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Commercial data for the Greenland halibut fishery in Uummannaq

by

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Abstract

Although the commercial fishery in for Greenland halibut started around 1910 the first available catch statistics from the Uummannaq area, is from the 1950's. The fishery is traditionally performed with longline from small open boats or dog sledges through a hole in the sea ice. This document presents catch statistics combined from various resources from the Uummannaq fjord. The document includes catch statistics, statistics of commercial sampling effort done by the GINR and calculations of mean size in the landings and a preliminary CAA. Also provided are 3 indices of CPUE. Two based on logbooks (one longline fishery and one gillnets fishery) and one on factory landings data (longline).

Introduction

The first available catch statistics from the Uummannaq fjord is from 1954. The fishery is traditionally performed with longline from small open boats, small vessels or through holes in the seaice and transported by dogsledge or snowmobile. 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 restricting the 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 minimum mesh-size in the gillnets was 110 mm (half meshes or knot to knot) until 2017 when the meshsize was reduced to 95 mm halfmesh.
Licence requirements were introduced in 1998 and in 2008 TAC and quota regulations were introduced for the inshore fishery. A separate TAC is set for each area. Logbooks have been mandatory for vessels larger than 30^{ft} since 2008. 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 ITQ and total quota set for each district.

Materials and methods

Input data for catch statistics and CPUE.

Recent catch statistics (factory landing and logbooks) are available from a centralized database managed by the Greenland Fisheries License Control Authority (GFLK). Both logbook (haul by haul) and factory landings (daily individual landings) are reported as individual fishing events containing dates, gear, field code or position, effort, fishing period, sorting categories and many more items. Catch can practically be broken in any thinkable way. Data quality has been very good since 2012.

Commercial sampling

Commercial samples are collected by the GINR. During surveys or in sampling campaigns factories are visited and the size of the landed fish by species and gear is registered. Due to the logistic challenges in Greenland (size of Greenland and mainly transport by air or sea), sampling catch is challenging. To ensure sufficient length information from the commercial catches, GINR do commercial length measurements in factories during the winter months (jan-April). However, in Uummannaq there is not the same great difference in the distribution of the fishery between summer and winter as seen in the Disko Bay, and sampling is less dependent on season. Commercial sampling is only separated by gear (longline or gillnet) and if possible, also summer and winter.
An alternative source of length information in the catch are Grader data. Graders are automated sorting machines that weigh each fish individually and sort them according to size categories. If extracted, the millions of individual weights can be transformed into length information. Graders typically do not register information on gear. This is however not a problem since all fish in the landings provide information, and gear therefore is randomly incorporated into in the length distribution. Unfortunately no grader data has been received from the uummannaq area since 2021. In 2023, local factory staff supplemented the collection of length information.

ALK

Age information is occasionally obtained from commercial landings, but the majority of otoliths collected in the area is through biological surveys with the GINR research vessel R/V Sanna during summer gillnet surveys (See SCR 22-010 for details).

Logbook CPUE calculation

A general linear model (GLM) with year, month and boat as factors is applied to the longline and gillnet fishery logbook data since 2008. Only longline setting with more than 200 hooks and gillnets with catches between 0 and 1001 kg/gillnet are included to omit obvious outlier values and limit the influence of data potential errors on the analysis. CPUE observations are log-transformed prior to the GLM analysis. Least-mean square estimates were used as standardized CPUE series. For more information about the standardized logbook CPUE see SCR 18/023. In 2022, a new CPUE based on factory landings data from longline fishery calculated in the same way as the logbook CPUE, but from a different source of statistics (SCR 22-024) Another difference is that due to the high number of small boat fishermen and diverse types of fishery all using the same standard gear (longlines from either logbook vessels, small open boats or directly from the sea ice) the model use year, vessel type (vessel, boat, dog sledge or snowmobile) and statistical catch square

Results

Catches

First available catch statistics is from 1954. Catches increased during the 1980s and peaked in 1999, at more than 8.000 tons (Tab. 1 and Fig 1.). Catch then decreased to around 6 000 but then started to increase and peaked in 2020 with 10 670 t taken in the area. Since then catches have steadily decreased reaching 8 250 tonnes in 2023.

