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A summary of commercial catch rate data for the
1986 Prince Edward Island Bar Clam (Spisula
solidissima) Fishery¹

by

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ABSTRACT

A summary of catch and effort data from the 1986 voluntary logbook program give the first estimate of commercial catch rates for fishing areas on the north shore and Cardigan Bay of Prince Edward Island. The overall average CPUE was 124 kg/m/h and ranged from a low in area 3 of 86 kg/m/h to a high of 155 kg/m/h in area 4. Catch rates tended to increase for all areas through the season. The fishery will probably remain a self-regulating secondary fishery with the maintenance of the present management strategies.

RESUME

Un sommaire des données d'un carnet de bord volontaire distribué en 1986 a donné une première estimation des taux de capture commerciaux pour les régions de pêches sur la côte nord et en Baie de Cardigan à l'Ile-du-Prince-Edouard. La moyenne des P.U.E. était 124 kg/m/h et variait entre un minimum de 86 kg/m/h dans la région 3 à un maximum de 155 kg/m/h dans la région 4. La tendance était à une augmentation des taux de capture pendant la saison dans toutes les régions. La pêche devrait demeurer une pêche secondaire faisant l'objet d'une autorégulation. Les stratégies de gestion actuelles devraient être maintenues.

INTRODUCTION

The P.E.I. bar clam fishery accounts for approximately 90% of all the bar clams (Spisula solidissima) harvested in the Gulf region (1985: 710 t, round weight, total landing from all sources) and an increased market demand has renewed interest in the commercial fishery. Commercial (hydraulic dredge) licenses are restricted as a conservation measure, with exceptions being made for exploratory permits in some unfished areas (3 issued in 1986), and the only fishing restriction is a minimum legal size limit of 75 mm.

Commercial dredge fishermen expressed a concern for the state of the fishery at a Workshop held in January, 1986 and in order to help assess the situation, a logbook was designed and reviewed with fishermen attending the Workshop. They agreed that a voluntary program be initiated for the 1986 fishery. This report is a descriptive analysis of the first voluntary logbook program in an effort to obtain a baseline estimate of the distribution of fishing effort in P.E.I. Consequently, there are no other commercial statistics of a similar scale for comparison.

MATERIAL AND METHODS

Logbooks

All licensed fishermen were contacted prior to the end of the lobster season to ascertain their participation in the program. Of 26 fishermen, 11 indicated their intention to fish and 7 of these agreed to participate in the program. Logbooks (format shown in Appendix 1) were distributed individually and each fishermen interviewed to assess their fishing gear.

The fishermen provided daily log sheets of fishing location, effort and catch. These data were used to calculate catch per unit of effort (CPUE) and locate the main fishing areas.

Logbooks were also distributed to 3 exploratory permit holders but they did not fish this past season.

Resource Survey

The data from the 1984 stock assessment survey (Sephton & Bryan 1985) was re-computed to estimate CPUE's for each of the fishing areas indicated by logbooks. Dry weight biomass, as reported by Sephton & Bryan (1985), was transformed (factor of 22.1) to round weight biomass, based on the fact that dry weight is 4.55% of the whole live weight, to obtain an estimate of the total resource available for the north shore and Cardigan Bay.

Data were extracted from a resource inventory survey conducted in 1972 by the P.E.I. Department of Fisheries (Yunker & Cudmore 1972) to calculate CPUE's for some of these fishing areas.

RESULTS

Logbooks

A total of 178 logsheets (one per fishing day) were submitted by fishermen and the catch and effort data are summarized in Table 1. The average catch per day was 705 kg and ranged from 442 to 880 kg. The average CPUE was 124.1 kg/m/h and ranged from 62.9 to 147.1 kg/m/h. The average time per tow was 14 minutes and the average width of a hydraulic dredge was 97 cm (38 in) (range 81 to 107 cm). The total landed catch reported from logbooks was 125.5 t. The fishing season commenced after the closure of lobster season and extended from the beginning of July to early October.

The logbook information indicated four fishing areas (1 to 4) on the north shore of P.E.I. and their locations are shown in Fig. 1. All fishermen fished at least 2 areas during the season and moved short distances within an area as catches declined. The two fishermen located in Cardigan Bay did not indicate exact fishing locations but did move between areas in the vicinity of Pamure and Boughton Islands as indicated in Fig. 1.

