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The inshore capelin fishery in NAFO Div. 3K in 1992 and a comparison of mean lengths in NAFO Div. 3K and 3L

by

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Abstract

Provisional landings of 16,351 t in 1992 in SA2 and Div. 3K were lower than landings reported from 1988 to 1991 and slightly less than the quota of 17,915 t. The 1992 commercial catch was dominated by the 1989 year-class as three-year-olds (77%). Reported discards were estimated as 22% of trap landings and 17% of purse seine landings. Small females in the catch accounted for 57% of the reported discarding by purse seines. For traps the reasons given were more variable with low percentage of females (30%), catches mixed with herring or small cod (24%) and closed quota (22%) being equally important. Small females (13%) were also important as discards for trap fishermen, constituting the highest portion in the series. Mean lengths- and weights-at-age have declined in recent years. Catch rates (t/day) estimated for traps and purse seines were third and second highest in their respective series and both were substantially higher than in 1991. In 1992 capelin arrived later than observed in the 1980's but not as late as in 1991. Manv fixed gear and purse seine fishermen did not fish or fished on a limited basis in 1992 because of the late arrival of capelin and small females in the population.

Résumé

Les chiffres préliminaires sur les débarquements en provenance de la sous-zone 2 et de la division 3K en 1992, soit 16 351 t, sont, d'une part, inférieurs à ceux de la période 1988-1991, d'autre part, légèrement inférieurs au quota (17 915 t). Ce sont les poissons de trois ans, soit ceux de la classe d'âge de 1989, qui ont dominé les prises commerciales, dans une proportion de 77 p. 100. Les rejets déclarés se chiffraient à 22 p. 100 dans la pêche au parc en filet et à 17 p. 100 dans la pêche à la senne coulissante. Le faible pourcentage de femelles a été la cause principale de 57 p. 100 des rejets déclarés par les pêcheurs à la senne coulissante. En ce qui concerne les pêcheurs aux parc en filet, ils ont donné diverses raisons pour expliquer leurs rejets, le faible nombre de femelles (30 p. 100), la présence de hareng ou de petites morues dans les prises (24 p. 100) et l'épuisement du quota (22 p. 100) étant les plus fréquemment invoquées. La proportion de petites femelles (13 p. 100) a aussi été une cause importante de rejets chez les pêcheurs au parc en filet. Il s'agit de la plus élevée de la série. Les longueurs et poids moyens selon l'âge sont en recul depuis quelques années. Les taux de prises estimés (t/jour) dans les deux types de pêche venaient aux troisième et deuxième rang des plus élevées de leur série respective. Dans les deux cas, ils étaient considérablement plus élevés qu'en 1991. En 1992, le capelan est arrivé plus tard que dans les années 80, mais toutefois pas aussi tardivement qu'en 1991. De nombreux pêcheurs aux engins fixes et à la senne coulissante n'ont pas pêché du tout ou ont peu pêché en raison de cette arrivée tardive du capelan et de la présence de petites femelles dans la population.

Introduction

Provisional landings in 1992 of 16,351 t were slightly less than the 17,915 t quota in NAFO SA2 and Div. 3K and were lower than landings in the previous four years (Table 1). The proportion of landings from the purse seine component of the fishery was much higher in 1992 than in 1991. We provide herein a summary of the 1992 commercial capelin fishery, the age composition of the catch, trends in mean lengths and weights of capelin in Div. 3K and Div. 3L, and an analysis of the data compiled in research logbooks maintained by 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, and 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 1992 research logbooks were mailed to 21 purse seine and 47 fixed gear licensed fishermen residing in Div. 3K. Of these fishermen, 10 purse seine and 28 fixed gear logbook records were returned to us in 1992, an increase in purse seine and trap loqbooks from 1991 (Nakashima and Harnum 1992). Three purse seiners from Div. 3L also fished in Div. 3K in 1992. Of the 47 fixed gear fishermen, 28 returned logbooks and ten did not fish in 1992. Only the records from the 21 fishermen who fished capelin traps were included in this report. Of the remaining seven fixed gear logbooks returned in 1992, four were for beach seines and three reports contained insufficient data. The number of fishermen who did not fish capelin in 1992 was high, most likely due to the late arrival of capelin, small females in some areas, and the northern cod moratorium. A telephone survey of fixed gear fishermen who had not sent in their logbooks indicated that many fishermen set their traps, got no or one poor catch (low numbers, poor quality, etc.) initially, and gave up fishing.