Breakdown of catch

A breakdown of catch by gear and area is provided in table 2. The fishery in Uummannaq is scattered all over the fjord near settlements (Fig.2). Particular in the deep South-eastern part of the fjord from Uummannaq and towards East where depths of more than 1500 meters are common. Greenland halibut can however be found in all areas in the fjord. The area is highly productive with 10 large iceberg producing glaciers where rinks Isbræ (karrat Fjord and “Store” (“Large” or “great”) are located are among the more remarkable.

Size of the landed fish.

An overview of number of length measured Greenland halibut by year and gear is shown in table 3. Due to the

logistical challenges in Greenland not all months have commercial length information. In most years the sampling covers the 3 different categories (Uummannaq longline winter, Uummannaq gillnet winter and Uummannaq longline summer). Grader information has not been received from the 2022 (Tab 4.) and due to logistics no sampling was done in the summer of 2022.
In Uummannaq there is not any major difference between summer and winter fishing grounds and only small differences in the summer and winter length distributions are observed. Only Gear is accounted for in the length sampling. Mean individual length in the commercial landings have gradually decreased since 1993 with a drastic decrease from 60 cm in 2016 to just above 50 cm in 2023 (Fig 3).

ALK – Age Length Key

Age reading of Greenland halibut was suspended from 2011 to 2017 at GINR due to low quality of the age readings and lack of an internationally agreed method. However, in 2017 the ageing was reinitiated. An Age-Length-Key (ALK) is currently being constructed for every year back in time. For years prior to 2021, the ALK used to calculate CAA table, was created using age readings from whole frozen otoliths from all 3 inshore areas collected from 2008, 2009 and 2010.

CAA – Catch At Age

The CAA was constructed with individual years ALK from the GINR Uummannaq gillnet survey and based on the new method from 2021 (Tab. 5). The lag of sufficient length information from the catches, the CAA from Uummannaq is less certain in 2022. The bubbleplot indicates a shift to small and younger fish in 2023 (Fig. 4)

Factory landings CPUE (longline)

A general linear model (GLM) with year, month and vessel type and catch area as factors was applied to the longline landings in the factory provided landing slips from 2012 to 2023 (See SCR 22-024). The new CPUE based on Factory landings data consists of more than 10 000 observations in all years and covers >90% all longline fishery (table 6). The CPUE shows a gradual decrease from 2013 to 2022 and a substantial decrease in 2023. (Fig. 5).

Logbook CPUE (longline)

The CPUE initially increased from 2007 to 2011, but has gradually decreased since then. The CPUE calculated for 2023 is the lowest values in the timeseries (Fig 6.).

Logbook CPUE (Gillnet)

A general linear model (GLM) with year, month and boat as factors was applied to the longline fishery logbook data since 2008. Fewer observations is available in the first year 2008, and the initial value is uncertain.

From 2009, the CPUE gradually increases and peaks in 2013 and again in 2018, whereafter it decreases. caution should be given when interpreting the CPUE after 2017 due to the allowed reduction from 110 mm gillnets to 95mm gillnets leading to a gradual transition to these gillnets selecting fish on average about 10 cm smaller (figure 8) (change from about 60 to 50 cm at first selection). Both the previous old 110mm gillnets and new the 95mm gillnets mainly selects Greenland larger than the mean length in the landings (figure 8).

Discussion

The main indices for the stock have all gradually decreased in the period of high catches. The CPUEs based on longline fishery is have a similar trend although they are derived from two different sources of statistics. CPUE indices are often heavily criticized for being untrustworthy. However, the longline based CPUE's presented here are based on a very large number of observations. The CPUE index from the factory landings are based on all individual landings and typically constitute more than 10.000 observations per year. Furthermore, the longlines have been optimized for decades and are difficult to improve further. And finally

the Greenland halibut is not a schooling species with a patchy distribution, improving the ability of the CPUE to track changes in the stock.

References

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Table 1. Catches (t) of Greenland halibut in Uummannaq by gear and year.