The catch and effort data for each of the fishing areas is summarized in Table 2. The average catch per fishing day ranged from 651 to 833 kg while the average CPUE ranged from 85.8 to 155 kg/m/h for north shore areas 1 to 4. The average catch per fishing day was 485 kg for Cardigan Bay with a mean CPUE of 145.75 kg/m/h. The figures for Cardigan Bay are low because of adverse weather according to fishermen.

The changes in the average CPUE per week over the fishing season for each of the north shore fishing areas are shown in Fig. 2 and Cardigan Bay in Fig. 3. The mean CPUE fluctuated through the season in all areas and the general trend was for CPUE to increase through the season.

Resource Survey

A summary of the catch and effort data for some of the fishing areas from the reassessed 1984 survey data and the 1972 P.E.I. Department of Fisheries data are shown in Tables 3 and 4, respectively.

An estimate of the total biomass (t, round weight) for the entire north shore, including the main and peripheral fishing areas, is 2191 t while that for Cardigan Bay is 200 t. (These estimates do not include intertidal areas). An estimate of the total biomass for all areas (including the south shore) surveyed in P.E.I. in 1984 is approximately 2600 t.

Landing Statistics

Table 5 shows the annual landings of bar clams for P.E.I. from 1972-1986. Overall, landings have increased from 1972 (133.4 t) to 1984 (742.2 t) and have decreased since that time. Unfortunately, the contribution made by resident hand-pickers to the total landed catch for any year cannot be differentiated from that landed by the hydraulic dredge fleet.

DISCUSSION

The CPUE fishing data for the north shore of P.E.I. indicate that there has been a decrease in CPUE and the virgin biomass since the original survey work was completed by the province of Prince Edward Island in 1972. Anecdotal information from fishermen, that their daily boat catches have decreased in the last 10 years, concurs with this but is difficult to quantify. The CPUE's estimated from the 1984 research survey are in agreement with the 1986 fishing data but are slightly lower. The relative increase in CPUE over the season may indicate that partial recruitment may be occurring over the season or that the fishery has had little impact on the resource (Ricker 1975). As well, this change in CPUE may reflect a micro-redistribution of fishing effort over time as controlled by learning and fishing a contagiously distributed species such as bar clams (Conan 1984). This suggests that the traditional tools of fishery management may have to be superseded by the use of disaggregated models using more precisely located catch and effort data in order to offer insight into rates of optimized exploitation (Conan, pers. comm.).

The CPUE data for the Cardigan Bay fishing areas are slightly lower than the 1984 survey data but are inconclusive because (1) actual fishing locations were not reported and (2) activity was apparently hampered by inclement weather.

The bar clam fishery may be considered a secondary or opportunistic fishery as the level of activity is controlled by fluctuations in primary fisheries (lobster and mackerel) and socio-economic factors. It is difficult to ascertain the number of active licenses from year to year as well as discriminate the commercial fleet landings from those of resident hand diggers and account for unreported landings (i.e. sales outside of Province, etc.). Accurate statistics differentiating the types of fishing effort would assist in the interpretation of future data. Based on the estimate of the total overall biomass from the 1984 survey, the landed catches have been below a 30% rate of exploitation.

The prognosis for the fishery is difficult to predict, based on the limited commercial fishery data and research information on population dynamics (Caddy & Billard 1976, Robert 1981) but there are no biological problems observed at this time. The fishery will probably remain self-regulating with the maintenance of the present number of licenses (and presumed effort) and legal size limit regulations. The results of a recently published study of the reproductive cycle (Sephton 1987) and soon to be completed age and growth rate study may provide additional management advice and implications for legal size limits. This summary of the catch and effort information obtained from a voluntary logbook program initiated in 1986 will be useful for monitoring the fishery in the future.

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Table 1. Catch and effort statistics from logbook data for each of the 7 participants in the 1986 P.E.I. bar clam logbook program.

