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The Fishery for Greenland Halibut in Subarea 1

by

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1. The fishery.

The fishery for Greenland halibut in NAFO Subarea 1 is primarily an inshore small-scale fishery carried out by boats below 20 GRT. The summer fishery is typically carried out by dinghies and small cutters with either longlines or gillnets and usually takes place in the inner parts of the deeper fiords at depths of 500-800 meters. In winter, fishery from the ice is carried out by means of dog sledges also using longlines or gillnets. The winter fishing grounds are more dispersed throughout the inshore area than the summer fishing grounds.

In the northern part of Div. 1A (Upernavik) only longlines were used, while in Umanak and Jakobshavn (middle-southern part of Div. 1A) longlines and gillnets each accounted for about 50% of the catches in 1988. In Div. 1B to 1F gillnets predominated the fishery.

The inshore fishery is carried out by Greenlanders only. In the last ten years only the Federal Republic of Germany (1979-80) and Japan (1987-88, joint-venture) have fished offshore with stern-trawlers.

2. Catches.

Table 1 lists annual catches of Greenland halibut by country in NAFO Subarea 1 during the period 1979-88. Catches increased in the period primarily due to the Greenland fishery and to a less degree due to the Japanese fishery in 1987-88. Some over-reporting of catches may have taken place in 1979 (Horsted 1980).

Annual catches in Subarea 1 during 1979-88 by NAFO divisions are given in Table 2. Div. 1A accounts for 68% of the annual catch except in 1979, with increasing dominance during the period. The fishery in Div. 1A is concentrated mainly around the cities Jakobshavn, Umanak and Upernavik (Fig. 1) each accounting for about 3000 tons in 1988. The trend for the fishery in Div. 1A is a northward expanding with the Upernavik area as a new fishing area. The 1568 tons in Div. 1CD in 1988 were taken by Japan.

3. Length and age distribution of catches in the commercial fishery.

Length distribution of the 1988 catch in the commercial inshore fishery

as well as the offshore fishery in Subarea 1 are presented in Fig.2 and 3, respectively.

The inshore catch distribution (Fig.2) is constructed on the basis of comprehensive samples from the commercial fishery in 1988. Length measurements have been carried out in Div. 1A, 1D and 1F. The offshore catch distribution (Fig.3) exclusively derives from samples from the Japanese joint-venture fishery in Div.1C and 1D.

In the total inshore catch distribution lengths range from 45 to 100 cm with most of the catch within the 55-80 cm range (Fig.2). In assessing the figure it must be noticed that the minimum weight for landing of Greenland halibut in Greenland is 1.5 kg corresponding to about 55 cm in length. Fig.3 shows length distribution of the Japanese offshore fishery. Most catches lie within the length range 40-70 cm having a peak at 50 cm.

An age-length key for the inshore area was obtained using otolith samples from Div.1A,1D and 1F from 1986 to 1988. All samples were pooled to obtain a quantitative comprehensive age-length key as no remarkable differences in length at age were observed between the samples. A total of 2300 otoliths are included in the age-length key. On the basis of this age-length key age distributions of the inshore commercial catches were constructed for each of the three important areas in Div.1A, for each of the divisions 1A, 1D and 1F as well as for the total inshore part of Subarea 1 (Fig.4).

498 otoliths sampled from the Japanese offshore fishery in Div.1CD were used to obtain an age-length key. An age distribution of the Japanese catches is presented in Fig.5.

From Fig.4 it appears that in the northern areas, fish are older than in the southern areas when fully recruited to the fishery. This may be due to gear selection, as longlines which predominate in the northern areas select older fish than do gillnets. Thus catches in Div.1A in 1988 were comprised mainly of the 1974-79 year-classes with a mode at the 1977 year-class, while catches in Div.1DF were comprised mainly of 1977-79 year-classes. Japanese offshore catches in 1988 in Div.1CD were dominated by the 1977-81 year-classes among those the 1979 year-class is the most abundant (Fig.5).

4. Mean weight at age.

Mean-weight-at-age data are presented for different areas in Table 3. A mean-weight-at-age relationship applying to Subarea 1 was calculated by weighting the different weight-at-age data set with the catches in the respective areas.

