part of the season suggest a total biomass of 3 000 to 4 000 t which is doubtful, knowing that the average catch rate was 62 kg/trap haul (compared to 96 kg in area 1) and that the fishing grounds are mostly concentrated near the border line with area 1. This average CPUE of 62 kg/trap haul is close to the catch rate of 66 kg/trap haul obtained in area 1 during August 12-18, which is the last week before the fishery officially started in area 7.

The fall season in area 7 was again successful in avoiding the problem of soft-shell crabs in the landings. These landings reached the highest level ever reported for this area, reflecting the increase in effort from 5 784 trap hauls in 1981 (Elner, 1982) to 13 365 trap hauls in 1982. The catch rates were apparently very resilient to this effort level, with a CPUE stabilizing near 60 kg/trap haul for most of the season.

DISCUSSION

Most of the possible fishing grounds in area 1 seem to be exploited by the fishery, according to the log books information (Figure 2). However, 8 out of 13 squares of the grid each received 5% or less of the fishing effort, despite high catch rates. This could indicate that part of the population is not under exploitation, and that the results of Leslie's analysis reflect the situation of an unknown portion of the total population only.

The exploitation rate of 1982 does not seem to be different from that of 1981 (45% compared to 47%). While 894 t were estimated remaining at the end of 1981 fishing season (Elner, 1982), 2 282 t were present at the start of 1982 season, indicating a between-seasons biomass addition of 1 388 t. This is similar to the total annual biomass increments of 1 563 t, 1 360 t and 1 336 t observed in 1978-1979, 1979-1980 and 1980-1981 respectively. This is further evidence for a stable annual production of approximately 1 300 t in area 1 population.

The constant increase in the average size of crabs in the landings since 1979 probably reflects the control on fishing mortality by the imposition of TAC's. Crabs are effectively allowed to grow more before capture. Average size would probably be stabilized at a lower size by imposition of a TAC equivalent to the annual production of approximately 1 300 t.

The positions of fishing and the catch rates indicate that area 7 fishermen are effectively fishing the fringe of area 1 snow crab population. Consideration should be given to the possibility of combining these two areas.

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- Bailey, R. 1983. Overview of Leslie's fishing success method as an assessment tool for snow crab stocks. In preparation.
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- Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Bull. Fish. Res. Board Can. 191: 382 p.

TABLE 1. CATCH AND EFFORT STATISTICS FROM LOG BOOKS FOR CAPE BRETON AREA 1 IN 1982.

SEX	DATES	NUMBER OF TRIPS	NUMBER OF TRAP HAULS	CATCH (kg)	CUMULATIVE CATCH (kg)	CATCH-PER-UNIT-EFFORT Soak days				
						1	2	3	4-	Total
	July 15-21	110	3,123	354,858	177,429	111	130	107	79	114
	July 22-28	96	2,616	265,461	487,589	95	108	109	76	101
	July 29/Aug. 4	72	1,884	172,429	706,534	89	87	98	73	92
	August 5-11	59	1,486	116,043	850,770	75	87	97	-	78
	August 12-18	18	460	30,493	924,038	70	72	82	42	66
	August 19-25	6	156	6,503	942,536	37	46	52	45	42
	Aug. 26/Sept. 1	2	50	1,767	946,671	34	-	-	37	35
	Sept. 2-8	3	73	3,248	949,178	25	-	-	54	44
	Sept. 9-15	2	48	2,168	951,886	34	-	-	57	45
		—	—	—	—	—	—	—	—	—
	TOTAL:	<u>368</u>	<u>9,896</u>	<u>952,970</u>		<u>94</u>	<u>107</u>	<u>100</u>	<u>63</u>	<u>96</u>

TABLE 2. CATCH AND EFFORT STATISTICS FROM LOG BOOKS FOR CAPE BRETON AREA 7 IN 1982.