	Uummannaq		Notes
Year	Longline Gillnet	Catch	
1954		16	
1955		76	
1956		84	
1957		31	
1958		177	
1959		206	
1960			No catch statistics ?
1961			No catch statistics ?
1962			No catch statistics ?
1963			No catch statistics ?
1964		403	
1965		688	
1966		675	
1967		593	
1968		407	
1969		584	
1970		326	
1971		149	
1972		271	
1973			No catch statistics ?
1974			No catch statistics ?
1975		309	
1976			No catch statistics ?
1977		754	
1978		1144	
1979		835	
1980		1422	
1981		1662	
1982		1210	
1983		966	
1984		1259	
1985		1833	
1986			No catch statistics ?
1987		2897	
1988		2920	
1989		2859	
1990		2779	
1991		3045	
1992		3067	

1993			3916	
1994			4004	
1995			7234	
1996	3176	1437	4579	
1997			6293	
1998			6912	
1999			8425	
2000	7103	465	7568	
2001	6185	375	6558	
2002			5339	
2003	3924	1115	5039	
2004	4140	1101	5248	
2005	1947	2908	4856	
2006			5984	
2007	4460	858	5318	
2008			5426	
2009			5451	
2010	5617	610	6226	
2011	5046	1179	6397	
2012	5847	357	6204	
2013	6639	369	7008	
2014	7800	407	8207	
2015	7279	962	8244	
2016	9512	792	10305	
2017	8261	788	9049	
2018	7505	1334	8839	
2019	8142	2021	10162	
2020	8880	1797	10677	
2021	8479	1130	9609	
2022	7977	1030	9007	Poor commercial sampling. No grader data available.
2023	7662	588	8250	

Notes.
1998 License requirements introduced.
2002 Offshore shrimp trawlers equipped with grid separators.
2008 First Quota regulations introduced
2009 Logbooks mandatory for vessels larger than 30^{ft}.
2011 Inshore shrimp trawlers equipped with grid separators.
2012 Separate TAC set for vessels and small boats.
2014 Quota free areas outside TAC placed by the fisheries minister.
2017 Minimum mesh size in gillnets reduced from 110 halfmesh (220mm) to 95mm halfmesh (190mm).

Table 2. Uummannaq Landings of Greenland halibut (t) by gear and month.

	Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OKT	NOV	DEC	Total
Longline	2011	169	156	306	560	357	772	1298	736	98	585	9	0	5046
	2012	387	614	625	158	217	1023	1140	957	301	184	207	35	5847
	2013	197	354	482	357	547	1128	1352	934	609	424	216	38	6639
	2014	172	351	667	572	347	965	1420	1201	1032	532	415	126	7800
	2015	173	462	701	598	211	494	1428	1068	1060	657	314	113	7281
	2016	598	731	585	469	871	1405	1540	1324	1129	519	217	127	9512
	2017	432	563	732	521	311	900	1340	1167	921	885	291	197	8261
	2018	157	370	508	564	427	1173	1455	1017	876	708	134	118	7505
	2019	443	409	440	466	666	1321	1398	1036	663	865	234	200	8142
	2020	193	470	455	440	537	1692	1597	1210	1102	760	183	241	8880
	2021	161	297	350	176	814	1632	1364	1208	1160	945	208	164	8479
	2022	146	219	671	735	376	1051	1569	1078	701	773	349	310	7977
	2023	305	539	671	554	461	1160	1167	681	826	768	291	238	7662

	Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OKT	NOV	DEC	Total
Gillnet	2011	158	293	8	0	140	531	50	0	0	0	0	0	1179
	2012	90	37	60	14	0	3	0	0	0	9	57	85	357
	2013	66	56	54	77	28	0	0	1	0	0	57	30	369
	2014	83	76	42	62	0	1	0	0	0	0	40	104	407
	2015	74	38	59	43	1	0	617	95	2	0	23	10	963
	2016	20	40	44	115	38	0	0	67	180	120	86	82	792
	2017	46	18	27	33	24	37	46	3	32	131	158	233	788
	2018	163	76	270	316	3	14	3	0	0	0	320	169	1334
	2019	207	509	362	263	8	1	1	3	1	1	250	414	2021
	2020	229	324	380	284	3	4	4	2	3	13	261	288	1797
	2021	241	55	104	207	59	6	0	0	0	0	85	373	1130
	2022	248	10	105	127	141	16	0	0	0	0	163	219	1030
	2023	67	15	90	61	5	0	0	0	0	0	138	212	588

	Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OKT	NOV	DEC	Total
Total	2011													
	2012	477	651	685	172	217	1026	1140	957	301	193	265	120	6204
	2013	263	410	537	434	575	1128	1352	935	609	424	273	68	7008
	2014	256	427	710	633	347	965	1420	1201	1032	532	455	230	8207
	2015	247	500	761	640	212	494	2045	1163	1063	657	337	124	8244
	2016	618	772	629	584	908	1405	1540	1391	1309	638	303	208	10305
	2017	478	581	760	554	335	938	1386	1169	953	1016	449	430	9049
	2018	320	445	778	880	430	1187	1458	1017	876	708	454	287	8839
	2019	650	918	802	730	674	1322	1400	1039	664	866	484	614	10162
	2020	423	794	835	725	540	1696	1601	1212	1105	773	444	528	10677
	2021	402	352	454	383	873	1638	1364	1208	1160	946	293	536	9609
	2022	394	229	776	862	517	1068	1569	1078	701	773	512	529	9007
	2023	372	554	761	616	466	1160	1167	681	826	768	429	450	8250

Table 3 Number of length measured Greenland halibut by gear, division and month from the inshore areas in 2019. Blocks indicates the use of length distributions in the CAA calculation.

	Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Longline	2010	-	3047	1583	-	-	-	-	-	854	2673	-	-
	2011	-	287	3265	1853		2973	2328	988	-	5124	-	-
	2012	-	-	2416	-	-	-	-	1469	-	-	-	-
	2013	-	484	3068	-	-	-	-	287	1485	-	-	-
	2014	-	4390	-	-	-	-	-	1690	-	-	-	-
	2015	-	5972	-	-	-	-	864	821	-	-	-	-
	2016	-		5940	-	-	-	777		-	-	-	-
	2017	-	5126	3858	-	-	-		4208	-	-	-	-
	2018	-	732	4770	-	-	-	3239	-	-	-	-	-
	2019	-	3653	-	-	-	-	204	3250	-	-	-	-
	2020	-	3955	-	-	-	453	-	2031	1334	-	-	-
	2021	-	821	2259	-	-	-	-	3232		-	-	-
	2022	-	-	495	-	-	-	-	-	-	-	-	-
	2023	-	-	-	-	-	-	1446	-	2785	-	631	1026

	Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Gillnet	2010	-	127		-	-	-	-	-	-	-	-	-
	2011	-	632	1454	-	-	-	-	-	-	-	-	-
	2012	-	-	-	-	-	-	-	-	-	-	-	-
	2013	-	45	-	-	-	-	-	-	-	-	-	-
	2014	-	-	-	-	-	-	-	-	-	-	-	-
	2015	-	185	-	-	-	-	-	-	-	-	-	-
	2016	-	-	487	-	-	-	-	-	-	-	-	-
	2017	-	102	-	-	-	-	-	-	-	-	-	-
	2018	-	331	91	-	-	-	-	-	-	-	-	-
	2019	-	1902	-	-	-	-	-	-	-	-	-	-
	2020	1744	2753	-	-	-	-	-	-	-	-	-	-
	2021	-	163	-	-	-	-	-	-	-	-	-	-
	2022	-	-	237	-	-	-	-	-	-	-	-	-
	2023	-	-	-	-	-	-	-	-	-	-	44	-

Table 4 2021 Uummannaq grader data: W is the mean weight (g) of the individual weights registered by the grader. # obs is the number of Greenland halibut passing the grader in Uummannaq in 2021. ML is the Mean of the lengths estimated from a LW relationship and the individual W (g). Raw data kindly provided by the Greenland fishing industry. (data not received in 2022)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021	20899	13761	48620	55551	146335	177245	155751	153469	115541	79663	NA	NA
2022						ND						
2023						ND						

Table 5. 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
2017	2	28	204	424	924	1079	564	553	299	174	121	62	38		4473
2018	2	36	265	499	1036	1150	586	550	261	137	93	43	29		4687
2019	5	67	311	528	1171	1307	691	644	306	158	102	47	35		5372
2020	5	61	356	576	1225	1404	694	652	319	162	120	57	38		5668
2021	0	148	673	1408	1435	1088	719	405	175	129	27	33	5	18	6263
2022	7	164	1946	1683	525	549	359	174	57	26	5	1	0	14	11020
2023	43	240	2237	1451	929	1027	384	181	75	32	23	18	17	6	6663

Notes:
2009-The CAA is based on age-readings from 2008,2009 and 2014 from 2009-2020.
2021, 2022, CAA based on readings from individual years.
2022 poor length freq sampling.

