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The 1988 Inshore Capelin Fishery in Div. 3K

by

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### Abstract

Provisional landings for the inshore capelin fishery in NAFO SA2 + Div. 3K were 26,383 t in 1988. The 1985 year-class comprised 59.5% of the catch followed by the 1984 year-class at 20.5% and the 1983 year-class at 16.9%. The purse seine catch rate of 18.5 t per fishing day was the highest rate since 1981 and the trap catch rate of 5.9 t per fishing day was the second highest rate since 1983. Reported discarding was significantly lower than in 1987.

### Résumé

Les débarquements provisoires des bateaux de pêche côtière du capelan dans la zone SA2 et dans la division 3K de l'OPANO se sont établis à 26 383 tonnes en 1988. Les classes d'âge de 1985, 1984 et 1983 représentaient respectivement 59,5 %, 20,5 % et 16,9 % des prises. Le taux de prise à la senne coulissante était de 18,5 tonnes par jour et le taux de prise au parc en filets de 5,9 tonnes par jour. Le premier était le plus élevé de tous ceux obtenus depuis 1981 et le deuxième n'a été dépassé qu'une fois depuis 1983. On a rejeté un nombre de poissons considérablement inférieur à celui de 1987.

## Introduction

In 1988, provisional inshore capelin landings in NAFO SA2 + Div. 3K were 26,383 t which was the highest ever recorded (Table 1). Background data on the inshore fishery is presented in Carscadden et al. (1984, 1987, 1988) and Nakashima and Harnum (1985, 1986). We present herein a summary of the 1988 inshore commercial fishery, the age composition of the commercial catch, and an analysis of research logbook records collected from fishermen.

## Materials and Methods

Commercial samples were collected by fishermen and at fish plants by reliable collectors at the rate of two samples per gear type per week per statistical section in Div. 3K (Fig. 1). From each sample, length, sex, maturity stage were measured on 200 fish and a stratified sample of 2 otoliths per sex per 1/2 cm length was taken for ageing.

In 1988, research logbooks were distributed to 21 purse seine and 22 trap fishermen who live in Div. 3K. Of these, 15 purse seine and 19 trap logbooks were returned in 1988. Eight purse seiners fished exclusively in Div. 3K, six participated in both Div. 3K and Div. 3L, and one purse seiner fished only in Div. 3L. Two purse seine fishermen residing in Div. 3L fished in both Div. 3L and Div. 3K. Consequently we were able to use logbook records from 16 purse seiners in our analysis. Two trap fishermen involved in the survey each fished two capelin traps in 1988. Two fishermen who received logbooks did not fish in 1988 and seven have not returned their logbooks to date.

Fishing effort was estimated from logbook records for both purse seines and capelin traps. Fishing days for purse seines were defined as those days when the vessel was not searching for capelin schools. Similarly fishing days for traps were defined as those days when the trap was fishing.

In 1988, 16 trap fishermen fished one trap, one fisherman fished two traps and kept separate records for each trap, and one fisherman fished two traps and combined the effort for the two traps. To utilize his data we applied an effort adjustment factor derived from the Div. 3L fishery where many fishermen fish two traps. To estimate fishing days we doubled the reported fishing days and multiplied by 0.92 and the number of hauls were calculated by doubling the reported hauls and multiplying by 0.87 (Nakashima and Harnum 1987).

## Results and Discussion

### The Fishery

The inshore capelin fishery has been regulated by quota management since 1982. The announced quotas by area and gear type for 1988 are given in Appendix I. White Bay and Notre Dame Bay are the principal bays in Div. 3K where the fishery operates (Fig. 1).

The fishery opened on June 1 in all areas of the Newfoundland Region, however the commercial fishery in Div. 3K first landed capelin on June 15. In Notre Dame Bay the purse seine fishery was closed on June 30 and the fixed gear fishery on July 1. Both the purse seine and fixed gear fisheries were closed on July 2 in White Bay. The fixed gear fishery in White Bay was reopened on July 6 and allowed to fish the reserve quota of 1500 t until July 7.

