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Fisheries and Catches of Greenland Halibut Stock Component in NAFO Division 1A Inshore

by

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Abstract

This paper presents catch information, results from data collection from commercial landings and CPUE indices based on logbook data.

The inshore fishery for Greenland halibut developed in the beginning of the twentieth century, with the introduction of the longline to Greenland in 1910. The majority of the inshore fishery is concentrated in the Disko Bay and the districts surrounding Uummannaq and Upernavik. The fishing grounds are concentrated near cities and settlements in the area, but also tends to concentrate in areas of iceberg producing glaciers. Access to the ice fjords is limited in some seasons, and varies from year to year. The stocks are believed to recruit from the spawning stock in the Davis Strait, and no significant spawning has so far been documented inshore. Therefore, the stocks are believed to be dependent on recruitment from the offshore spawning areas. There is little migration of adult individuals between inshore and offshore and between the districts and a separate TAC is set for each area. Quota regulations were introduced as in each area in 2008 as a shared quota for all fishermen, but in 2012 the TAC was split in two components with ITQ's for vessels and shared quota for open boats. In 2014, "quota free" areas within each subarea were set by the Government of Greenland, and in these areas catches were not drawn from the total quota. In the Disko bay, several indicators suggest that the stock has been in a decreasing trend in the recent decade. Mean length in the landings have continuously been decreasing since the high catches taken 10-15 years ago. Trawl survey biomass index has gradually been decreasing from 2005 to 2016. Gillnet survey CPUE has been below average in the most recent 4 years (see SCR 17/030). Logbook CPUE calculated from longlines has been decreasing since the introduction of logbooks. The decreasing trends in several indicaters led to a reduction of the advice to 6 400 tons in 2017 and 2018. However, the 2016 catch increased to 10 760 tons likely with favourable sea ice conditions in 2016 and favourable regulations (quota free areas). Gillnet CPUE from logbooks has been stable, but it seem likely that fishermen have compensated for the smaller fish by increasing the use of finer meshed gillnets.

In Uummannaq a record high 10 365 tons was taken in 2016. However, the stock in Uummannaq has shown a high level of stability in size distribution in the landings, and a gillnet survey initiated in recent years has shown a dominance of larger individuals in the area. Furthermore, the standardized longline and gillnet CPUE based on logbooks have shown stability since 2008.

In Upernavik, the catches have increased in recent years and reached 7 362 tons in 2016, with the aid of increased production facilities. Although landings in Upernavik still contain considerable amounts of large Greenland halibut, mean length in the landings have been decreasing over the recent decade. Logbook CPUE for both longlines and gillnets have decreased slightly during the period.

Introduction

Greenland halibut can be found in the waters around Greenland from the Qaanaaq district in North West Greenland to Ittoqqortoormiit in East Greenlan both offshore and inshore. High concentrations has always been found in NAFO division 1A inshore where the fishery started in the 19th century. The stock is considered to be recruited from the stock in the Davis Strait, but the adults appear resident in the fjords and are isolated from the offshore spawning stock (Riget and Boje, 1989). As a result, the inshore component probably do not contribute significantly to the spawning stock in the Davis Strait (Boje, 1994). In samples from Disko Bay <10% of females in the reproductive age, were mature during the assumed peak spawning period in spring (Simonsen and Gundersen 2005) and only sporadic spawning has been observed in the inshore area (Jørgensen and Boje, 1994). The inshore component is assumed not to be self-sustainable, but dependent on recruits and immigration from the offshore area (Bech, 1995). In 1994, NAFO decided to separate the assessment and advice on the inshore stock components from the offshore component in the Davis Strait and Baffin Bay. Settlement occurs both inshore and offshore, but large concentrations of recruits are yearly found inshore in the Disko bay and on the Banks West of Greenland particularly in NAFO division 1B and 1A. Less is known about recruitment to the other inshore in other areas. The Disko Bay is of major importance to the shrimp fishing industry and earlier studies of the by-catch of Greenland halibut in the commercial shrimp fishery (Jørgensen and Carlsson, 1998) suggest that the by-catch is considerable and could have a negative effect on recruitment to the inshore stock component. To minimize by-catch of fish in the shrimp fishery, offshore shrimp trawlers have been equipped with grid separators since 2002 and inshore shrimp trawlers (Disko Bay) since 2011. The implementation of sorting grids in the shrimp fishery has led to a protection of juvenile fish species dependent on size and shape. Greenland halibut is in this sense less protected by the sorting grids due to the flat shape than other species with a more round body shape (SCR 07/88). A study of the by-catch in the offshore fishery suggested that grid separators currently used in the shrimp trawl offers high protection for Greenland halibut larger than 25 cm (SCR 07/88). The implementation of grid separators in the inshore component after 2011 may have led to a reduction in fishing mortality in the Disko Bay since 2011. Besides the Disko Bay and a small area inshore in Division 1B, there is no trawl fishery in other inshore areas.

Description of the fishery

The longline fishery

The inshore fishery targeting Greenland halibut started in the beginning of the 1900 century with the introduction of the longline (fig 1). The fishery started in the Disko Bay and gradually spread to the Uummannaq and Upernavik districts and inshore areas in South West Greenland. The fishery is traditionally performed with longline from small open boats or dog sledges through a hole in the sea ice.