Table 6 **CPUE** Factory landings (longline only) used to calculate longline CPUE for all longline fishery.

Year	GLM LogCPUE	SE	df	lower.CL	upper.CL	Kg/100 hooks
2012	-0.29013	0.024029	185951	-0.33722	-0.24303	74.82
2013	-0.34115	0.023979	185951	-0.38814	-0.29415	71.1
2014	-0.31762	0.023991	185951	-0.36464	-0.2706	72.79
2015	-0.40729	0.023915	185951	-0.45417	-0.36042	66.54
2016	-0.33568	0.023866	185951	-0.38245	-0.2889	71.49
2017	-0.59524	0.023796	185951	-0.64188	-0.5486	55.14
2018	-0.66164	0.023803	185951	-0.7083	-0.61499	51.6
2019	-0.69361	0.023765	185951	-0.74019	-0.64703	49.98
2020	-0.72849	0.023793	185951	-0.77512	-0.68185	48.26
2021	-0.71104	0.023831	185951	-0.75775	-0.66433	49.11
2022	-0.77757	0.023823	185951	-0.82426	-0.73088	45.95
2023	-1.1537	0.023746	185951	-1.20024	-1.10716	31.55

Table 7. CPUE **L**ogbook (**longline**) for vessels >30ft. Uumannaq

Year	GLM LogCPUE	SE	df	lower.CL	upper.CL	Kg/100 hooks
2006	6.081412	0.080185	14709	5.92424	6.238585	43.76
2007	5.931054	0.033608	14709	5.865177	5.996931	37.66
2008	5.926074	0.033819	14709	5.859784	5.992364	37.47
2009	5.961189	0.033344	14709	5.895832	6.026547	38.81
2010	6.115791	0.029295	14709	6.058368	6.173213	45.3
2011	6.232876	0.026277	14709	6.181371	6.284382	50.92
2012	6.165847	0.02604	14709	6.114806	6.216889	47.62
2013	6.077081	0.024415	14709	6.029225	6.124936	43.58
2014	6.219636	0.024333	14709	6.171939	6.267332	50.25
2015	6.048367	0.024261	14709	6.000814	6.095921	42.34
2016	6.041831	0.023411	14709	5.995943	6.087719	42.07
2017	5.864731	0.024218	14709	5.817261	5.912202	35.24
2018	5.930336	0.025414	14709	5.88052	5.980151	37.63
2019	5.885225	0.024069	14709	5.838047	5.932402	35.97
2020	5.818093	0.025135	14709	5.768826	5.867361	33.63
2021	5.96711	0.026684	14709	5.914806	6.019414	39.04
2022	5.773016	0.027863	14709	5.7184	5.827632	32.15
2023	5.580592	0.029781	14709	5.522218	5.638967	26.52

Table 8. CPUE logbook (**gilllnet**) for vessels >30ft. Uumannaq

Year	GLM LogCPUE	SE	df	lower.CL	upper.CL	Kg/gillnet
2008	3.172327	0.255037	5374	2.67235	3.672304	23.86
2009	3.986192	0.070842	5374	3.847313	4.125071	53.85
2010	4.075132	0.065379	5374	3.946963	4.203301	58.86
2011	4.181323	0.061906	5374	4.059962	4.302685	65.45
2012	4.10098	0.072059	5374	3.959716	4.242244	60.4
2013	4.437642	0.07	5374	4.300415	4.574869	84.58
2014	4.368797	0.068911	5374	4.233705	4.50389	78.95
2015	4.255272	0.081913	5374	4.09469	4.415855	70.48
2016	4.290437	0.072294	5374	4.148711	4.432164	73
2017	4.380836	0.071717	5374	4.240241	4.521431	79.9
2018	4.394854	0.065534	5374	4.266381	4.523327	81.03
2019	4.327477	0.064086	5374	4.201844	4.453111	75.75
2020	4.123717	0.061736	5374	4.00269	4.244743	61.79
2021	4.244172	0.062473	5374	4.121699	4.366644	69.7
2022	4.148703	0.062781	5374	4.025627	4.271779	63.35
2023	3.9181	0.066936	5374	3.786879	4.049321	50.3