### Age Composition of the Catch

In 1988, 63 samples were collected and analyzed from commercial landings. These constituted 21 samples from purse seines, 29 from capelin traps, and 13 from beach seines (Table 2).

The 1988 catch was dominated by the 1985 year-class as three-year-olds (Table 3). The 1984 year-class as four-year-olds represented 20.5% of the total catch and the 1983 year-class as five-year-olds was 16.9%. The strong 1983 year-class was more predominant as females than as males in the 1988 catch. Based on age compositions of the inshore catch the 1983 year-class is the strongest ever observed in the 1980's.

### Research Logbook Survey

In 1988, the reasons for discarding by purse seiners were varied, whereas discarding by trap fishermen was predominantly due to boat quotas. Purse seiners reported 39% of discarding was due to redfeed content, 20% due to low percentage of females in the catch, and 20% due to miscellaneous reasons of which the dominant one was release of fish because of gear damage (Table 4). For capelin traps 50% of discarding was attributed to market-related problems of which a boat quota was the prevalent reason, 19% was due to unacceptable redfeed levels, 14% had low percentages of females, and 14% were males which were sorted from the females (Table 5). For both gear types, the amount of discarding due to redfeed content was lower than reported in 1987.

In general reported discards for purse seines and capelin traps declined substantially from 1987 levels. Expressing reported discards as a proportion of logbook landings, discards were 18% of purse seine landings (Table 6) and 54% of trap landings (Table 7) in 1988. The level of discarding was the lowest reported for purse seines except for 1981 and was the lowest for traps in the time series. Included as discards were 156.3 t of purse seine discards and 99.3 t of trap discards given to other fishermen. From the logbook records where a distinction was made between live and dead discards, 81% of trap and 92% of purse seine discards were reportedly released alive. These estimates are for the data in Tables 4 and 5 and do not include the capelin given away to other fishermen.

For the analysis in Tables 4, 5, 6, and 7 we defined discards as all capelin not landed by the fisherman who caught them. This included both live capelin released at sea and dead capelin which had to be dumped.

Catch/effort (CPUE) data were available from 1981 to 1988 for purse seines and from 1983 to 1988 for traps. Estimates of CPUE for purse seines based on days fished were the highest in the series, while those based on number of sets were above average (Table 6). Using C/D which we consider the best indicator of CPUE for the fishery, the index for 1988 was the highest in the series. With the exception of 1987, the CPUE in 1988 for capelin traps based on days fished was the highest in the series (Table 7).

As noted in Carscadden et al. (1988) the 1987 CPUE's for the inshore fishery were probably biased by the delay in starting the fishery due to a labour dispute. Purse seiners averaged 9.1 fishing days and made 16.1 sets per vessel in 1988. The number of fishing days per vessel was more typical of the 8-10 day range estimated for purse seiners between 1981 and 1986 and almost double the 5.2 fishing days observed in 1987 (Table 6). Capelin traps were fished for 12.9 days and hauled 21.2 times in 1988 (Table 7). Similar to purse seiners, fishing effort for capelin traps in 1988 was considerably higher than in 1987 and within the range of estimates prior to 1987.

Considering CPUE as an index of abundance and excluding 1987 data as being unrepresentative due to the labour dispute, the C/D for both the purse seine and capelin trap components of the 1988 commercial fishery indicated that inshore abundance was the highest since 1981.

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Table 1. Inshore capelin landings (t) by gear, 1976-88.