The gillnet fishery

In the 1980s, small vessels entered the fishery and the use of gillnets increased in the following years. In the late 1990s, the first regulations limiting areas open to gillnet fishery were introduced, limiting gillnet fishery to the winter season. Competence to regulate seasons and areas open to gillnet fishery, was transferred to municipalities in 2004, and areas open to gillnet fishery has expanded since then. The gillnet fishery is regulated by a minimum mesh-size of 110 mm (half meshes) although increased illegal use of cod gillnets (80mm) used to target Greenland halibut has been observed since 2008. In general, gillnets have narrow selection curves and targeting fish at certain size intervals. Theoretical selection curves and factory landings show that 110 mm gillnets catches Greenland halibut from 55 cm and has maximal selectivity in the size interval 65-85 cm whereas 80 mm gillnets catch Greenland halibut as small as 42 cm and have a maximum selection in the interval 47-62 cm. By 2017, the minimum mesh-size in the Greenland halibut fishery has been reduced to 95 mm, which catches Greenland halibut as small as 50 cm and have a maximal selection in the interval 55-70 cm.

Regulations and catches

Licences requirements were introduced in 1998 and in 2008 TAC and quota regulations were introduced for the inshore fishery. In 2012, the TAC was split in two components with ITQ's for vessels and a shared quota for open boats. The ITQ system currently does not specify catch to a certain district which causes a discrepancy between the total ITQ and total quota set for each district.

The areas and the fishery
The fishery in the Disko bay has always been highly concentrated around the bank just south of Ilulissat and typically more than one third of the Disko Bay catches are from small area (fig.3). Other important fishing grounds in the Disko Bay is the deep Kangia ice fjord (>900m) and the northern part of the Disko Day concentrated around the settlements Saqqaq and Qeqertaq and the ice fjord Torssukattak east of the settlements. Since 2014, areas west of the important Ilulissat Icefjord bank were set as quota free area for all vessels along with the inner parts of the Kangia Icefjord during the winter, when transporting the catch with dog sledges. In the most recent years the fishery has increased in the Western part of the Disko bay between Assiaat and Qeqertarsuaq where deep trenches are located.

The fishery in Uummannaq is scattered all over the fjord near settlements (fig.4). Particular in the deep South-eastern part of the fjord from Uummannaq and towards East where depths of more than 1500 meters are common and large iceberg producing glaciers are located holds the more important fishing areas.

The Upernavik area consists of several large ice fjords, but the main fishing grounds are the deep Ikeq fjord (Upernavik Icefjord) and Gulteqarffik (Giesecke Icefjord) (Gulteqarffik is the Inuit word for "where the gold is collected"). Since the large icefjords are often not accessible due to glacier ice the fishery is sometimes restricted to the shallower fjords near Upernavik and the settlements in the area or the less active glaciers in Tasiusaq bay located between Gulteqarffik and Ikeq.

Commercial data

Catch data

Data on the all inshore landings are reported to the Greenland Fishery Licence Authority (GFLK). Factories receiving the catch gather information on the fishery, including effort and location on individual fishing events and send the data to GFLK. Although in a different format, the factory landings works as a of a simple haul by haul logbook. The high resolution of the landings allows for a breakdown of catches by area gear season (tab 1 and 2). Since 2008, logbooks have been mandatory for vessels larger than 30^{ft}. Standardized logbook CPUE's for Gillnets and longlines are available in SCR 17/031.

Length frequencies by season and gear

Individual samples of length in landings has been collected in the areas for decades by Grønlands fiskeri-undersøgelser (GF) and later by the Greenland Institute of Natural Resources (GINR). In general, samples are collected several times during the seasons and at various locations during sampling expeditions or under research surveys. In **Disko bay** mean length in the longline landings of Greenland halibut caught in summer are generally smaller than fish caught during winter, and winter mean size in general shows higher inter annual variation. The winter fishery conducted from the Sea ice is highly dependent on ice coverage allowing access to the inner parts of the Kangia icefjord, where larger fish are accessible at greater depths. In **Uummannaq** and **Upernavik** there is not the same difference between summer and winter fishing grounds and only small differences in the summer and winter length distributions are observed.

ALK – Age Length Key

Age reading of Greenland halibut has been suspended since 2011 at GINR due to low quality of the age readings and lack of an internationally agreed method. The most recent age readings was however performed on frozen otoliths which is a better method for ageing Greenland halibut. Otoliths are still collected during the annual gillnet and trawl surveys and archived for future reading. In order to complete the CAA tables and calculate the

total number of fish caught in the areas, an ALK was constructed using age readings from whole frozen otoliths from all 3 inshore areas collected from 2008, 2009 and 2010.

CAA – Catch At Age

Since it is known that Greenland halibut caught in the deep Kangia Icefjord are considerably larger than in the rest of the Disko Bay, recent catches were split on both gear (longline and gillnet) and location (Disko Bay and the Ilulissat icefjord (Kangia)). The numbers in each cm category was calculated and the ALK applied. Although the ages are likely underestimated, particularly for the larger individuals, the calculated total number of fish caught should be valid.

Disko Bay

In the Disko Bay**, catches** increased during the 1980s and peaked in 2004 to 2006 with catches of more than 12.000 tons per year (fig 2). Thereafter, catches decreased without the TAC being reached, to explain the decrease. Since 2009 catches have gradually increased and in 2016 catches were 10 760 tons. Although the total landings in tons is still less than during the end of the 1990s, the estimated total number of fish caught are much higher (fig 2). The reason for this is the significant decrease in the overall length distribution in the landings.