EX	DATES	NUMBER OF TRIPS	NUMBER OF TRAP HAULS	CATCH (kg)	CUMULATIVE CATCH (kg)	CATCH-PER-UNIT-EFFORT Soak days				
						1	2	3	4+	Total
	July 22-28	3	88	8,618	4,309	50	123	-	-	98
	July 29/Aug. 4	4	116	12,121	14,679	105	132	75	-	104
	August 5-11	3	87	10,587	26,033	122	-	-	-	122
	August 12-18	3	78	8,353	35,503	69	119	-	139	107
	August 19-25	83	2,163	138,756	109,057	61	82	41	38	64
	Aug. 26/Sept. 1	69	1,861	115,924	236,397	57	69	68	69	62
	Sept. 2-8	121	3,213	211,339	400,029	61	79	87	77	66
	Sept. 9-15	101	2,793	163,351	587,374	54	67	64	92	58
	Sept. 16-22	59	1,556	90,863	714,481	53	64	58	75	58
	Sept. 23-29	31	783	42,094	780,959	53	57	61	38	54
	Sept. 30/Oct. 6	14	366	16,147	810,080	46	-	54	26	44
	October 7-13	11	261	6,116	821,211	17	33	23	34	23
	TOTAL:	502	13,365	824,269		58	73	64	66	62

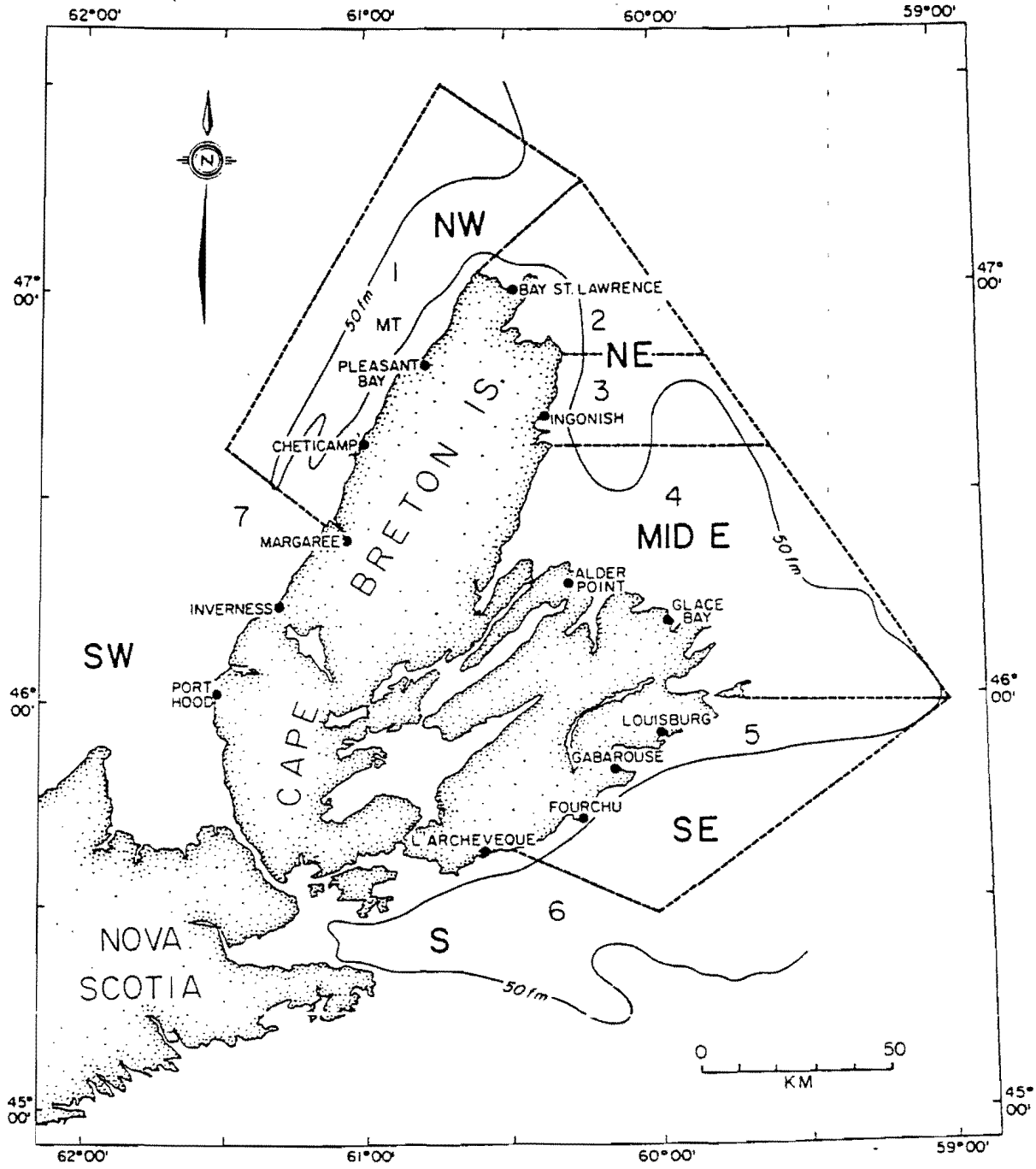


FIGURE 1. Snow crab management areas (1 to 7) in Cape Breton Island , N.S.