Year	NAFO Div.	Purse seine	Ring net	Beach seine	Trap	Misc.	Total
1976	2J	-	-	1	-	-	1
	3K	-	-	1519	162	4	1685
	2+3K	-	-	1520	162	4	1686
1977	2J	-	-	-	-	-	-
	3K	-	-	1891	24	-	1915
	2+3K	-	-	1891	24	-	1915
1978	2J	-	-	-	-	-	-
	3K	-	25	1948	447	-	2420
	2+3K	-	25	1948	447	-	2420
1979	2J	-	-	-	-	-	-
	3K	-	168	461	42	-	671
	2+3K	-	168	461	42	-	671
1980	2J	-	-	-	-	-	-
	3K	-	560	655	139	-	1354
	2+3K	-	560	655	139	-	1354
1981	2J	-	-	-	-	-	-
	3K	-	1000	520	283	-	1803
	2+3K	-	1000	520	283	-	1803
1982	2J	-	4	4	-	-	8
	3K	-	1935	1544	381	-	3760
	2+3K	-	1939	1548	381	-	3768
1983	2J	-	-	4	-	-	4
	3K	2359	-	1062	344	-	3765
	2+3K	2359	-	1066	344	-	3769
1984	2J	-	-	1	-	-	1
	3K	3661	-	2338	1119	-	7118
	2+3K	3661	-	2339	1119	-	7119
1985	2J	-	-	1	-	-	1
	3K	3948	-	835	2584	-	7367
	2+3K	3948	-	836	2584	-	7368
1986	2J	-	-	3	-	-	3
	3K	4222	-	2534	5143	-	11889
	2+3K	4222	-	2537	5143	-	11892
1987*	2J	-	-	4	-	-	4
	3K	3038	-	2141	5625	-	10804
	2+3K	3038	-	2145	5625	-	10808
1988*	2J	-	-	3	-	-	3
	3K	9661	-	3381	13338	-	26380
	2+3K	9661	-	3384	13338	-	26383

\* provisional

Table 2. Summary of the commercial samples collected and aged from the 1987 inshore capelin fishery in Div. 3K.

Gear type	No. of LSM/strat samples	No. otoliths aged (N)	Mean no. otoliths $\pm$ SD per sample
Purse seine	21	805	38.3 $\pm$ 5.5
Beach seine	13	545	41.9 $\pm$ 4.5
Capelin trap	29	1107	38.2 $\pm$ 4.3
TOTAL	63	2457	

Table 3. Age-compositions (%) of capelin from the inshore commercial capelin fishery, Div. 3K, 1982-87.

	Age				
	2	3	4	5	6
<b>Males</b>					
1982	1.1	90.2	8.5	0.2	0.1
1983	0.2	65.0	34.8	0	0
1984	0	30.6	68.0	1.1	0
1985	0.6	61.7	34.7	3.0	0
1986	0	59.1	40.4	0.5	0
1987	0	8.7	89.9	1.4	0
1988	0.6	66.1	29.6	3.7	0
<b>Females</b>					
1982	0.8	79.4	10.7	7.4	1.7
1983	0	44.0	52.6	3.4	0
1984	1.5	38.0	54.1	6.2	0.3
1985	0.8	55.5	27.1	16.0	0.5
1986	0	62.6	32.1	3.9	1.3
1987	0.2	12.5	76.3	10.4	0.6
1988	3.4	54.4	13.5	27.0	1.7
<b>Sexes combined</b>					
1982	0.9	84.1	9.7	4.3	1.0
1983	0.1	62.4	37.1	0.4	0
1984	0.6	33.4	62.6	3.1	0.1
1985	1.5	57.2	29.5	11.5	0.4
1986	0	61.0	35.8	2.4	0.7
1987	0.1	10.8	82.5	6.3	0.3
1988	2.2	59.5	20.5	16.9	1.0



Table 4. Reasons (expressed as % by weight) reported in logbooks for discarding capelin in purse seines in Div. 3K, 1981-88. This analysis excludes capelin given away to other fishermen.

Year	Low % females	Redfeed	Not mature enough	Small females	Females spawned out	No market	Over ripe	Misc.	Unknown
1981	90	6	4	0	0	0	0	0	0
1982	32	52	0	10	6	0	0	0	0
1983	5	48	0	4	0	42	0	0	1
1984	81	4	0	2	8	3	2	0	0
1985	6	52	0	0	5	2	0	33	3
1986	31	36	0	0	4	3	0	26	0
1987	6	78	0	0	0	0	0	10	6
1988	20	39	0	7	0	9	0	20	5

Table 5. Reasons (expressed as % by weight) reported in logbooks for discarding capelin from capelin traps in Div. 3K in 1983-87. This analysis excludes capelin given away to other fishermen.