Besides the usual fishinggrounds within and surrounding the Ilulissat icefjord and torsukattak a fishery is developing north of Aasiaat in the western part of the Disko bay (fig 3). **Mean length in the landings** gradually decreased for more than a decade in the area in both the winter longline fishery (a mixture of Greenland halibut from the Disko Bay and Kangia) and the summer longline fishery (fig 6). The total mean length when accounting for differences distribution of the catch and gear have also decreased significantly from 2010 to 2016 (fig 6). In the 2017 winter fishery the Kangia Icefjord was unusually accessible allowing fishermen to target the innermost and deeper areas of the icefjord. The calculated total mean length in the landings is in high agreement with mean length calculated from mean overall mean individual weight provided by royal Greenland. The decreasing size in the landings can also be seen as a general shift of the length distribution towards smaller fish and a narrower distribution in the longline landings (fig 7). Since longlines and hooks in general have wide selection curves, the overall length distribution from the longline fishery can be taken as a proxy for the true length distribution of the fishable stock. The significant drop in the mean length from gillnet landings is without question related to illegal use of cod gillnets (80mm) used to target Greenland halibut in the area (fig 8). The use of 80mm gillnets is further supported by data provided by the industry when mean length in gillnet landings is calculated from mean individual weight for in the gillnet landings. The **CAA bubble plot** indicates a general movement towards younger fish since 2002 when the highest catches occurred (fig 9). The **exploitation rate of ages 10** or less has likewise gradually increased, indicating that larger and older fish in the stock has decreased, indicating higher dependence of incoming year classes (fig 10), but the same conclusion can be drawn from the overall decrease in the mean length in the landings.

Uummannaq

In **Uummannaq**, catches increased during the 1980s and peaked in 1999 at more than 8.000 tons (tab 1 and fig 2). Catch then stabilized at a level around 6 000 t but after 2009 catches have increased substantially. In 2016 and all time record high 10 305 t was taken in the area (tab 1 fig 2). The fishery is spread over a large area, but most concentrated in the south Eastern parts (fig 4). **Mean length in the landings** have gradually decreased during two decades, but at a very slow rate and particularly the overall yearly mean weighted by gear has shown high stability in the most recent 6 years (fig 6). The overall length distribution in the longline landings has also shown high stability in recent years and the 2016 landings mainly consisted of Greenland halibut in the size range from 45 to 80 cm (fig 7). The Gillnet mean length in the landings do not indicate any use of fine meshed gillnets which indicates that large fish are available except for 2010 (fig 8). The **CAA bubble plot** does not reveal any particular strong year-classes (fig 9). The **exploitation rate of ages 10** or less reveals a high level of stability in the recent years and that old fish still constitute a significant part of the stock (fig 10).

Upernavik

In **Upernavik**, catches increased from the mid 1980's and peaked in 1998 at a level of 7 000 tons (tab.1, fig.2). Landings then decreased sharply, for unknown reasons, but during the past 15 years landings have gradually returned to the high level. Since 2014, factory vessels receiving catch from small boats have been used in order to increase the factory capacity and increase competition and prices in the area. In years with factory vessels the production capacity is higher and more fish are landed. In 2016, 7 363 t was caught in the area. The fishery is limited by the distance to the nearest factory and the fishery is generally taking place in the same places as in the past (Gulteqarffik, Ikeq, Tasiusaq bugt and near settlements and Upernavik) (fig 6). **Mean length in the landings** initially decreased and remained stable for almost two decades (fig 6). However, the overall mean length weighted by gear was stable from 2010 to 2013. The mean length den dropped by 2 cm bur have remained stable since then. Mean lengths in the gillnet landings gradually increased until 2004, but has stabilized since then and the use of fine meshed gillnets seems to increasingly have occurred (fig 8). The length frequencies from the longline landings reveal a shift towards smaller fish in the recent 3 years (fig 7). The 2016 longline landings mainly consisted of Greenland halibut in the size range from 40 to 80. The **CAA bubble plot** does not reveal any particular strong year-classes (figure 9). The **exploitation rate of ages 10** or less indicates that old fish still constitute significant part of the stock (figure 10).

Discussion

The bubble plots and the exploitation of age 10 and younger are highly depending on the uncertain ALK's used in the calculation. It is however also possible that the high number of recruits settling in the area every year leads to a density dependant reduction in large year classes and therefore a limited variability in the cohords when reaching the fishable stock.

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Table 1. Landings of Greenland halibut by area and gear.

	Disko Bay		Disko Kangia		total	Uummannaq			Upernavik		
Year	Longline	Gillnet	Longline	Gillnet	Catch	Longline	Gillnet	Catch	Longline	Gillnet	Catch
1987					2258			2897			1634
1988					2670			2920			777
1989					2781			2859			1253
1990					3821			2779			1245
1991					5372			3045			1495
1992					6577			3067			2156
1993					5367			3916			3805
1994					5201			4004			4844
1995					7400			7234			3269
1996					7837			4579			4846
1997					8601			6293			4879
1998					10671			6912			7012
1999					10593			8425			5258
2000					7574			7568			3764
2001					7072			6558			3239
2002					11718			5339			3019
2003					11571			5039			3884
2004					12857			5248			4573
2005			8400	4051	12451			4856	3096	1743	4839
2006					12114			5984	3535	1598	5132
2007			8721	1661	10381	4460	858	5318	4218	659	4877
2008			7115	585	7700			5426			5478
2009					6321			5451			6497
2010	6954	1505	332	86	8458	5617	610	6226	5443	411	5941
2011	5592	1367	451	1	8005	5046	1179	6397	6176	362	6471
2012	6145	968	756	28	7755	5847	357	6151	6204	514	6830
2013	6867	1520	678	4	9073	6639	369	7007	5606	433	6039
2014	6675	1979	518	0	9177	7800	407	8199	6964	409	7381
2015	6383	1541	746	5	8674	7279	962	8244	5491	782	6274
2016	7776	2650	328	5	10760	9512	792	10304	6954	408	7362

Table 2. Landings of Greenland halibut by area Gear and month in tons 2016.