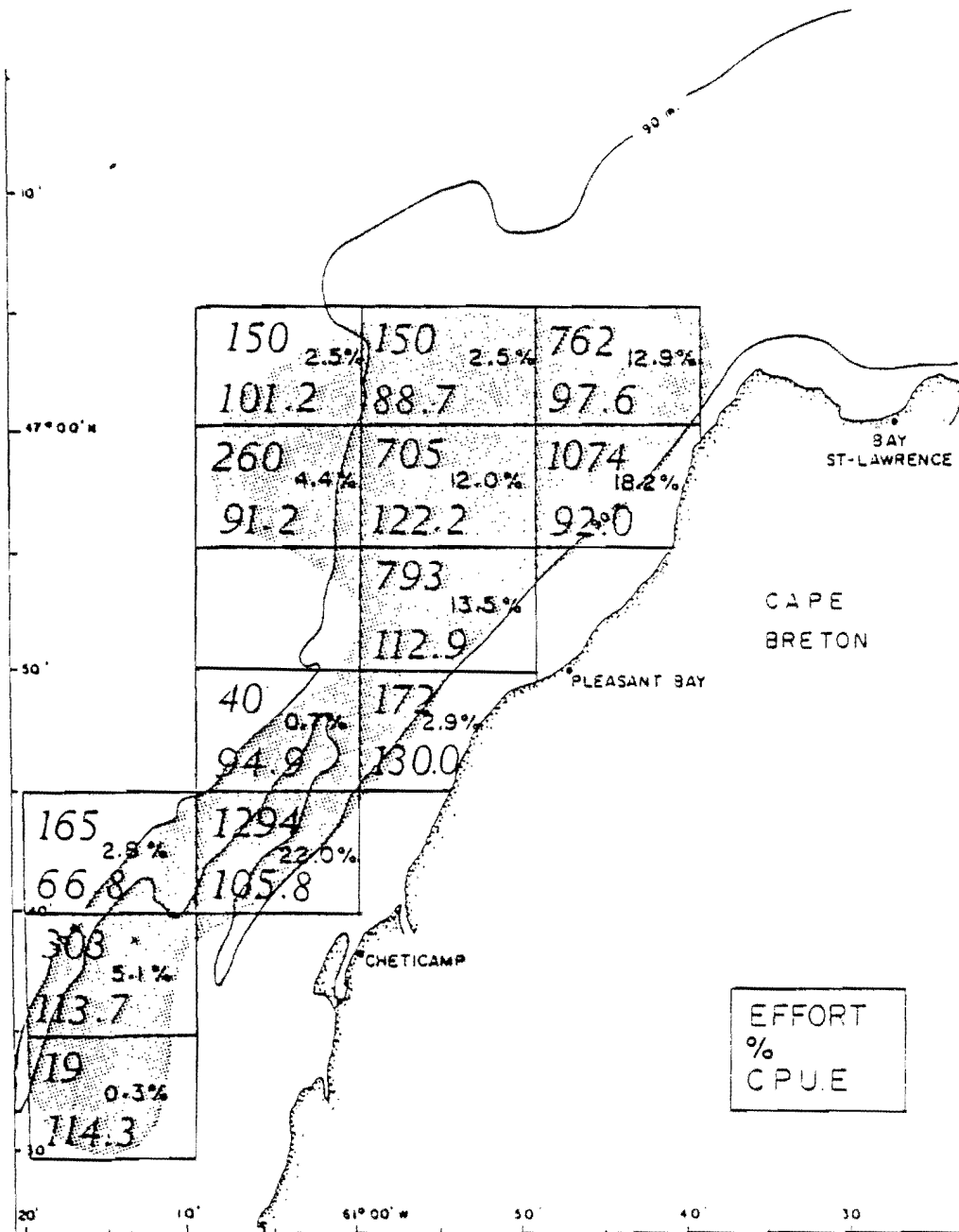


FIGURE 2. Effort (trap hauls) distribution and CPUE (kg/trap haul) by 5' lat. X 10' long. squares in Cape Breton area 1 for 1982. The effort figures represent 60% of the total effort reported.