Fishing effort was estimated from research logbook records for both purse seines and capelin traps. Fishing days for purse seines are defined as those days when the vessel was out searching for capelin schools. Similarly fishing days for traps were defined as those days when the trap was fishing. In 1992, 19 trap fishermen fished one trap each and two fishermen fished two traps per trap crew and maintained separate records for each trap fished.

Mean lengths and weights for Div. 3K and 3L were estimated from the commercial samples for each gear type and combined by weighting by landings.

Results and Discussion

The Inshore Fishery

The inshore fishery in Div. 3K was prosecuted by purse seines, capelin traps, and beach seines and has been regulated by quota management since 1982. Quotas by area and gear type are presented in Appendix A. Similar to 1991 the 1992 quota of 17,915 t was subdivided between mobile and fixed gears and among Opening and closing dates varied considerably in 1992. areas. Purse seine and fixed gear fisheries in Notre Dame Bay and the fixed gear fishery in Labrador opened on June 5. Capelin in White Bay and north White Bay was monitored prior to opening the The fixed gear fishery between Cape St. John fishery on June 23. and North Head in Notre Dame Bay was closed on June 23 to allow a monitoring programme. Similarly the area between North Head and Dog Bay Point in Notre Dame Bay was closed for fixed gears on June 25 for monitoring. On July 8, Labrador and the remainder of Notre Dame Bay for fixed gear and purse seining in Notre Dame Bay were closed. On July 14 the purse seine and fixed gear fisheries were closed in White Bay. Purse seining in Notre Dame Bay was reopened on July 19 and closed two days later on July 21. The fixed gear fishery from Cape St. John to North Head in Notre Dame Bay reopened on July 20 and closed on July 23 and North Head to Dog Bay Point area reopened on July 22 and closed on July 27. The fixed gear fishery north of White Bay in the area north of Fischot Island closed on July 30. All remaining areas were closed to fishing on August 5. All purse seine and fixed gear fishermen who completed logbooks fished in July in Div. 3K.

Age Composition of the Commercial Catch

In 1992, 50 biological samples were collected and processed from commercial catches throughout Div. 3K. The samples were from 14 purse seine, 11 beach seine, and 25 trap catches (Table 2). The average numbers of otolith pairs per sample were approximately four less than in 1991 for purse seines and beach seines and the same number for traps between the two years (Nakashima and Harnum 1992).

In 1992, the catch in numbers was strongly dominated by the 1989 year-class as three-year-olds (76.9%) (Table 3). The 1988 year-class as four-year-olds (13.3%) was very weakly represented in the catch. The 1990 year-class as two-year-olds (8.6%) was surprisingly high and especially so for females (12.0%). We had some difficulty in differentiating seasonal growth patterns on otoliths possibly due to the influence of colder spring temperatures on delayed maturation and spawning which was observed in 1991 (Carscadden et al. 1992). The age compositions reported in Nakashima and Harnum (1992) have been revised in Table 3 using more recent landing statistics for 1991.

Mean Lengths and Weights in Div. 3K and Div. 3L

The mean lengths-at-age in Div. 3L during 1981 were small (Fig. 2). For age 2, the 1982-90 mean lengths did not vary much or exhibit any trends but declined during 1991 and 1992. For ages 3 and 4, mean lengths showed only small variations between 1982 and 1988 but have shown a gradual decline since then. For all ages combined, the decline seems more severe during 1991 and 1992 and this is largely because of the increased importance of the two-year-olds in the overall sample.