	AREA	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OKT	NOV	DEC	Total
Gillnet catch	1A Upernavik	10	87	89	99	4				1		97	22	408
	1A Uummannaq	20	40	44	115	38			67	180	120	86	82	792
	1A Disko Bay	365	928	801	546	8	1	0			0	0	4	2655
	1A Disko kangia													0
	1A gillnet total	396	1055	934	759	50	1	0	67	181	120	183	108	3855
Longline catch	1A Upernavik	502	590	424	343	555	801	1023	1026	740	427	270	255	6954
	1A Uummannaq	598	731	585	469	871	1405	1540	1324	1129	519	217	127	9512
	1A Disko Bay	67	31	33	204	1387	1555	1052	1214	789	667	391	387	7776
	1A Disko kangia	57	19	6	4		0	2	5		34	123	79	329
	1A longline total	1240	1397	1086	1043	2835	3766	3616	3568	2659	1647	1002	848	24707
	1A Qaanaaq	17	26	39	24	23	5	0	0	2	0	0	0	136
Total inshore catch in NAFO 1	1A Upernavik	512	677	513	442	559	801	1023	1026	740	427	366	277	7362
	1A Uummannaq	618	772	629	584	908	1405	1540	1391	1309	638	303	208	10305
	1A Disko Bay	431	959	830	750	1395	1556	1053	1214	789	668	392	390	10426
	1A Disko kangia	57	19	10	4	0	0	2	5	0	34	123	79	333
	1A inshore total	**1635**	**2453**	**2021**	**1804**	**2885**	**3767**	**3618**	**3636**	**2840**	**1767**	**1184**	**954**	**28562**
	1B inshore total	0	2	2	4	8	13	12	2	0	6	3	0	53
	1C inshore total	3	35	20	3	4	9	8	3	2	3	2	8	101
	1D inshore total	84	62	78	50	84	162	142	190	160	109	124	134	1379
	1E inshore total	29	31	32	7	3	9	17	25	20	16	32	12	232
	1F inshore total	18	31	28	22	24	35	33	25	17	12	15	10	272

Table 3. CAA – Catch at age for the Disko bay.

Year/Age	3	4	5	6	7	8	9	10	11	12	13	14	15+	16+	Total
1988	0	0	0	1	9	59	182	173	132	73	63	65	38	33	828
1989	0	0	0	0	0	14	106	121	94	49	33	39	31	41	528
1990	0	0	0	0	1	24	141	185	188	126	80	59	42	44	890
1991	0	5	5	11	279	806	535	333	238	76	45	67	57	44	2501
1992	0	34	92	122	332	476	390	451	532	309	140	92	18	0	2988
1993	0	7	15	62	280	479	339	280	240	122	91	112	75	86	2188
1994	0	0	3	15	112	281	539	396	190	91	50	45	41	36	1799
1995	0	0	0	0	45	459	639	798	463	185	127	27	36	27	2806
1996	0	0	8	1	47	323	941	651	454	273	145	75	44	69	3031
1997	0	0	0	21	132	646	1113	1168	607	185	69	19	10	6	3976
1998	0	0	0	74	397	775	944	1248	754	346	132	68	27	6	4770
1999	0	1	4	41	360	619	836	1028	786	426	136	72	29	2	4340
2000	0	0	9	98	535	729	780	636	478	223	52	28	12	1	3583
2001	0	1	15	33	224	390	521	450	485	280	78	33	31	16	2557
2002	0	0	2	54	283	561	771	421	575	393	398	175	112	0	3745
2003	0	0	2	64	425	722	1187	610	847	422	158	146	135	89	4808
2004	0	0	2	56	409	691	1083	634	730	311	144	130	152	89	4431
2005	0	1	48	287	516	703	868	423	481	213	100	97	122	83	3943
2006	0	0	10	211	882	1001	1008	522	582	231	105	89	125	85	4852
2007	0	0	2	56	459	1073	754	749	151	94	4	166	126	60	3694
2008	0	0	2	46	363	825	552	548	105	66	2	114	86	40	2751
2009	0	1	26	199	904	962	515	337	147	79	55	40	26	13	3303
2010	21	17	148	467	1218	1187	460	402	194	119	114	78	70		4495
2011	1	14	172	558	1196	1153	430	356	136	67	57	34	40		4213
2012	5	54	457	829	1333	1047	400	359	154	77	59	28	48		4851
2013	3	35	368	765	1611	1333	438	374	175	101	68	35	60		5368
2014	3	36	379	844	1731	1493	514	420	159	70	49	23	32		5753
2015	8	120	718	1098	1685	1303	436	356	130	58	43	21	28		6002
2016	7	113	706	1126	1858	1588	647	546	206	84	51	23	30		6986

Table 4. CAA – Catch at age for Greenland halibut in the Uummannaq district.