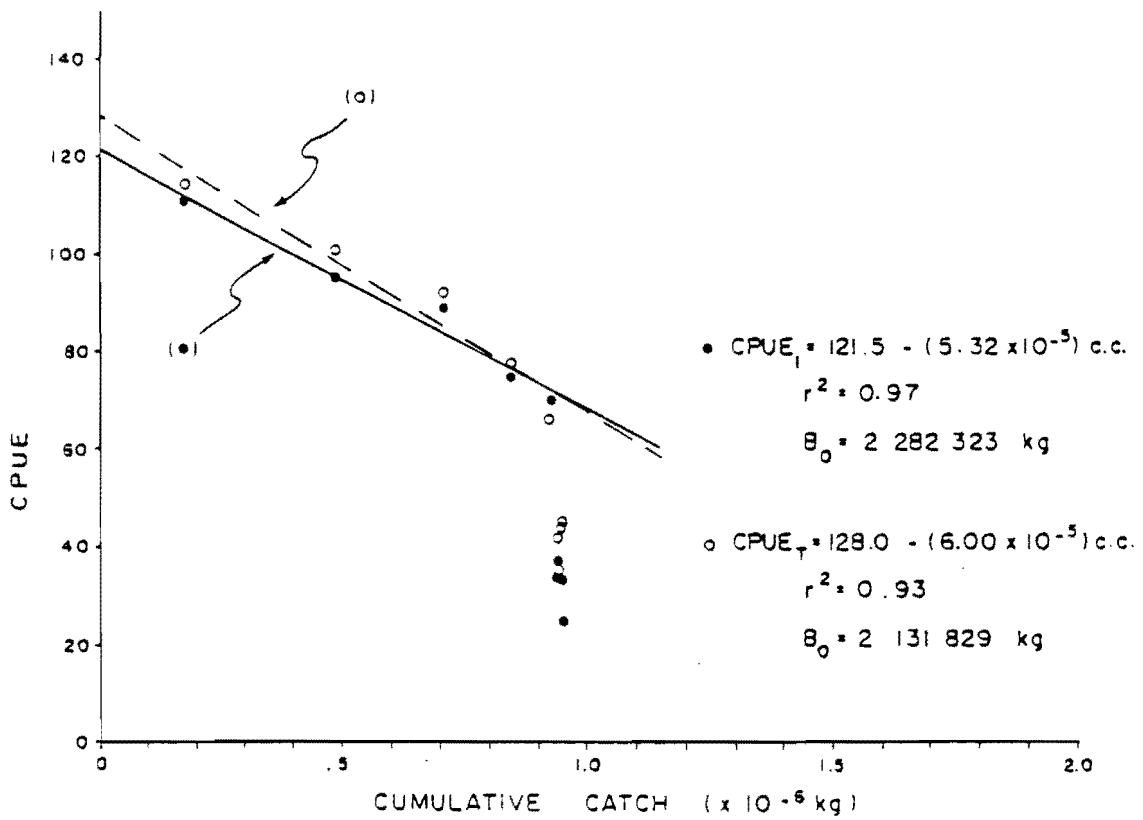


FIGURE 3. Leslie analysis of catch and effort data from Cape Breton area 1 fishery in 1982.