In Div. 3K (Fig. 3) there seems to be no trend in mean length at age 2. For ages 3, 4, and all ages combined, there has been a general decline in mean length with 1991 and 1992 mean lengths being the smallest in the series.

For males, age 2 fish usually comprise only a small proportion of the stock, so sample sizes are small. However, for age 3 males, differences between Div. 3L and 3K were small until 1992, when Div. 3L males at age were much smaller. At age 4, Div. 3L and 3K males were approximately the same length, even in 1992.

Age 2 females contribute more to the spawning stock than age 2 males. In most years, Div. 3L two-year-old females were smaller than Div. 3K females. This was true in 1991 and 1992 when age 2 fish made a significant contribution to the spawning stock and therefore contributed to the decline in overall mean size (all ages combined) of females in the population. Females in Div. 3L at age 3 was only slightly smaller than females at the same age in Div. 3K until 1992 when the difference became larger. At ages 4 and 5, females in Div. 3L and 3K were approximately the same length.

The sample mean weights from the inshore fishery and mean weights used in the projections performed by NAFO are given in Table 4.

Similar data are shown for Div. 3K in Table 5. In this table, sample mean weights-at-age are given only for 1984-92. In some years prior to 1984, sample sizes were small although the mean weights for all available data were used in the projections.

Research Logbook Survey

The reasons reported by fishermen for discarding capelin in 1992 were variable but small females and low percentage of females were two reasons often given (Table 6). For traps in White Bay, capelin mixed with herring or cod (39%), low percentage of females (24%), and small females (24%) were important reasons given for discarding capelin (Table 6). Discarding from traps in Notre Dame Bay was attributed to fishery closures (46%) and low percentage of females (38%) in the catch (Table 6). Almost all the discarding in White Bay by purse seiners was due to small females (99%) compared to Notre Dame Bay where catches were let go because of spent females (52%) and low percentage of females (48%) (Table 6). For Div. 3K in general purse seiners reported small females (57%), spent females (22%), and low percentage of females (21%) as the main reasons for discarding (Table 7). Small females and spent females in 1992 represent the highest levels ever reported by purse seiners. Also noteworthy, was the absence of redfeed problems in the 1992 purse seine fishery. Trap fishermen in Div. 3K experienced problems with low percentages of females (30%), mixed catches of capelin and herring or small cod (24%), inability to sell catches because the quota was taken (22%), and small females (13%) Similar to purse seines, the presence of small (Table 8). females in trap catches was much higher than in previous years and redfeed was unimportant in 1992 (Table 8).

Discarding as a percentage of landings was the lowest ratio since 1981 for purse seines (Table 9) and the lowest in the series for traps (Table 10). Purse seine discards constituted 13% of landings in 1992 compared to 100% in 1991 (Table 9). Discarding from traps continued to decline from 56% of landings in 1990 to 22% in 1992 (Table 10). The reported discards for purse seines include 55.4 t and for traps 23.6 t which were given away to other fishermen. According to research logbook reports fishermen reported that 71% of trap and 51% of purse seine discards were released alive at sea. In the analyses presented in Tables 6-11 discards are defined as all capelin caught but not landed by the fisherman who caught them and includes both live and dead fish.

Catch/effort (CPUE) data were available since 1981 for purse seine vessels and since 1983 for capelin traps. The CPUE estimate in 1992 for purse seines was higher than the average CPUE from 1981 to 1990 of 15.8 t/day and higher than the 1991 estimate when only one purse seine logbook was available for analysis (Table 9). The 1992 purse seine CPUE of 18.7 t/day was the second highest in the series. For traps, the 1992 CPUE of 6.3 t/day was higher than the 1991 estimate of 4.6 t/day and was similar to the average CPUE from 1983 to 1991 of 6.0 t/day (Table 10). The average fishing effort by 13 purse seiners in Div. 3K was 3.6 searching days and 6.6 sets per vessel in 1992 (Table 9) resulting in a noticeable reduction in searching days compared to previous years. For capelin traps in Div. 3K in 1992 23 traps averaged 9.0 fishing days and were hauled 13.4 times (Table 10). Similar to 1991 (Nakashima and Harnum 1992) the effort in White Bay was twice the effort in Notre Dame Bay. In White Bay, 17 traps were fished 10.9 days and had 15.3 hauls each compared to 3.7 days and 7.8 hauls for 6 traps in Notre Dame Bay (Table 11). The majority of the fishery took place in White Bay and the western part of Notre Dame Bay similar to 1991 (Nakashima and Harnum 1992).