age/year	3	4	5	6	7	8	9	10	11	12	13	14	15+	16+	Total
1988	0	0	0	1	5	20	52	121	143	121	96	49	23	17	648
1989	0	0	0	0	2	9	35	98	120	99	76	38	19	20	516
1990	0	0	0	1	3	15	47	108	121	101	82	42	20	21	561
1991															
1992															
1993	0	0	0	9	45	200	202	142	138	104	158	93	28	20	1139
1994	0	0	0	24	105	226	271	346	139	105	34	12	0	3	1265
1995	0	0	0	6	217	564	601	413	414	219	138	49	28	22	2671
1996	0	1	0	6	76	308	279	286	232	142	69	28	11	15	1453
1997	0	0	0	0	69	377	793	702	460	206	75	32	10	6	2732
1998	0	0	0	0	0	235	566	657	586	355	138	39	15	5	2595
1999	0	8	70	218	554	596	690	789	526	295	131	42	12	4	3935
2000	0	0	19	86	357	441	543	669	487	311	170	68	24	8	3184
2001	0	0	65	113	674	507	315	492	303	178	121	60	28	12	2868
2002															
2003	0	0	3	21	127	360	321	235	220	158	78	145	150	94	1911
2004	0	0	1	10	105	197	249	198	163	118	82	103	78	59	1364
2005	0	1	17	101	108	192	142	115	109	74	58	80	67	50	1115
2006	0	1	32	12	47	243	70	284	127	324	49	108	9	9	1315
2007	0	3	40	181	221	340	273	192	149	94	64	82	71	56	1767
2008	0	4	46	203	249	381	304	213	166	104	71	91	79	63	1974
2009	0	3	9	25	238	525	470	415	243	157	90	42	20	11	2248
2010	0	1	8	77	484	822	459	458	235	128	79	32	21		2804
2011	0	0	11	94	465	743	432	441	242	141	91	43	26		2730
2012	0	0	6	61	347	627	393	422	260	168	114	57	37		2492
2013	0	1	9	72	397	730	494	531	302	173	108	49	31		2896
2014	0	1	20	120	622	1026	613	608	308	163	107	46	32		3667
2015	0	2	26	112	489	828	545	582	354	211	144	68	41		3403
2016	0	4	49	203	840	1290	736	727	386	211	132	58	40		4679

Table 5. CAA – Catch at age for Greenland halibut in the Upernavik district.

age/year	3	4	5	6	7	8	9	10	11	12	13	14	15+	16+	Total
1988	0	0	0	0	0	6	33	55	80	74	68	62	31	22	431
1989	0	0	0	0	0	2	16	34	59	66	69	73	40	31	390
1990	0	0	0	0	0	2	17	41	62	57	52	48	25	17	321
1991															
1992															
1993	0	0	0	0	0	2	16	86	252	268	143	95	40	46	948
1994	0	0	0	2	51	188	316	217	239	154	155	51	23	0	1396
1995	0	0	0	0	13	55	84	128	133	147	117	103	45	42	867
1996	0	0	3	0	16	114	359	275	238	206	151	90	48	39	1539
1997	0	0	4	25	142	428	500	430	278	175	67	37	19	8	2111
1998	0	0	0	116	343	538	535	505	410	275	112	84	39	10	2968
1999	0	14	55	172	449	619	566	343	229	138	51	36	16	5	2693
2000	0	0	2	108	420	446	302	160	133	116	48	38	17	9	1800
2001	0	0	28	144	404	422	258	103	104	87	36	14	9	3	1611
2002															
2003															
2004															
2005															
2006															
2007															
2008	0	0	4	65	197	429	274	788	372	135	10	6	0	6	2284
2009	0	0	5	51	333	579	465	421	262	187	112	65	94	7	2579
2010	0	0	3	47	376	707	471	484	242	126	70	27	15		2568
2011	0	5	51	175	555	772	468	484	260	141	80	31	18		3040
2012	0	2	28	111	375	620	445	504	312	188	117	50	27		2778
2013	0	12	42	107	387	581	368	401	259	161	113	55	34		2520
2014	3	31	177	349	773	919	483	475	243	131	88	45	27		3743
2015	5	25	98	205	574	752	405	388	200	117	92	52	43		2957
2016	2	17	138	308	736	867	460	452	251	142	103	52	34		3566

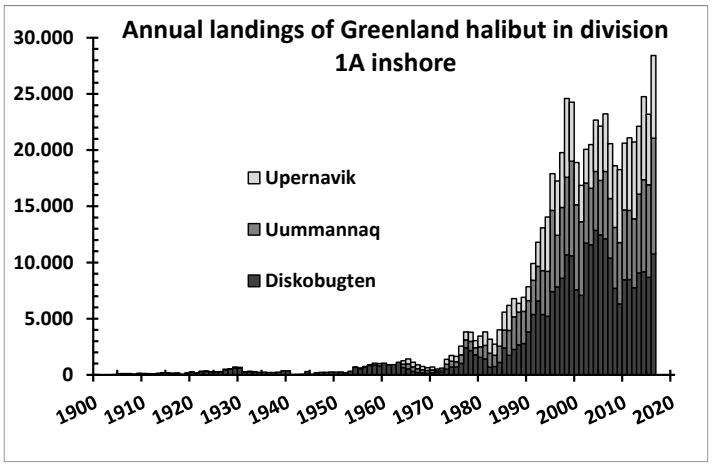

Fig. 1. Catches of Greenland halibut in NAFO Subarea 1 Division 1Ainshore since 1904 for NAFO division 1A inshore in North West Greenland.