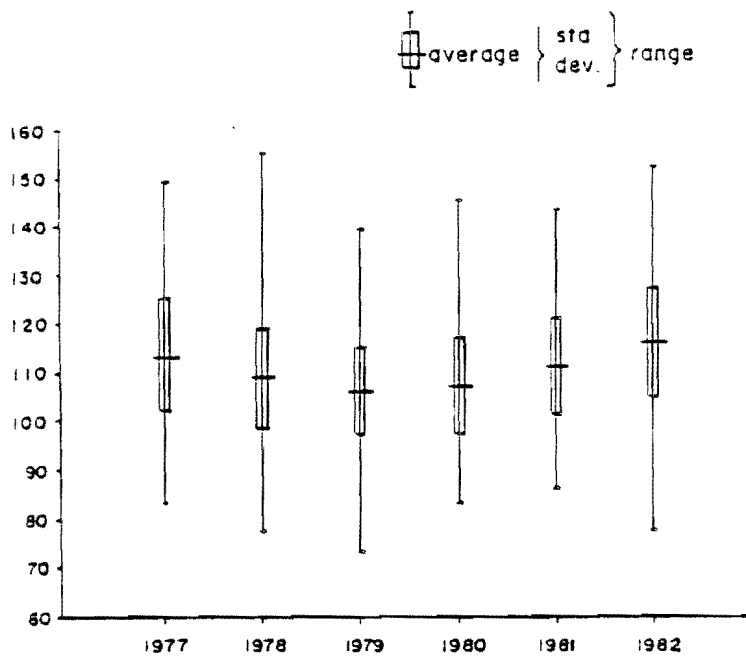


FIGURE 4. Range, standard deviation and average size (mm) of snow crabs landed in Cape Breton area 1 in August 1977 to 1982.