If we accept CPUE's as an index of inshore abundance of mature capelin and assume that total catch (i.e. landings + discards) as reported in these research logbooks is more realistic than landings alone, then both purse seine and trap CPUE's indicate that inshore biomass and abundance was higher in 1992 than in 1991 (Fig. 4,5).

The number of fishermen who fished for capelin in 1992 was again low. Fishermen did not fish because of the late arrival of capelin in several areas especially in Notre Dame Bay, the small size of females and the low percentage of females.

Relative Year-class Strength

Relative year-class strength was estimated for catches by purse seines and traps by estimating total effort (days fished) from landings (Table 1) and catch rates (Tables 9, 10). The total effort (Table 12) and catch-at-age numbers (Table 13) were used to derive catch rates-at-age given in Table 14. To visualize trends in year-class strengths in the 1980's the catch rates-at-age were summed for ages 3 and 4 for year-classes 1979 to 1988 (Table 15) and compared (Fig. 6,7). The standardized values in Figure 7 suggest that the same strong (eg. 1983, 1986) and weak (eg. 1981, 1984) year-classes were prosecuted by both Interestingly enough the 1988 year-class appears inshore gears. weak in the purse seine series and average in the trap series despite its strong appearance as two-year-olds in acoustic surveys in 1990 (Anon. 1991).

Acknowledgements

We especially are grateful to the fishermen who have diligently reported their fishing activities in our research logbooks. The inshore commercial sampling programme was organized by P. J. Williams. Samples were processed by the technical staff of the Pelagic Fish Section. Otoliths were aged by P. G. Eustace. M. Y. Hynes assisted in the preparation of the manuscript.

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Year Div. seine net seine Trap Total 1980 2J -		NAFO	Purse	Ring	Reach		
1980 2J - <th>Year</th> <th>Div</th> <th>seine</th> <th>net</th> <th>seine</th> <th>Tran</th> <th>Total</th>	Year	Div	seine	net	seine	Tran	Total
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Table 1. Inshore capelin landings (t) by gear, 1980-92.

* provisional

Gear type	No. of LSM/strat samples	No. otoliths aged (N)	Mean no. otoliths ± SD per sample
Purse seine	14	474	33.9 ± 3.9
Beach seine	11	353	32.1 ± 6.4
Capelin trap	25	903	36.1 ± 4.1
TOTAL	50	1730	

Table 2. Summary of the commercial samples collected and aged from the 1992 inshore capelin fishery in Div. 3K.

		Age								
	2	3	4	5	6					
lales										
1982	1.2	92.3	6.3	0.1	0.1					
1983	0	47.5	52.5	0	0					
984	0	30.7	68.2	1.1	Õ					
1985	0.6	61.7	34.7	3.0	Õ					
1986	0	59.1	40.4	0.5	Ō					
1987	0	8.7	89.9	1.4	ō					
1988	0.6	65.8	29.9	3.7	õ					
1989	+	72.7	27.0	0.3	+					
1990	0.1	29.2	70.7	+	Ô					
1991	5.8	50.5	42.3	1.4	õ					
1992	4.7	84.0	11.0	0.3	õ					
emales										
1982	0.9	79.5	9.8	7.7	2.1					
1983	0	38.0	58.8	3.2	0					
1984	1.5	38.0	54.1	6.2	0.3					
985	0.8	55.5	27.1	16.0	0.5					
986	0	62.6	32.1	3.9	1.3					
987	0.2	12.5	76.3	10.4	0.6					
988	3.4	54.3	13.6	27.0	1.7					
989	0.8	66.5	27.2	2.4	3.1					
1990	0.3	39.1	58.6	2.0	0					
1991	3.8	45.8	38.7	11.7	+					
992	12.0	70.6	15.4	2.0	+					
exes combined										
1982	1.0	85.0	8.3	4.5	1.3					
983	0	43.3	55.0	1.4	0					
984	0.6	33.4	62.6	3.1	0.1					
985	1.5	57.2	29.5	11.5	0.4					
986	0	61.0	35.8	2.4	0.7					
987	0.1	10.8	82.5	6.3	0.3					
988	1.9	59.5	20.8	16.9	1.0					
989	0.4	69.7	27.1	1.3	1.5					
990	0.2	34.7	63.9	1.2	0					
991	4.7	48.1	40.4	6.7	+					
992	8.6	76.9	13.3	1.2	+					