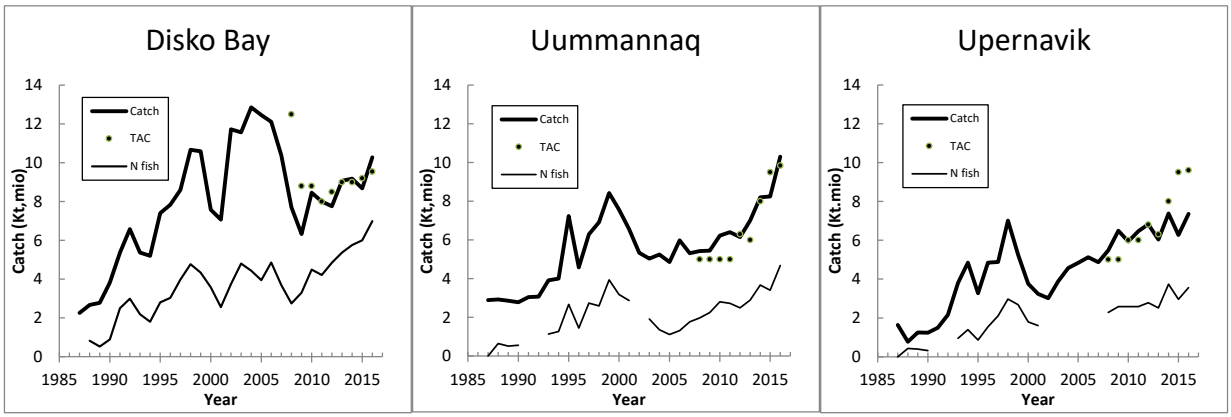

Fig. 2. Greenland halibut in NAFO division 1A inshore: Catches since 1987 (Kt), TAC (Kt) set by the Greenland authorities and total number of fish landed (mio).

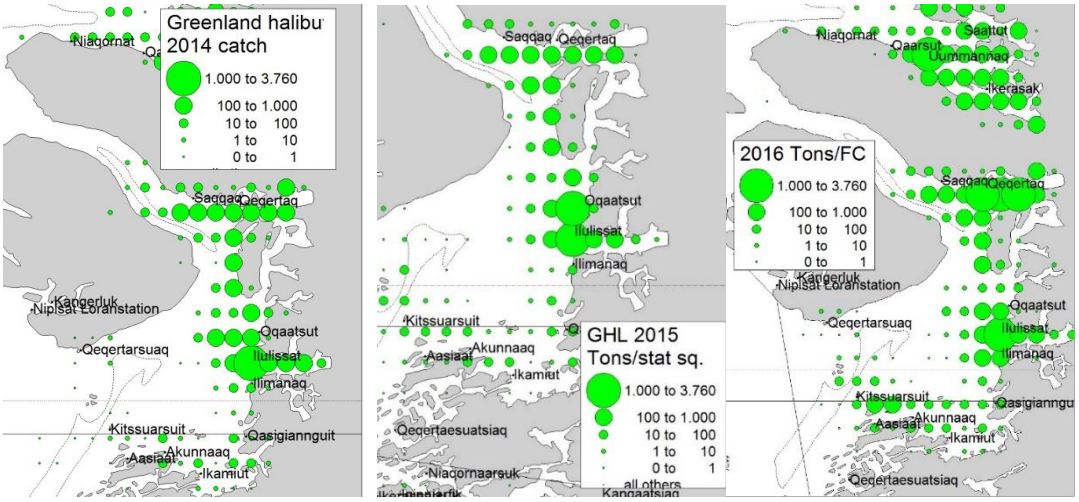

Fig. 3. Greenland halibut catch by statistical square in the Disko bay in 2014 -2016.

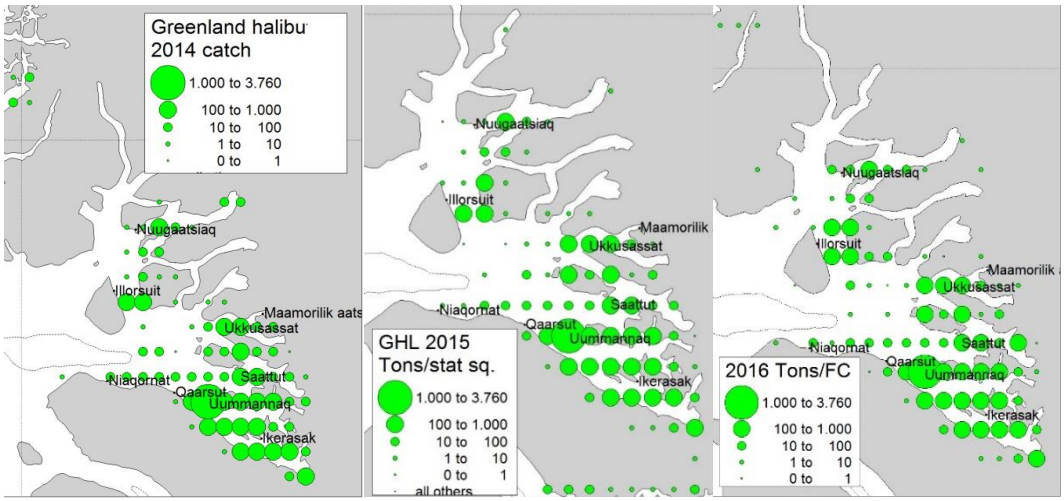

Fig. 4. Greenland halibut catch by statistical square in the Uummannaq area in 2014 and 2016.