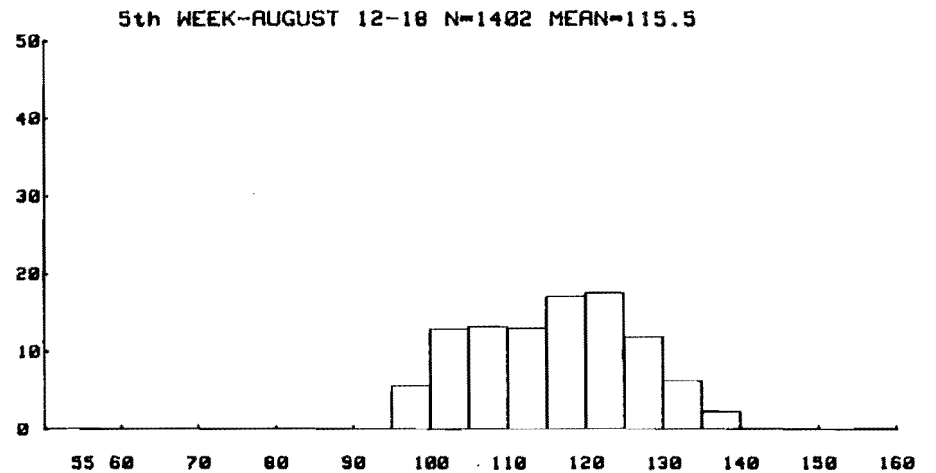
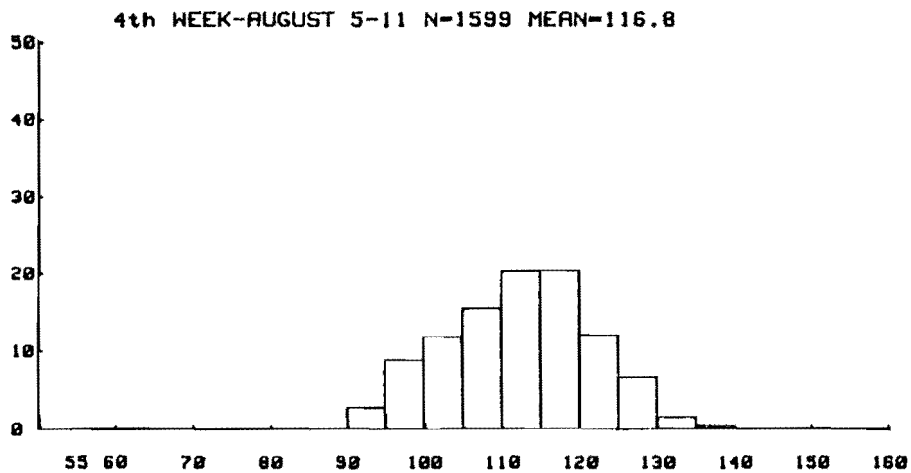
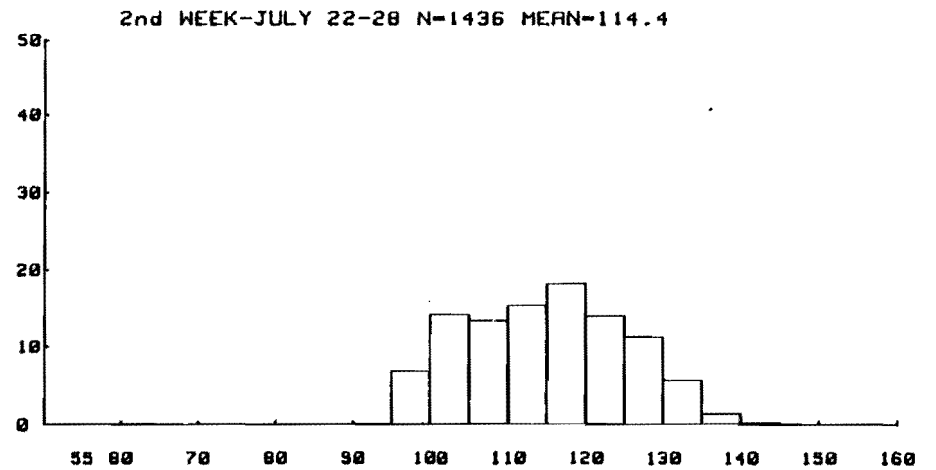
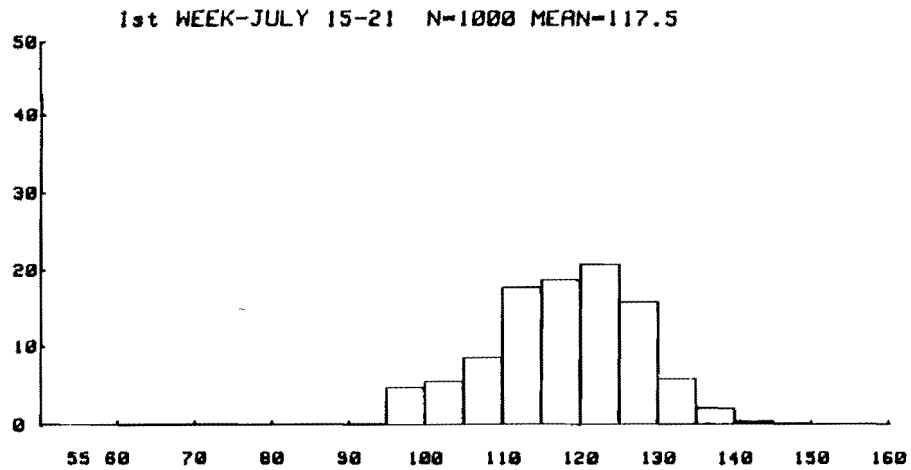