5. Catch by age group.

As a first attempt to obtain data for a future assessment on Greenland halibut in Subarea 0+1 information on catch at age is presented.

Catch at age in numbers (Table 4) for Subarea 1 was estimated using the weighted total mean-weight-at-age relationship and age distributions raised proportionally to the 1988 catches. In the estimation it is assumed for the inshore area that age frequency data for Div.1A are

representative for Div.1A and 1B, that data for Div.1D are representative for Div.1C and 1D, and that data for Div.1F are representative for Div.1E and 1F.

The 1974 year-class in the inshore as well as the offshore fishery seems to be slightly stronger than average which is also apparent in Fig. 4 and 5. According to Bowering & Brodie (1983) the 1972, 1973 and 1974 year-classes were stronger than average and dominated the fishery in the late 70'ies in Subarea 2 and Div 3KL.

No reliable effort data are available from the commercial fleet at present and such data are difficult to obtain from the present small-scale fishery. This may impede a future assessment on Greenland halibut in Subarea 1.

Acknowledgement.

The authors like to thank O.A.Jørgensen at our institute for having prepared the data from the Japanese fishery.

References.

Bowering, W.R. & W.B. Brodie (1983). An evaluation of the Greenland halibut (Reinhardtius hippoglossoides) stock complex in NAFO Subarea 2 and Divisions 3KL. NAFO SCR Doc. 83/VI/55, Ser.No. N713. (mimeo)

Horsted, Sv.Aa. (1980). Subarea 1 Cod: Data for 1979 and early 1980, and estimates of stock and yield for 1980-82. NAFO SCR Doc. 80/VI/72, Ser.No. N124. (mimeo)

Table 1. Nominal catches (tons) of Greenland halibut by year and country in Subarea 1, 1979-88 (NAFO Stat. Bull.).

	<u>79</u>	<u>80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>87^a</u>	<u>88^a</u>
Greenland	: 5273	5355	5755	5397	4136	6509	9127	8705	8660	9965
Fed.Rep.of Germany:	12784	1174	10	9	14	15				
Japan	:					26	5		905	1568
Norway	:					2				
Total	18057	6529	5765	5406	4150	6552	9132	8705	9574	11533

^{a)} provisional data

Table 2.. Nominal catches (tons) of Greenland halibut by division and country in Subarea 1, 1979-88 (NAFO Stat., Bull. and Greenland Home Rule Auth.).

	79:	80:	81:	82:	83:	84:	85:	86:	87: ^{a)}	88: ^{a)}
1A	3036	3450	3830	3167	2738	4010	5579	6481	7615	8649
1B	1275	648	375	330	82	447	200	89	122	84
1C	2147	749	196	61	55	111	78	24	733	224
1D	4280	941	711	815	570	963	2141	1180	723	714
1E	3283	296	390	386	419	520	287	565	149	103
1F	4036	445	263	647	286	467	847	362	198	191
1CD	0	0	0	0	0	0	0	0	0	1568
1NK	0	0	0	0	0	34	0	4	34	0
Total	18057	6529	5765	5406	4150	6552	9132	8705	9574	11533

a)) provisional data

Table 3.. Mean weight at age in samples from Subarea 1 (numbers of fish sampled given in brackets).