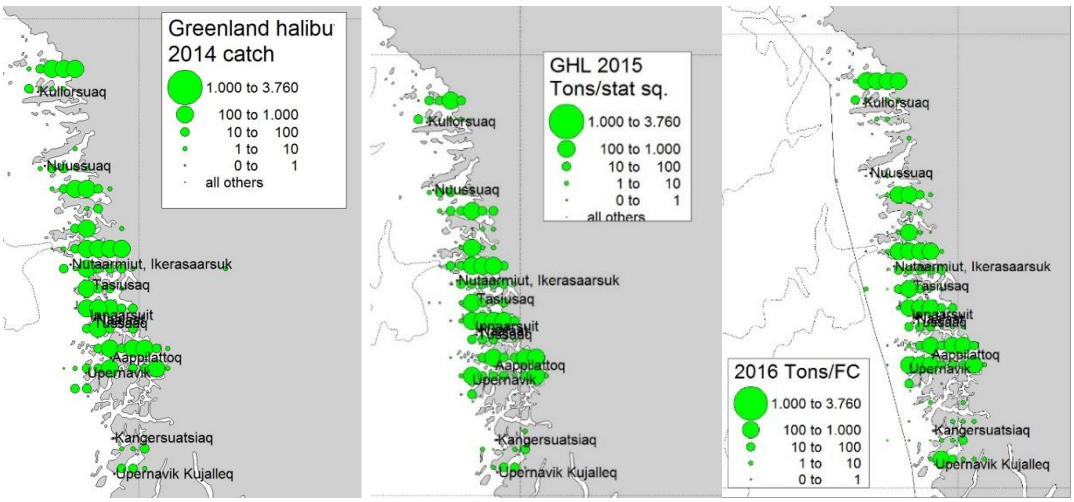

Fig. 5 Greenland halibut catch by statistical square in the Upernavik area in 2014 and 2016.

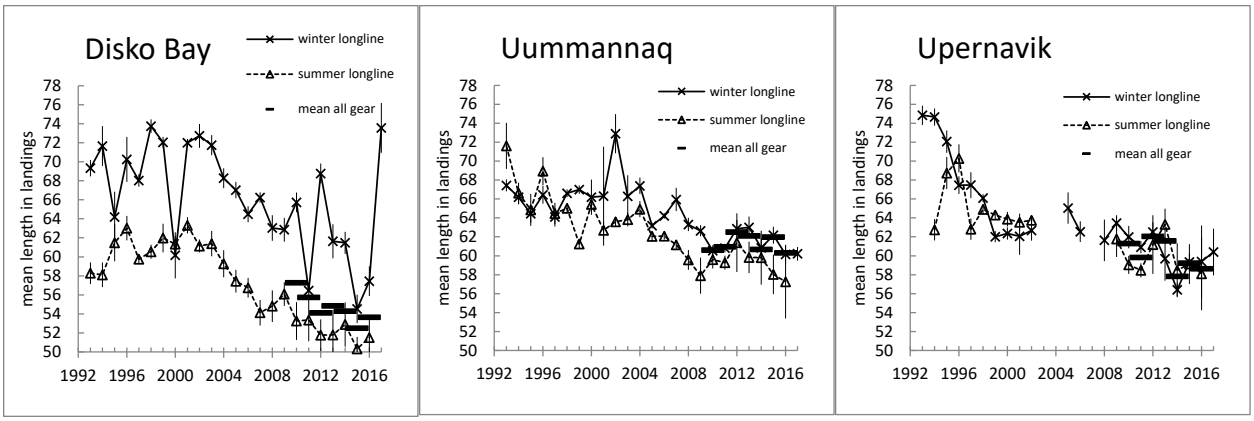

Fig. 6. Mean length in the landings: for longlines in the summer fishery, the winter fishery and the overall mean length accounting for differences in gear season and area.

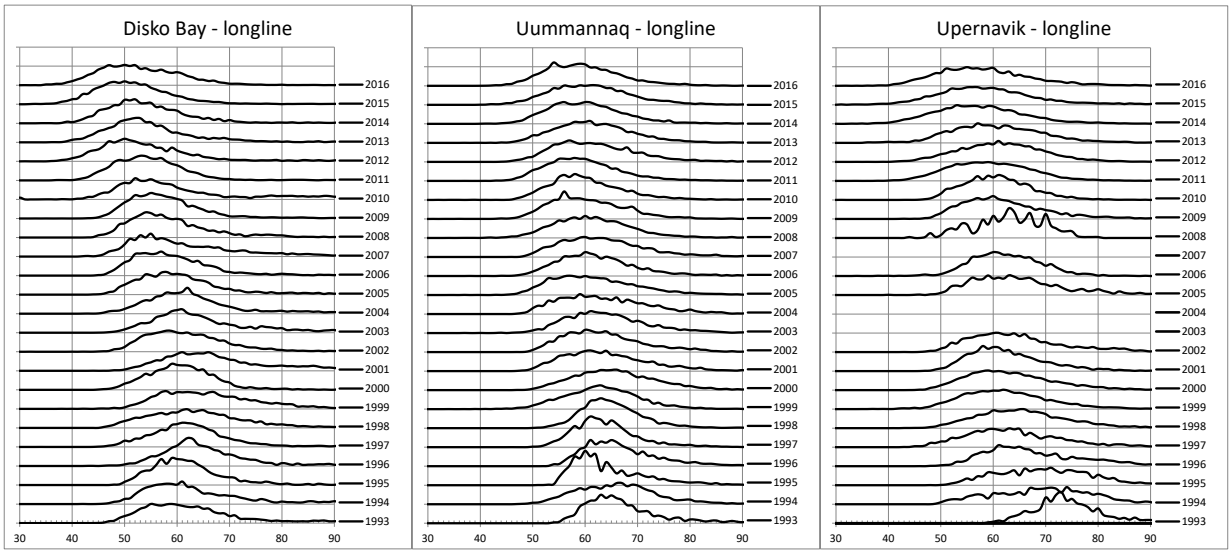

Fig. 7. Disko bay length frequencies in longline landings in % of number measured all months combined.