Year	Redfeed	Females over ripe	No market	Low % females	Males picked out	Females spawned out	Misc.	Unknown
1983	81	0	0	4	1	15	0	0
1984	1	0	17	51	19	4	8	0
1985	19	0	27	28	19	+	2	4
1986	10	16	27	30	7	3	6	0
1987	27	0	37	11	5	0	14	6
1988	19	0	50	14	14	0	2	1

Table 6. Capelin landings (t), discards (t), and catch/effort for purse seines in Div. 3K, 1981-87.

Year	No. fishermen	Landings		Discards logbook	No. days fished (D)	No. sets made (S)	L = Landings		C = Landings + discards	
		Statistics	Logbook				L/D	L/S	C/D	C/S
1981	10	533.9	725.0	92.9	89	118	8.2	6.1	9.2	6.9
1982	8	713.1	849.9	188.0	67	109	12.7	7.8	15.5	9.5
1983	14	808.2	1097.0	253.2	113	161	9.7	6.8	12.0	8.4
1984	10	854.1	928.0	297.1	87	127	10.7	7.3	14.1	9.7
1985	9	766.1	1067.2	551.5	98	129	10.9	8.3	16.5	12.6
1986	8		1053.9	310.0	76	110	13.9	9.6	18.0	12.4
1987	6		253.2	219.7	31	61	8.2	4.2	15.3	7.8
1988	16		2300.3	407.8	146	257	15.8	9.0	18.5	10.5

Table 7. Capelin landings (t), discards (t), and catch/effort for capelin traps in Div. 3K, 1983-88.

Year	No. fishermen	No. traps	Landings		Discards logbook	Bycatch		No. days fished (D)	No. times hauled (H)	L = Landings		C = Landings + discards	
			Statistics	Logbook		Cod	Herring			L/D	L/H	C/D	C/H
1983	3	3	87.3	85.8	51.3	6.0	24.9	41	48	2.1	1.8	3.3	2.9
1984	6	6	156.0	217.0	111.3	2.6	0.1	80	101	2.7	2.1	4.1	3.3
1985	9	9	172.6	212.0	209.9	2.8	0	132	123	1.6	1.7	3.2	3.4
1986	14	14		757.6	575.9	3.4	+	229	278	3.3	2.7	5.8	4.8
1987	13	15		355.8	378.4	0.1	0	70	125	5.1	2.8	10.5	5.9
1988	18	20		992.0	532.5	1.5	0	258	423	3.8	2.3	5.9	3.6