Boat	No. Days Fished	Total Landings kg	C P U E			
			kg/m/h		lb/ft/h	
			\bar{X}	SD	\bar{X}	SD
A	17	9166	90.7	23.8	60.9	16.0
B	32	28150	109.2	32.3	73.3	21.7
C	18	10057	62.9	10.1	42.2	6.8
D	35	27099	136.6	40.5	91.7	27.2
E	50	38459	147.1	40.2	98.7	27.0
F	8	3533	145.8	81.8	97.2	54.9
G	18	9079	146.0	68.7	98.0	46.1
TOTAL	178	125543	124.1	50.1	83.3	33.6

Table 2. Summary of catch and effort statistics for logbooks for each of the main fishing areas on the North Shore of P.E.I. (1 to 4) and Cardigan Bay (CB) in 1986. (See Figure 1 for locations)

Area	No. Boats Fishing	No. Days Fished	Total No. Tows	Total landings kg	C P U E			
					kg/m/h		lb/ft/h	
					\bar{X}	SD	\bar{X}	SD
1	2	25	748	20827	155.0	47.5	104.0	31.9
2	2	58	1739	44368	140.5	33.2	94.3	22.3
3	3	12	332	7813	85.8	26.4	57.6	17.7
4	3	51	1436	37674	95.2	33.7	63.9	22.6
CB	2	26	615	12612	145.7	71.4	97.8	47.9

Table 3. Summary of catch and effort data from the 1984 research survey for some of the main fishing areas on the north shore of P.E.I. and Cardigan Bay (CB).

Area	Total No. Tows	Total Catch kg	Average CPUE kg/m/h	95% C.I.	
				Upper	Lower
1	5	21.5	78.4	124.7	32.6
3	8	35.5	80.6	135.7	25.6
4	16	74.8	85.1	104.6	65.4
CB	17	196.5	210.2	283.4	137.1

C.I. Confidence Interval

Table 4. Summary of catch and effort data from the 1972 P.E.I. Department of Fisheries survey for the main fishing areas of the north shore of P.E.I.

Source: Younker, D.S. & J.B. Cudmore. 1972. Inshore Bar Clam Survey, Final Report, 1972. P.E.I. Department of Fisheries, Charlottetown, P.E.I.

Area	Total No. Tows	Total Catch kg	Average CPUE	
			kg/m/h	lb/ft/h
1	181	1905	134.5	90.3
3	42	1159	352.8	236.8
4	145	3323	270.9	181.8

Table 5. Annual landings (t, round weight) of bar clams for P.E.I. from 1972 to 1986. Estimated total catch value, prices per kg and lb, and number of licensed fishermen are also shown.

Source: Statistics Unit, DFO Area Office, Charlottetown, P.E.I.

YEAR	TOTAL LANDINGS (t)	TOTAL \$ VALUE (10 ³)	\$/kg	\$/lb	TOTAL No. LICENSES
1972	133.4				3*
1973	104.6				3*
1974	143.1				3*
1975	95.2				3*
1976	131.4				5*
1977	72.9				5*
1978	165.0				6*
1979	230.9	71.3	0.31	0.14	6*
1980	221.8	63.6	0.29	0.13	6*
1981	217.6	95.9	0.44	0.20	6
1982	311.0	144.9	0.46	0.21	8
1983	428.5	188.9	0.44	0.20	26
1984	742.2	327.3	0.44	0.20	26
1985	635.8	280.3	0.44	0.20	26
1986	403.6	117.9	0.44	0.20	26