Division	1A	1A	1A	1A	1A	1D	1F	1CD	Subarea 1
Locality	Upernavik	Upernavik	Umanak	Umanak	Jakobshavn	Godthaab	Jullianshaab	offshore	weighted
Date	Aug.85	Aug.88	Aug.87	Aug.87	Aug.87	Jan.87	Jan.88	Nov.88	
Sample	commercial	commercial	commercial	research	research	research	research	commercial	total
<u>age</u>									
3								0.053(3)	0.053
4					0.200(2)			0.138(12)	0.191
5				0.288(5)	0.540(16)	0.540(1)		0.239(16)	0.385
6				0.439(25)	0.537(52)	0.820(2)	0.429(7)	0.475(32)	0.505
7				0.798(44)	0.890(40)	1.165(16)	0.661(18)	0.714(94)	0.842
8		1.199(18)		1.085(50)	1.246(85)	1.361(46)	0.997(50)	0.949(101)	1.146
9	2.079(2)	1.566(71)		1.609(45)	1.695(97)	1.611(102)	1.422(66)	1.301(108)	1.619
10	2.257(40)	2.091(60)		2.220(37)	2.170(75)	2.143(50)	1.841(43)	1.652(74)	2.105
11	2.666(92)	2.811(72)	3.685(1)	3.055(23)	2.723(49)	3.218(33)	2.281(35)	2.427(30)	2.936
12	3.156(61)	3.561(62)	4.289(5)	4.052(18)	3.429(34)	2.940(14)	2.884(18)	3.267(19)	3.596
13	4.092(53)	4.640(45)	4.555(15)	4.970(13)	4.351(18)	4.223(7)	3.796(10)	4.647(7)	4.508
14	5.046(49)	5.631(44)	5.346(23)	6.584(21)	5.603(11)	5.380(3)	5.168(5)	6.223(11)	5.730
15	6.191(36)	7.203(34)	6.403(4)	8.487(7)	6.104(8)	5.040(1)	6.090(2)	7.153(6)	6.710
16	7.610(13)	8.131(30)	8.085(1)	7.685(2)				8.700(1)	7.905
17	8.676(10)	8.587(17)						6.050(1)	8.262
18	9.560(4)	9.298(4)						8.000(2)	9.213

All commercial samples (gutted, head on) converted to whole weight by the conversion factor 1.05.

Table 4. Catch at age in numbers (thous.) by division in 1988.

age	Div.	Div.	Div.	Div.	Subarea 1
	1AB	1CD inshore	1CD offshore	1EF	
5	0	0	0	0	0
6	1	0	14	0	15
7	13	3	135	1	152
8	78	38	210	10	336
9	230	157	244	37	668
10	305	131	147	37	620
11	428	72	57	27	584
12	396	22	30	10	458
13	327	8	9	4	348
14	280	4	15	2	301
15	146	1	8	0	155
16	64	0	1	0	65
17	35	0	1	0	36
18+	11	0	3	0	14
5+	2314	436	874	128	3752

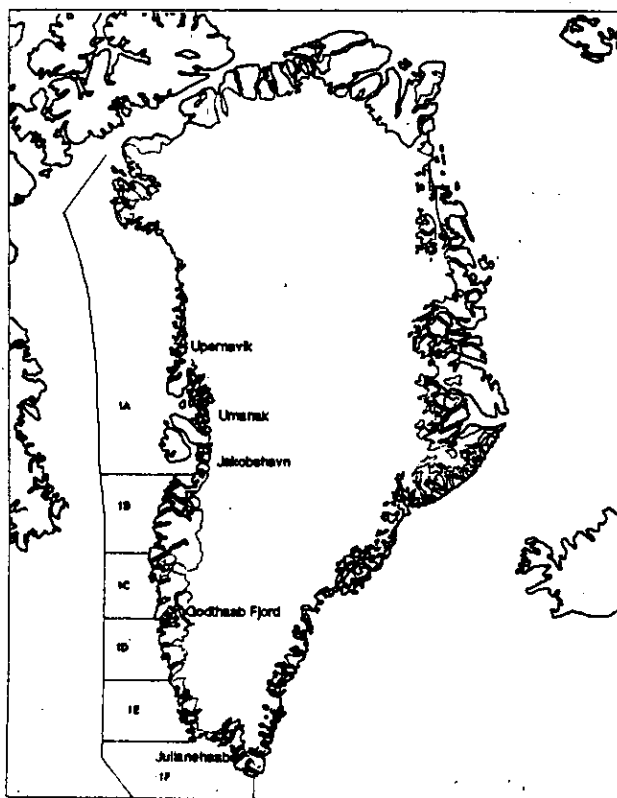


Fig. 1. Divisions in NAFO Subarea 1 and localities mentioned in the text.