Table 3. Age-compositions (%) of capelin from the inshore commercial capelin fishery, Div. 3K, 1982-92.

			Age			
Year	2	3	4	5	6	ALL
1981	7.8	22.3	29.8	32.3	36.4	28.1
1982	12.6	32.5	37	37.2	39.9	33
1983	13.9	27.7	33.8	34	37.6	29.1
1984	13.9	27.6	34.7	30.5	33.6	31.3
1985	12	25.4	35.9	32.6	33.1	26.7
1986	18	26.2	34.2	33.7	36.8	29.1
1987	14.2	27.4	36.3	33.5	38.1	33.1
1988	14.3	29.9	39.6	36.4	38.8	30.7
1989	14.5	29.3	36.5	36.6	37.9	30.8
1990	16	25.4	32.7	32.1	37.1	29.2
1991	12.6	21.2	29.2	27.8	35.7	22.6
1992	12.8	18	24.6	22.3		16.6
Projections		28.3	36.0	34.3		

Table 4. Mean weights (gm) of commercial samples in Div. 3L, sexes combined, for 1981-92.

Table 5. Mean weights (gm) for commercial samples in Div. 3K, sexes combined, for 1984-92.

		Age							
Year	2	3	4	5	6	ALL			
1984	14.7	30.5	37	34.5	32.3	35			
1985	15.3	26.3	34.1	31.7	33.6	29.2			
1986	11.3	27.4	34.4	32.9	35.3	30.1			
1987	17	30.7	37.9	34.8	35.8	36.8			
1988	17.2	31.2	42.6	36.4	38.9	34.1			
1989	14.5	31.3	38.2	36.9	38.8	33.2			
1990	16.4	26.1	32.6	31.3		30.2			
1991	18.9	23.1	27.2	26.4	31.7	24.8			
1992	15.2	24.7	26.7	24.9	34.3	24.2			
Projections		29.9	37.3	35.1	36.7				
(Mean wt. 1979, 1982-89)									
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Area Redfe	Low % ed females	Small females	Males picked out	Females spawned out	No market/ quota filled	Misc.	Not given
aps							
ite Bay 5	24	24	2	0	5	39	1
tre Dame Bay 0	38	+	12	0	46	4	0
rse Seine							
ite Bav 0	0	99	0	0	0	1	0
tre Dame Bay 0	48	0	0	52	0	0	0
ite Bay 0 tre Dame Bay 0	0 48	99 0	0 0	0 52	0 0	1 0	

Table 6. Percent contribution by weight of reasons for discarding capelin in 1992. (This excludes capelin given to other fishermen.)