* estimated number of licenses

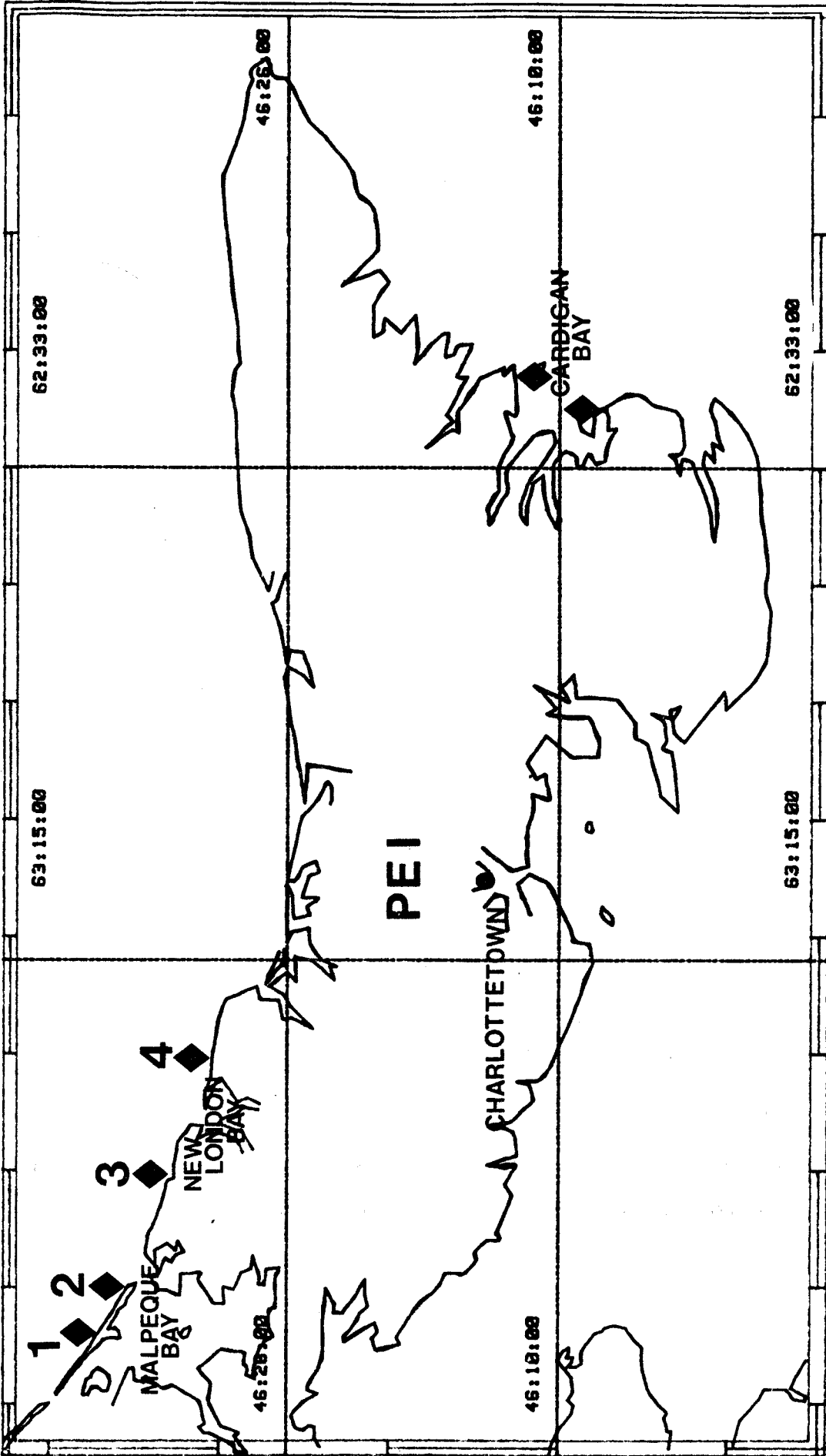


Figure 1. Location of the main fishing areas in P.E.I. as identified from the 1986 logbook data. There are 4 areas (1-4) on the north shore and two for Cardigan Bay.