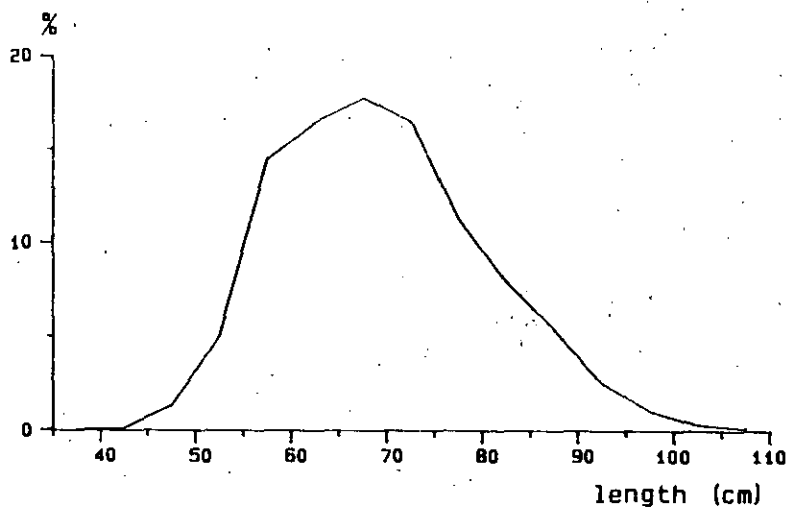


Fig. 2. Length distribution of catches of Greenland halibut in Subarea 1 (inshore) in 1988 (n=14729).

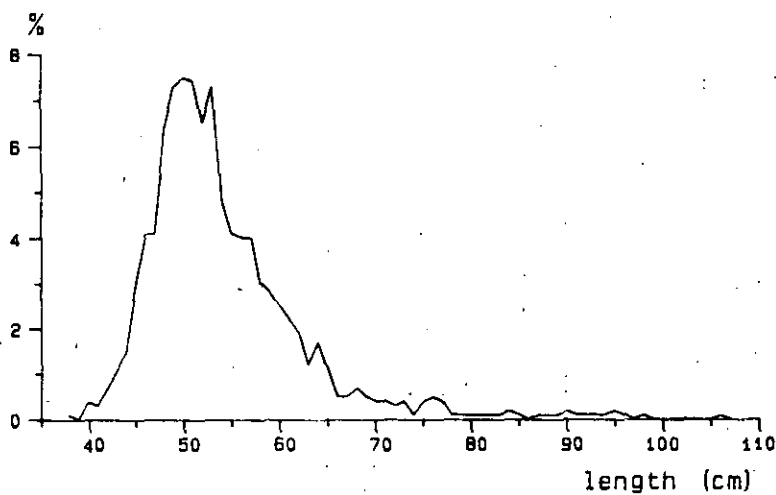


Fig. 3. Length distribution of catches of Greenland halibut in Subarea 1 (Div. 1CD, offshore) in 1988 (n=6358).