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Table 7. Reasons (expressed as % by weight) reported in logbooks for discarding capelin in purse seines in Div. 3K, 1981-92. 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.	Not given
1981	90	6	4	0	0	0	0	0	0
19 82	32	52	0	10	6	0	0	0	0
19 83	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
1989	38	51	0	4	0	0	0	6	1
1 990	31	45	0	3	2	13	0	3	3
1 991	44	0	0	0	0	0	0	0	56
1992	21	0	0	57	22	0	0	+	0

			Female	s		Males	Females		
Year	Redfeed	Small females	over ripe	No market	Low X females	picked out	spawned out	Misc.	Not given
1983	81	0	0	0	4	1	15	0	0
1984	1	Õ	ŏ	17	51	19	4	8	Ō
1985	19	0	0	27	28	19	+	2	4
1986	10	0	16	27	30	7	3	6	0
1987	27	0	0	37	11	5	0	14	6
1988	19	0	0	50	14	14	0	2	1
1989	3	Ó	Ó	18	66	12	0	1	0
1990	26	Ó	+	29	30	5	0	5	5
1991	28	3	0	9	38	20	1	+	1
1992	3	13	Ō	22	30	7	0	24	1

Table 8. Reasons (expressed as % by weight) reported in logbooks for discarding capelin from capelin traps in Div. 3K in 1983-92. This analysis excludes capelin given away to other fishermen.

Table 9. Capelin landings (t), discards (t), and catch/effort from research logbook records for purse seines in Div. 3K, 1981-92.

	No		Diagondo	No dovo	No. coto	L = La	ndings	C = La dis	andings + cards
Year	No. fishermen	Landings	logbook	No. days fished (D)	NO. Sets made (S)	L/D	L/S	C/D	C/S
1981	10	725.0	92.9	89	118	8.2	6.1	9.2	6.9
1982	8	849.9	188.0	67	109	12.7	7.8	15.5	9.5
1983	14	1097.0	253.2	113	161	9.7	6.8	12.0	8.4
1984	10	928.0	297.1	87	127	10.7	7.3	14.1	9.7
1985	9	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
1989	28	1840.4	510.3	141	238	13.1	7.7	16.7	9.9
1990	20	1784.1	1075.8	131	224	13.6	8.0	21.8	12.8
199 1	1	0	43.1	8	5	0	0	5.4	8.6
1992	13	778.3	102.1	47	86	16.6	9.1	18.7	10.2

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	No	No		Discards	Вус	catch	No. days fished	No. times	L = La	ndings	C = Land disc	dings + ards
Year	fishermen	traps	Landings	logbook	Cod	Herring	(D)	(H)	L/D	L/H	C/D	C/H
1983	3	3	85.8	51.3	6.0	24.9	41	48	2.1	1.8	3.3	2.9
1984	6	6	217.0	111.3	2.6	0.1	80	101	2.7	2.1	4.1	3.3
1985	9	9	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	9 92.0	532.5	1.5	0	258	423	3.8	2.3	5.9	3.6
1989	28	35	1360.7	1038.1	4.9	0	411	732	3.3	1.9	5.8	3.3
1990	34	48	1893.7	1447.9	2.9	0.1	312	575	6.1	3.3	10.7	5.8
1991	23	28	1288.5	722.5	1.4	1.4	439	583	2.9	2.2	4.6	3.4
1992	21	23	1072.1	231.8	1.5	5.7	208	308	5.2	3.5	6.3	4.2

Table 10. Capelin landings (t), discards (t), bycatch (t), and catch/effort from research logbook records for capelin traps in Div. 3K, 1983-92.

Table 11. Capelin landings (t), discards (t), bycatch (t), and catch/effort from research logbook records for capelin traps in Div. 3K in 1992.

	No.	No.		Discards	Ву	catch	No. days fished	No. times hauled	L = La	ndings	C = La dis	ndings + cards
Area	fishermen	traps	Landings	l ogbook*	Cod	Herring	(D)	(H)	L/D	L/H	C/D	C/H
White Bay	15	17	1012.0	124.8	+	5.3	186.1	261	5.4	3.9	6.1	4.4
Notre Dame B	ay 6	6	60.1	107.0	1.5	0.5	22.3	47	2.7	1.3	7.5	3.6

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* includes capelin given to other fishermen