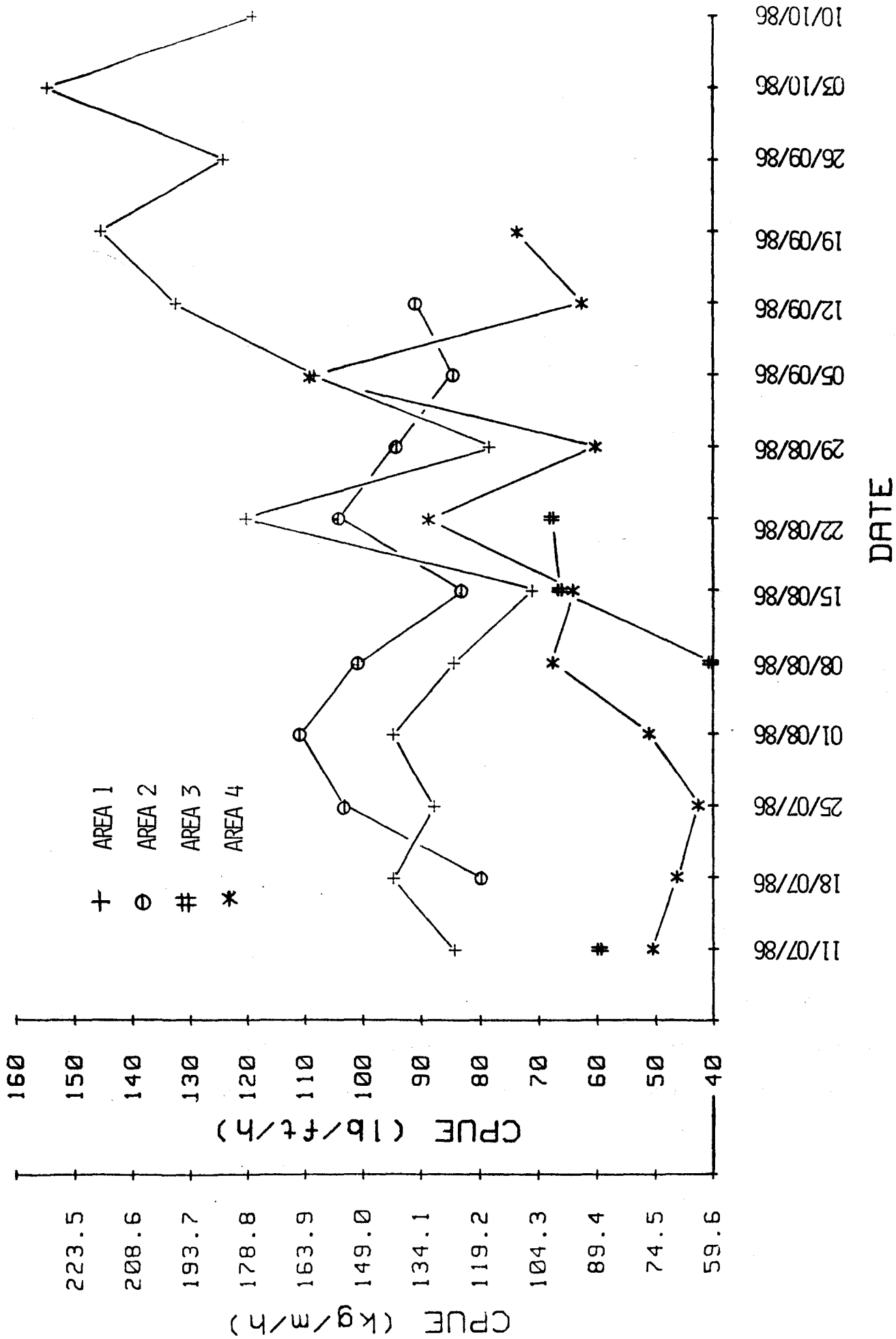


Figure 2. The change in the average CPUE per week over the 1986 fishing season for the 4 main fishing areas of the North Shore of P.E.I. (Areas 1-4)