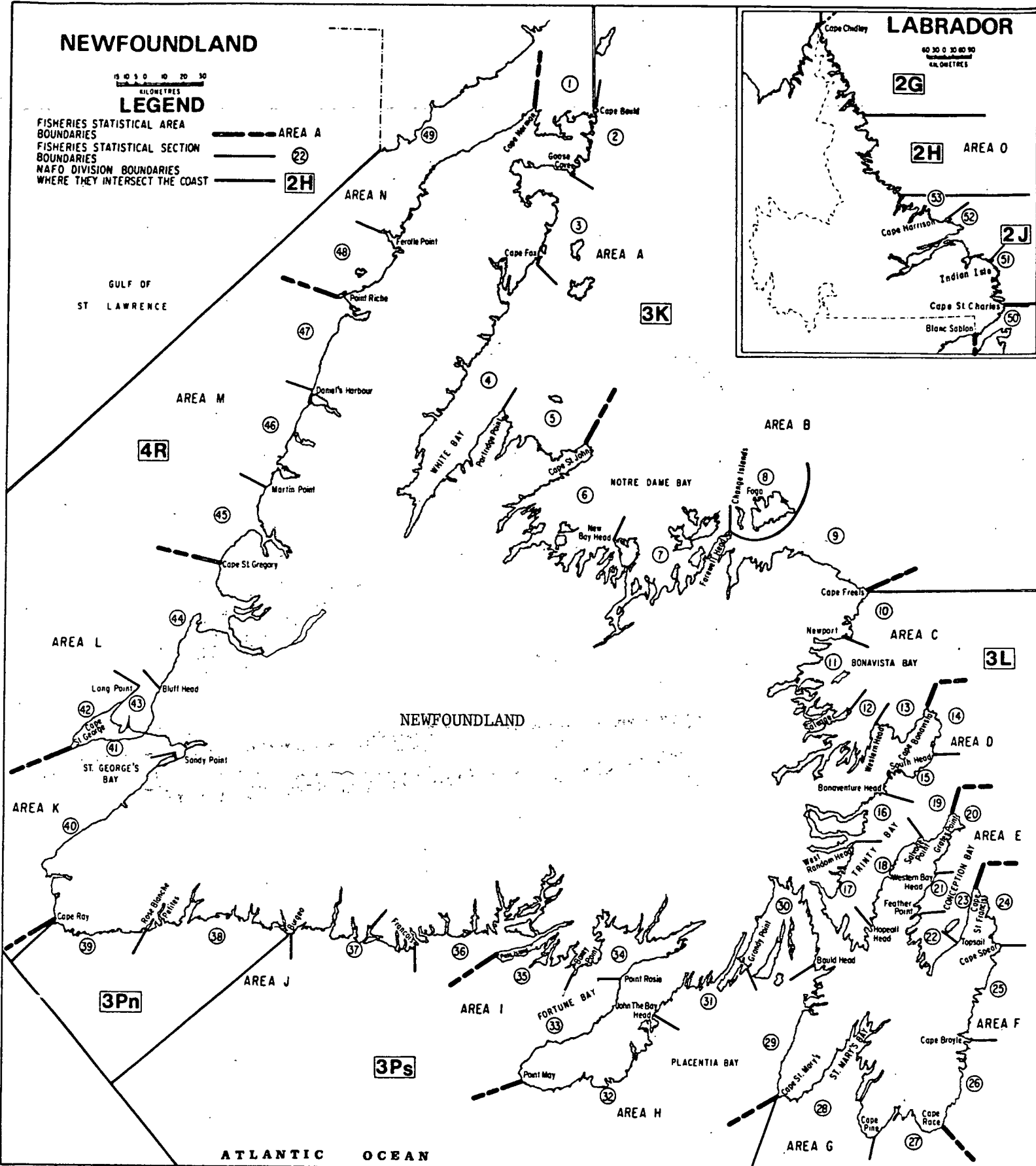


Fig. 1. Statistical area (alphabetic) and sections (numeric) in the Newfoundland Region.

APPENDIX I

Allocation of quotas (t) and opening dates for the inshore commercial fishery in SA2 + Div. 3K.

Year	Area	Fixed gear	Purse seine	Reserve	Total	Product use	Opening date
1982	2J3K	1000	1000	1000	3000	Frozen females	June 1
1983	Notre Dame Bay	1500	1500		3000	Frozen females	June 15
	White Bay	1500	1500		3000	Frozen females	June 15
	2J3K	1000	1000		2000	Roe extraction	June 15
1984	Notre Dame Bay	2500	2500		5000	Frozen females	June 15
	White Bay & Labrador	1500	1500		3000	Frozen females	June 15
1985	Notre Dame Bay	2500	2500		5000	Frozen females	June 28
	White Bay & Labrador	1500	1500		3000	Frozen females	June 28
1986	Notre Dame Bay	5500	5500		11000	Frozen females	June 1
	White Bay & Labrador	4000	4000		8000	Frozen females	June 1
1987	Notre Dame Bay	3300	1700		5000	Frozen females	June 1*
	White Bay & Labrador	2600	1000		3600	Frozen females	June 1*
1988	Notre Dame Bay	8200	3250		11450	Frozen females	June 1
	White Bay & Labrador	5300	3250	1500	10050	Frozen females	June 1

\* fishery began June 19 after agreement on price structure and quotas