Year	Gear	Landings	Catch rate	Effort
1982	PS	1939	15.5	125
1983	PS	2359	12.0	197
	T	344	3.3	104
1984	PS	3661	14.1	260
	T	1119	4.1	273
1985	PS	3948	16.5	239
	T	2584	3.2	808
1986	PS	4222	18.0	235
	T	5143	5.8	887
1987	PS	3038	15.3	199
	T	5625	10.5	536
1988	PS	9767	18.5	528
	T	13353	5.9	2263
1989	PS	6608	16.7	396
	T	17755	5.8	3061
1990	PS	10304	21.8	473
	T	21114	10.7	1973
1991	PS	665	5.4	123
	T	16336	4.6	3551
1992	PS	5814	18.7	311
	T	9297	6.3	1476

Table 12. Capelin landings (t), catch rates (t/day, and effort (days fished) for purse seines (PS) and capelin traps (T) in NAFO Div. 3K, 1982-92.

				Ages		
	Year	2	3	4	5	6
Purse seine	1982	721	50424	5853	2684	866
	1983	0	23701	41243	1120	0
	1984	869	43719	63597	2532	68
	1985	2317	88525	39908	17304	528
	1986	0	92407	49080	3328	962
	1987	292	25579	196175	14998	808
	1988	3232	165420	58995	49118	2423
	1989	302	152365	48062	2798	3299
	1990	610	119653	218226	3285	0
	1991	1064	13517	10821	2181	23
	1992	13185	197654	28333	1110	101
Trap	1984	211	9784	21590	1177	23
	1985	1320	45400	27798	9263	287
	1986	53	100409	62607	4415	1565
	1987	108	15454	100172	9027	687
	1988	7822	226722	85210	69096	3791
	1989	2667	355777	152256	6677	8028
	1990	1489	231748	457297	7935	0
	1991	31255	315508	252968	44405	259
	1992	41173	287815	52828	6827	0

Table 13. Catch-at-age (numbers x 10⁻³) for mature capelin by purse seines and traps in NAFO Div. 3K, 1982-92.

Table 14. Catch rates-at-age and total catch rate (numbers x 10⁻³/day) for mature capelin from purse seines and traps in NAFO Div. 3K, 1982-92.

		Ages						
	Year	2	3	4	5	6	Total	
Purse seine	1982	5.8	403.4	46.8	21.5	6.9	484.4	
	1983	0	120.3	209.4	5.7	0	335.4	
	1984	3.3	168.2	244.6	9.7	0.3	426.1	
	1985	9.7	370.4	167.0	72.4	2.2	621.7	
	1986	0	393.2	208.9	14.2	4.1	620.4	
	1987	1.5	128.5	985.8	75.4	4.1	1195.3	
	1988	6.1	313.3	111.7	93.0	4.6	528.7	
	1989	0.8	384.8	121.4	7.1	8.3	522.4	
	1990	1.3	253.0	461.4	6.9	0	722.6	
	1991	8.7	109.9	88.0	17.7	0.2	224.5	
	1992	42.4	635.5	91.1	3.6	0.3	772.9	
Traps	1984	0.8	35.8	79.1	4.3	0.1	120.1	
•	1985	1.6	56.2	34.4	11.5	0.4	104.1	
	1986	0.1	113.2	70.6	5.0	1.8	190.7	
	1987	0.2	28.8	186.9	16.8	1.3	234.0	
	1988	3.5	100.2	37.7	30.5	1.7	173.6	
	1989	0.9	116.2	49.7	2.2	2.6	171.6	
	1990	0.8	117.5	231.8	4.0	0	354.1	
,	1991	8.8	88.9	71.2	12.5	0.7	182.1	
	1992	27.9	195.0	35.8	4.6	0	263.3	

Year-class	Purse seine (C/D)	Trap (C/D)	
1979	612.8		
1980	364.9		
1981	335.2	70.2	
1982	579.3	126.8	
1983	1379.0	300.1	
1984	240.2	66.5	
1985	434.7	149.9	
1986	846.2	348.0	
1987	341.0	188.7	
1988	201.0	124.7	

Table 15. Catch rate-at-age (t/day) for ages 3 and 4 mature capelin combined for NAFO Div. 3K year-classes, 1979-88.