FIGURE 5. Weekly size distributions (mm) of snow crab landed in Cape Breton area 1 in 1982.

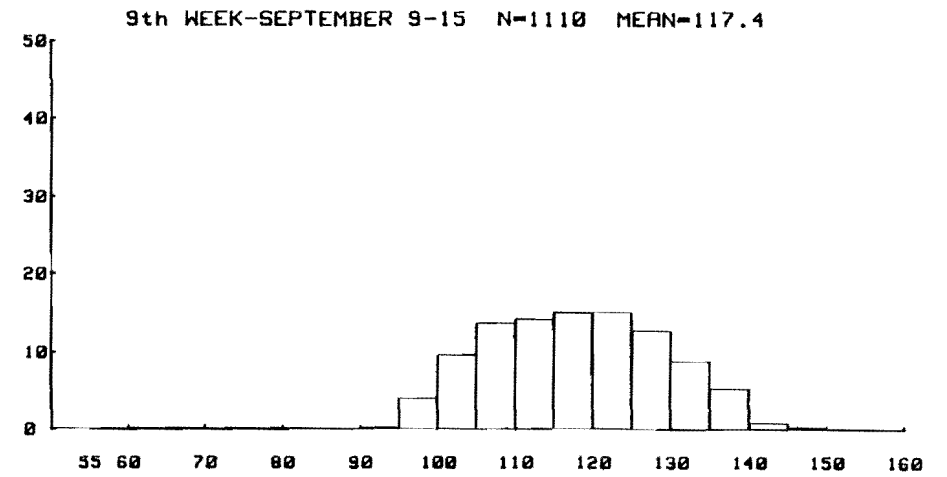
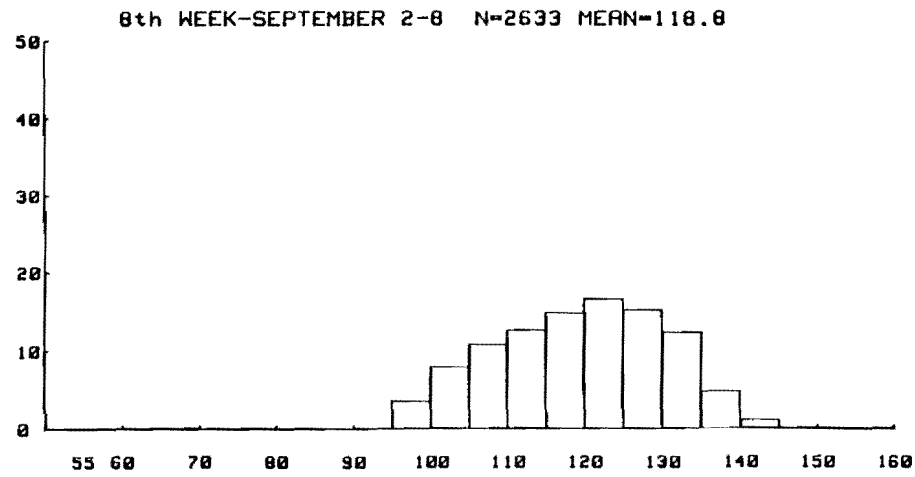
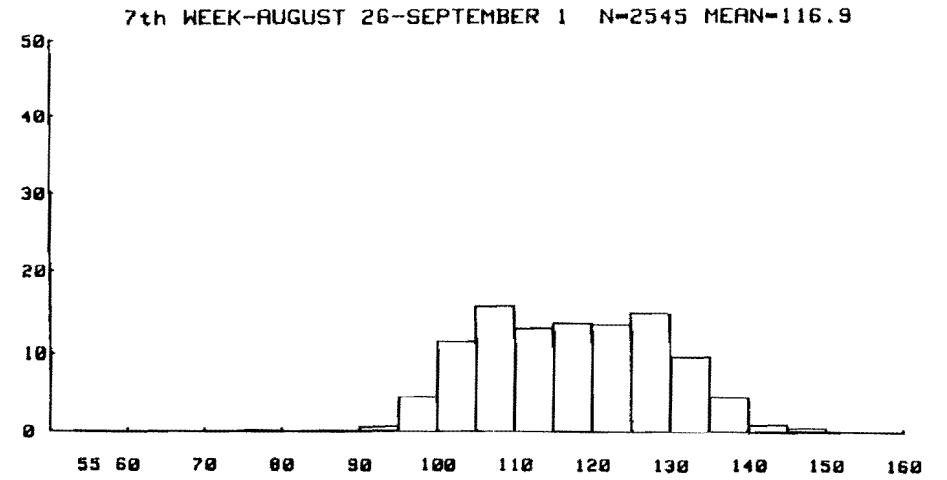
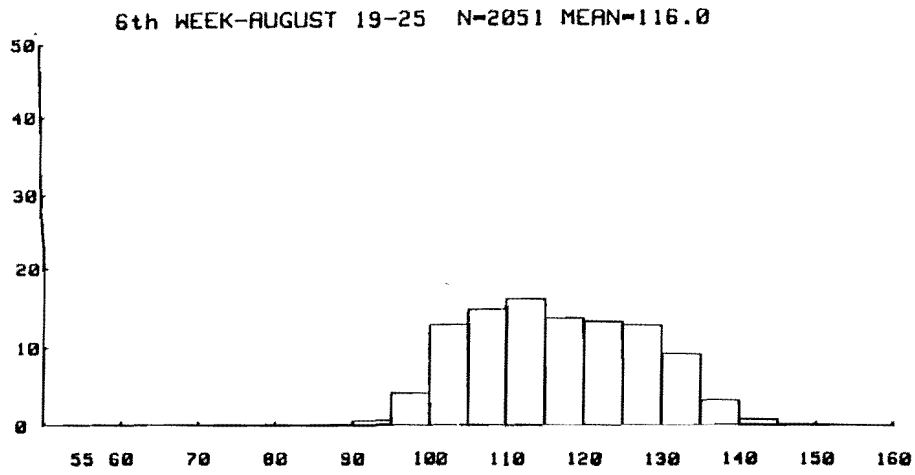


FIGURE 5. Continued.