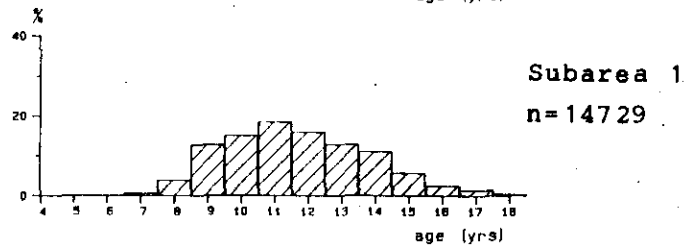
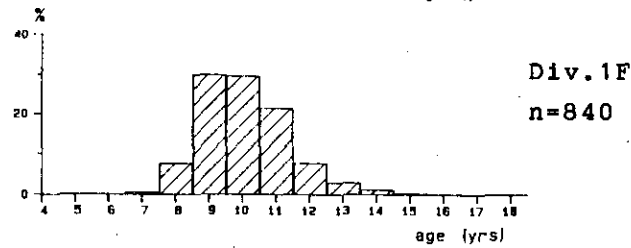
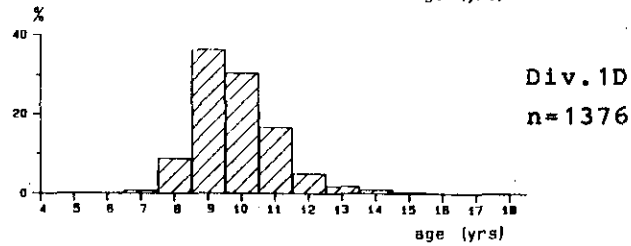
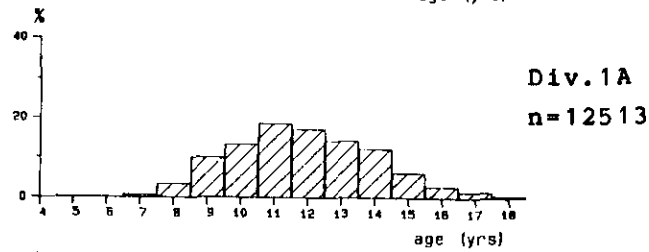
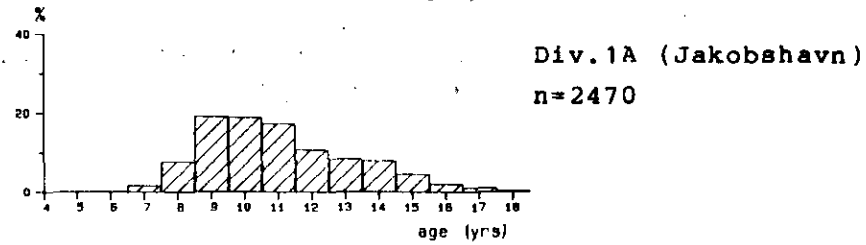
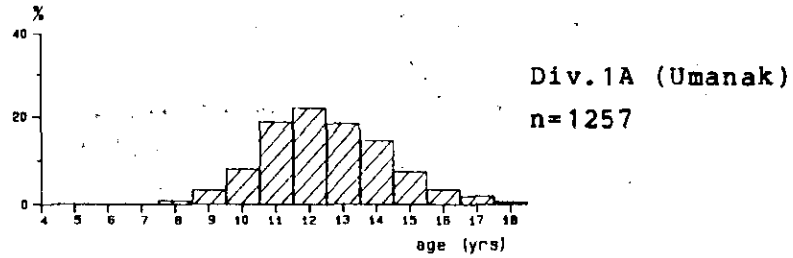
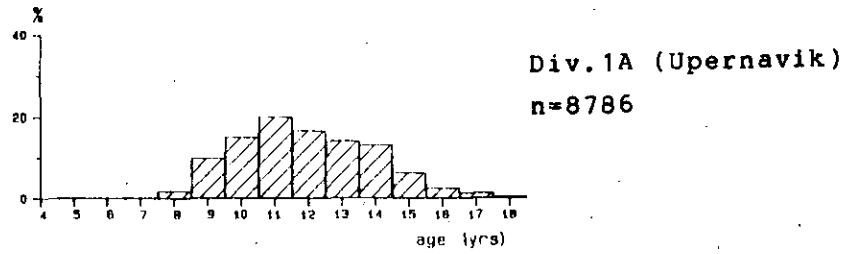


Fig. 4. Age distributions of catches of Greenland halibut in Subarea 1 (inshore) in 1988.

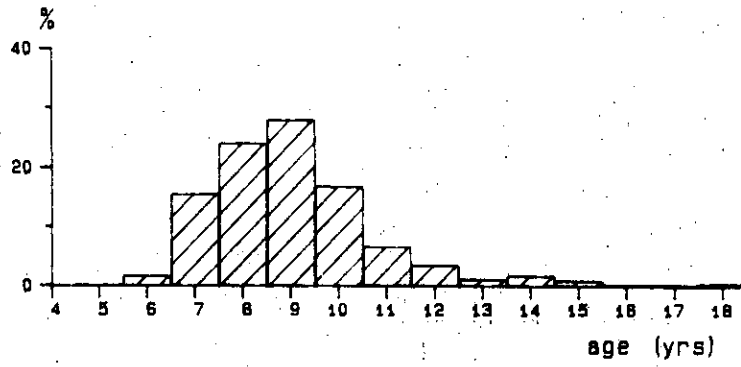


Fig. 5. Age distribution of catches of Greenland halibut in Subarea 1 (Div. 1CD, offshore) in 1988 (n=6358).