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Fig. 1. Statistical areas (C = Bonavista Bay; D = Trinity Bay; E = Conception Bay; F = Southern Shore; G = Trepassey and St. Mary's Bay) and sections (numeric) in NAFO Div. 3L along the coast of Newfoundland.







Fig. 2. Mean lengths-at-age for male and female capelin and sexes combined, Div. 3L, 1981-92.







Fig. 3. Mean lengths-at-age for male and female capelin and sexes combined, Div. 3K, 1984-92.







Fig. 5. Catch rates (nos. x 10^{-3} /day) for purse seines and traps in NAFO Div. 3K.

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Fig. 6. Catch rates at ages 3 and 4 combined for purse seines and traps in NAFO Div. 3K.



Fig. 7. Standardized catch rates at ages 3 and 4 combined for purse seines and traps in NAFO Div. 3K.

APPENDIX A

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

Year	Area	Fixed gear	Purse seine	Reserve 1	ſotal	Product use	Opening date
1982	2J3K	1000	1000	1000	3000	Frozen females	June 1
1983	Notre Dame Bay	1500	1500		3000	Frozen females	June 1
	White Bay	1500	1500		3000	Frozen females	June 1
	2J3K	1000	1000		2000	Roe extraction	June 1
1984	Notre Dame Bay	2500	2500		5000	Frozen females	June 1
	White Bay & Labrador	1500	1500		3000	Frozen females	June 1
985	Notre Dame Bay	2500	2500		5000	Frozen females	June 2
	White Bay & Labrador	1500	1500		3000	Frozen females	June 2
986	Notre Dame Bay	5500	5500		11000	Frozen females	June 1
	White Bay & Labrador	4000	4000		8000	Frozen females	June 1
987	Notre Dame Bay	3300	1700		5000	Frozen females	June 1
	White Bay & Labrador	2600	1000		3600	Frozen females	June 1
988	Notre Dame Bay	8200	3250		11450	Frozen females	June 1
	White Bay & Labrador	5300	3250	1500	10050	Frozen females	June 1
989	Notre Dame Bay	8500	3500		12000	Frozen females	June 7
	White Bay	7000	3300		10300	Frozen females	June 7
	N. White Bay	1500			1500	Frozen females	June 7
	Labrador	300			300	Frozen females	June 7
990	Notre Dame Bay	10500	4000		14500	Frozen females	June 20
	White Bay	8500	4000		12500	Frozen females	June 28
	N. White Bay	2000			2000	Frozen females	July 9
	Labrador	400			400	Frozen females	June 27
991	Notre Dame Bay		4000		4000	Frozen females	June 5
	- Cape John to North Hd.	2950			2950	Frozen females	July 23
	- North Hd. to Dog Bay Pt.	6150			6150	Frozen females	July 23
- I Wh Noj	- Dog Bay Pt. to Cape Freels	1400			1400	Frozen females	June 5
	White Bay		4000		4000	Frozen females	June 5
		8500			8500	Frozen females	July 17
	North White Bay						
	North of Fischot Is.	1500			1500	Frozen females	Aug. 1
	- South of Fischot Is.	500			500	Frozen females	July 31
	Lapr.900F	400			400	Frozen females	June 5
992	Notre Dame Bay		2325		2325	Frozen females	July 19
	- cape John to North Hd.	1715			1715	Frozen females	July 20
- - W	- North Hd. to Dog Bay Pt.	3570			3570	Frozen females	July 22
	- Dog Bay Pt. to Cape Freels	810	0705		810	Frozen females	June 5
	North White Bay	4940	2325		1205	Frozen females	June 23
	- North of Fischot Is.	1500			1500	Frozen females	June 23
	- South of Fischot Is.	500			500	Frozen females	June 23
	Labrador	230			230	Frozen females	June 5

 $\boldsymbol{\ast}$ fishery began June 19 after agreement on price structure and quotas