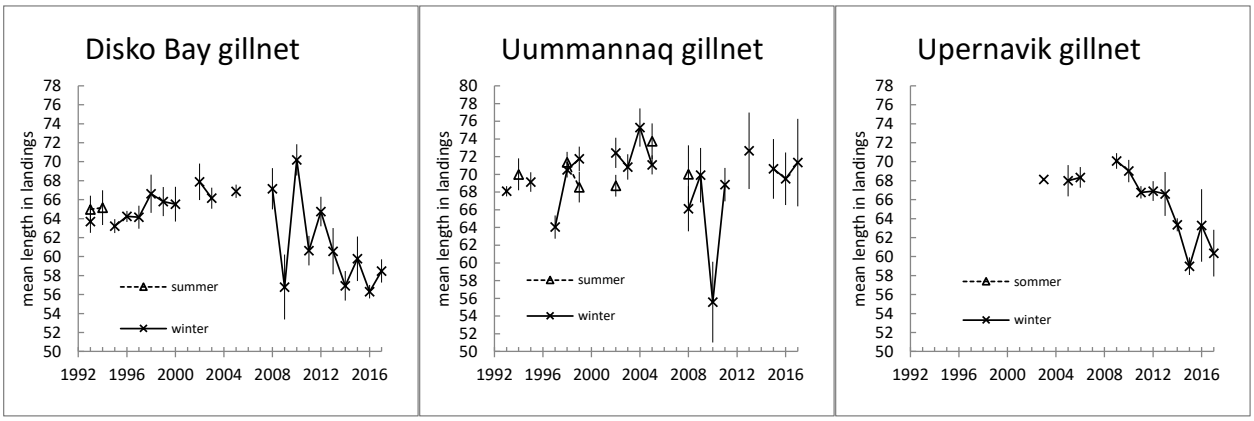

Fig. 8. Mean length in the landings from gillnets.

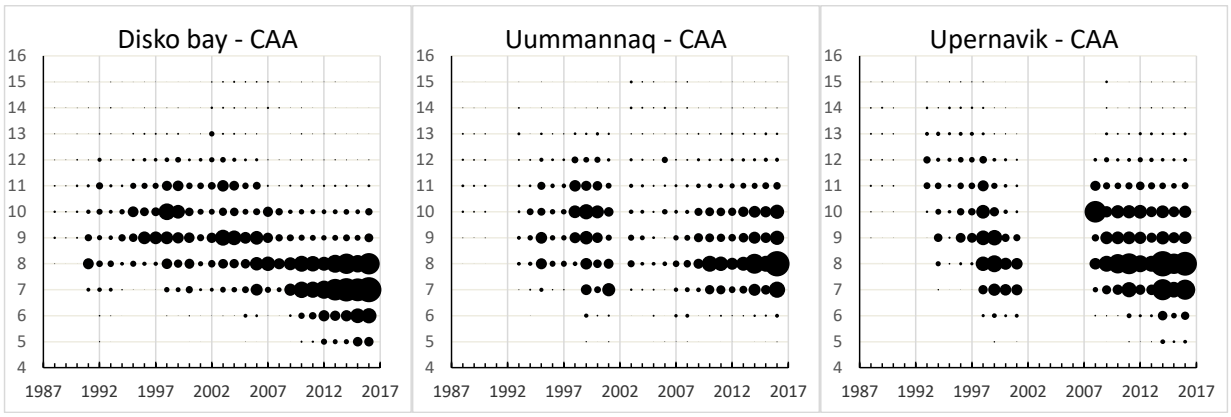

Fig 9. Catch at age bubble plot. For the years 2008-2016 a general ALK key was used based on the age readings from 2008-2010 and all three areas combined due to data limitations.

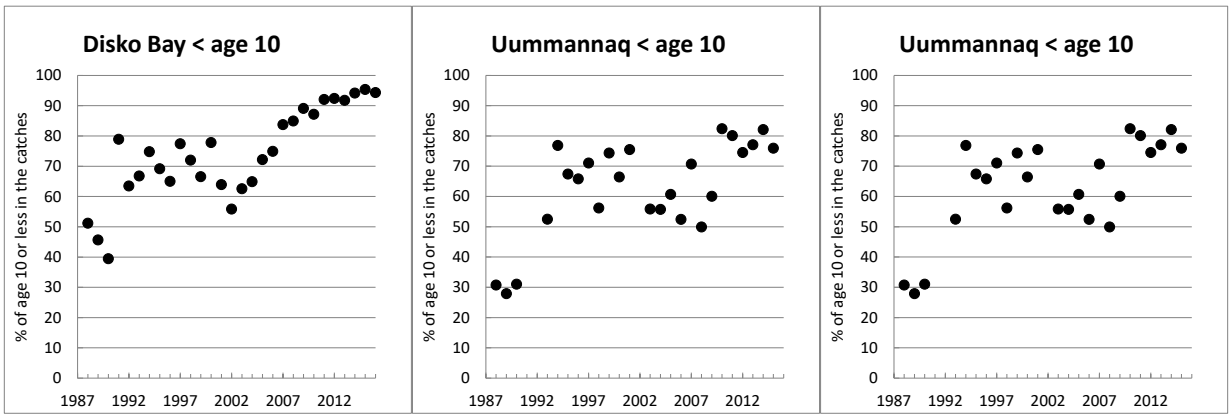

Fig. 10. Percentage of age 10 and younger in the catches. For the years 2008-2016 a general ALK key was used based on the age readings from 2008-2010 and all three areas combined due to limited data.