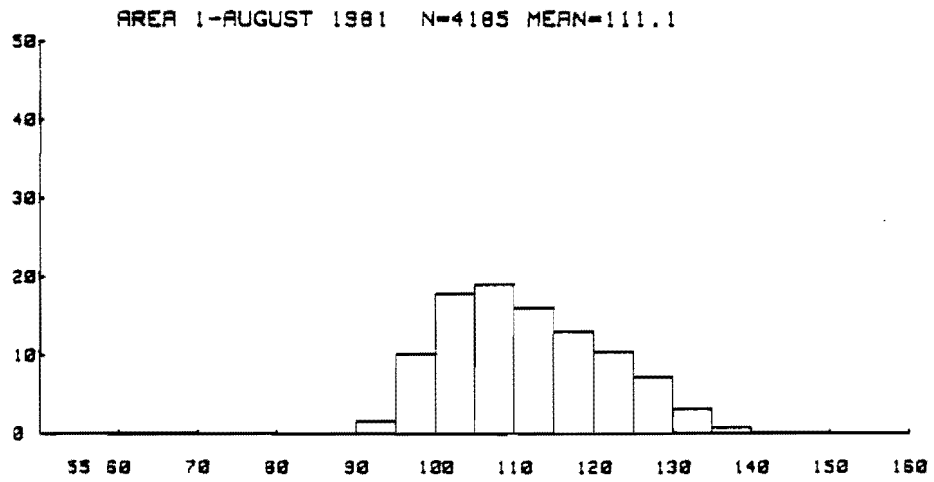


FIGURE 6. August 1981 size distribution of snow crabs in Cape Breton area 1.

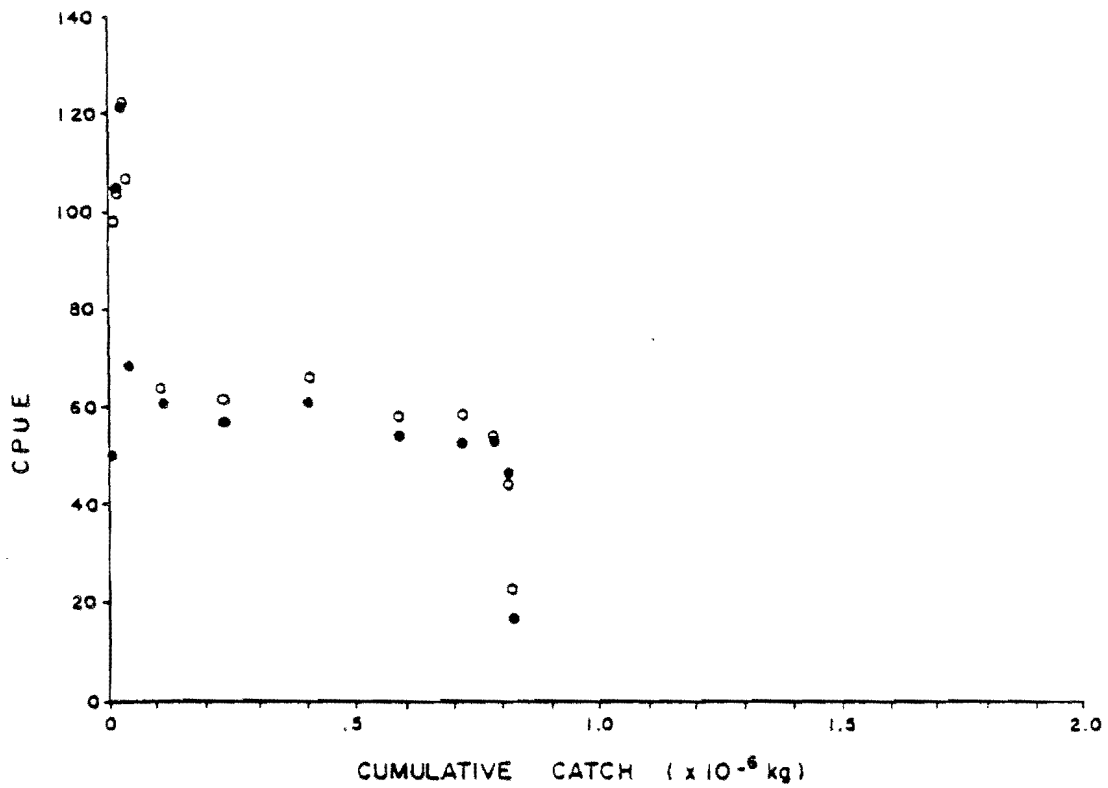


FIGURE 7. Weekly CPUE against cumulative catch obtained in Cape Breton area 7 for 1982.