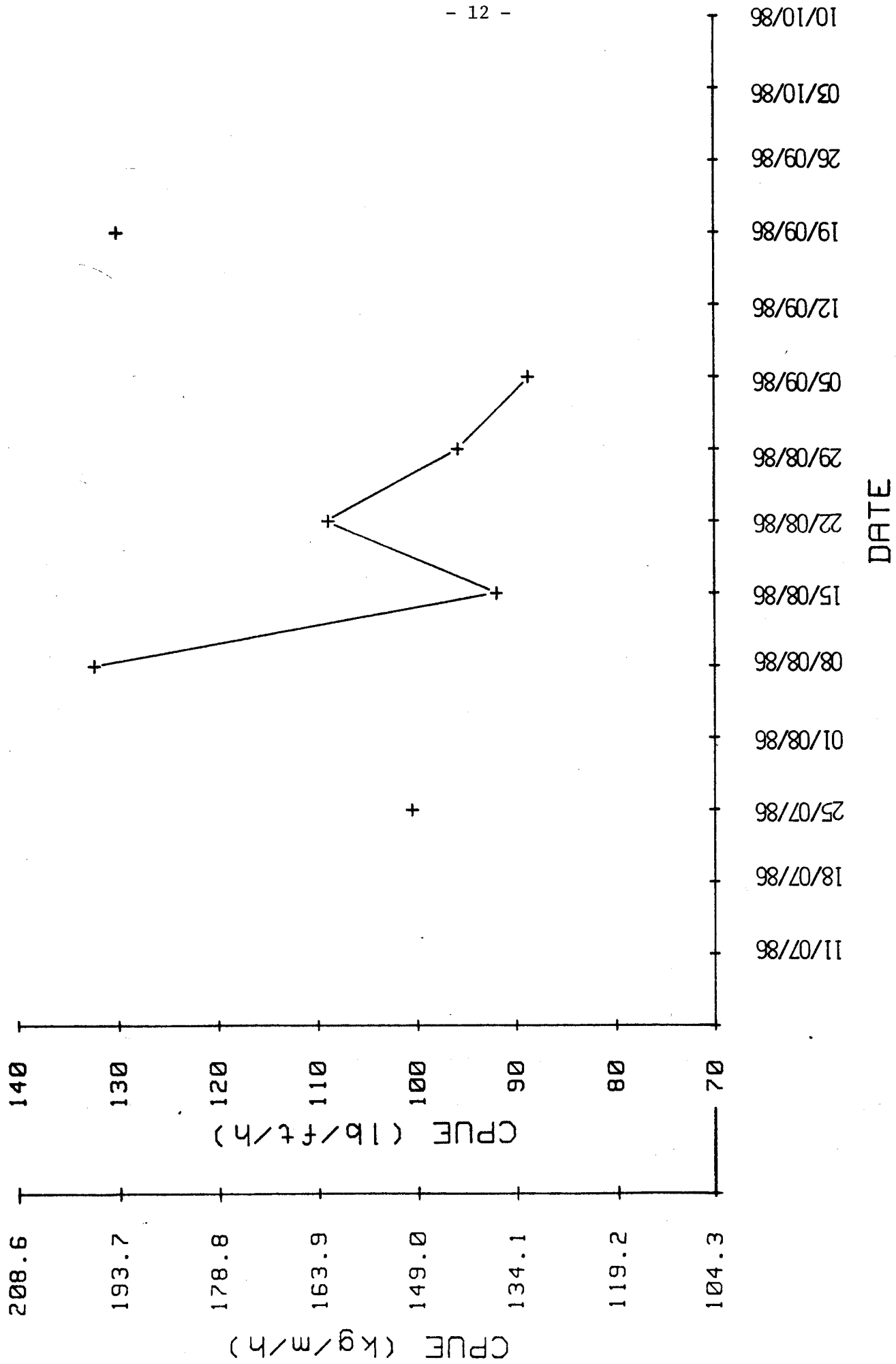



Figure 3. The change in the average CPUE per week over the 1986 fishing season for Cardigan Bay of P.E.I.

Appendix 1. Example of the logbook format used for the Bar Clam Fishery in 1986.

 GOVERNMENT OF CANADA GOVERNEMENT DU CANADA FISHERIES AND OCEANS PÊCHES ET OcéANS		ONE PAGE PER FISHING DAY / UNE PAGE PAR JOUR DE PÊCHE	
Date landed / Date de débarquement Place landed / Lieu de débarquement			
Time of first tow / Heure du premier trait Time of last tow / Heure du dernier trait			
Actual hours spent fishing (circle number) / Nombre d'heures de pêche (encerclez) 2 4 6 8 10 12 14 +			
LORAN C or/ou Geographic name/ nom géographique <input style="width: 100px; height: 20px;" type="text"/>	Number of tows per day / Nombre de traits par jour <input style="width: 100px; height: 20px;" type="text"/>	Time per tow / Durée d'un trait <input style="width: 100px; height: 20px;" type="text"/>	Mean depth /Profondeur moyenne <input style="width: 100px; height: 20px;" type="text"/>
Catch description / Description de la capture			
Young clams (less than 3" or 7.5 cm) Palourdes jeunes (moins de 3" ou 7.5 cm)	Few / Peu	Many / Beaucoup	<input type="checkbox"/> <input type="checkbox"/>
Broken clams / Palourdes blessées			<input type="checkbox"/> <input type="checkbox"/>
Bottom Type / Nature du fond			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Soft/Mou Sand/Sable Rocky/Rocheux Grassy/Herbeux Other/Autres			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Comments (sick clams, quality of meat, engine problems, weather). / Commentaires (palourdes malades, qualité de la viande, météo).		Estimated Catch (lbs) / Prise Estimée (lbs) <input style="width: 100px; height: 40px;" type="text"/>	

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