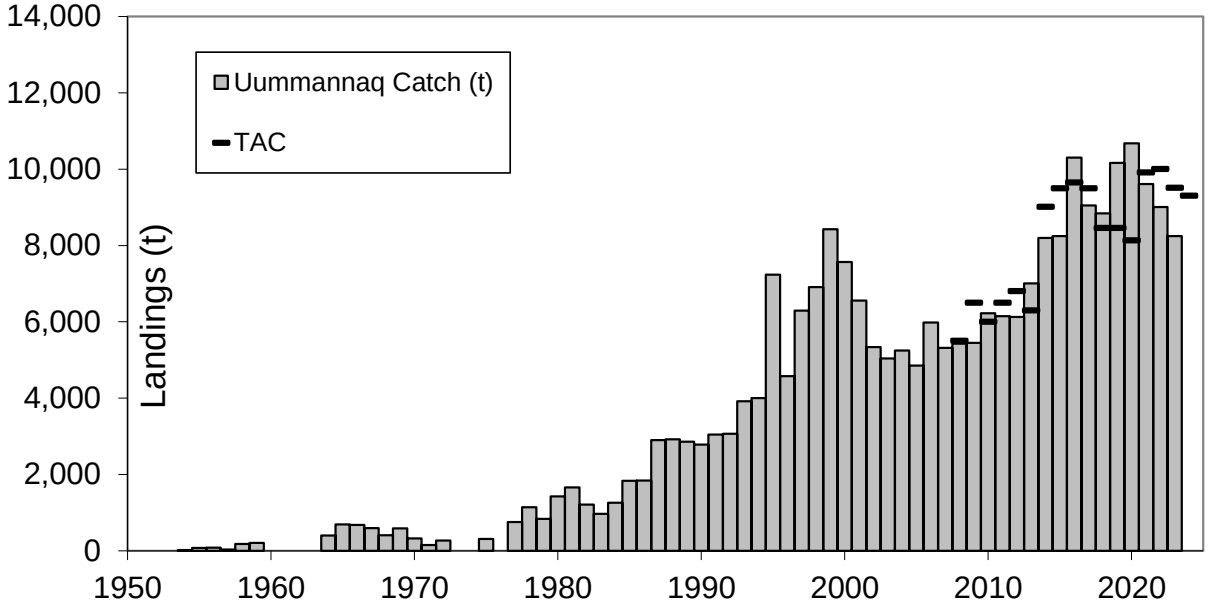

Figure 1. Catches of Greenland halibut in NAFO Subarea 1 Division 1Ainshore since 1954.

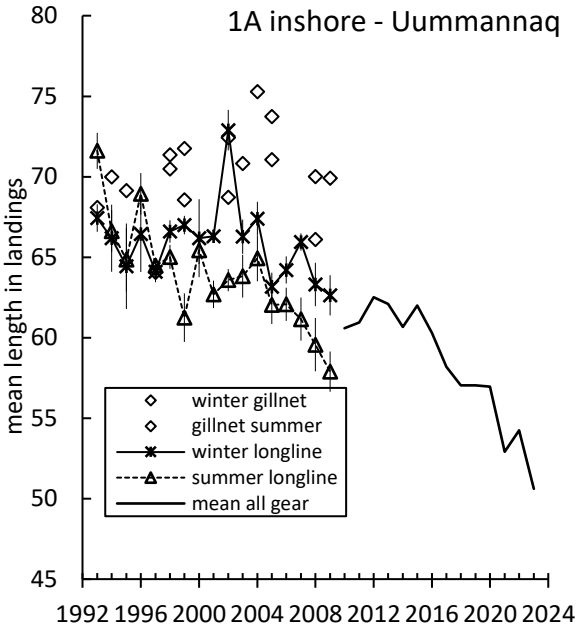

Figure 2. Uummannaq mean length in the landings: longline summer, longline winter, gillnet and overall mean weighted by area, season gear and amounts (after 2010).

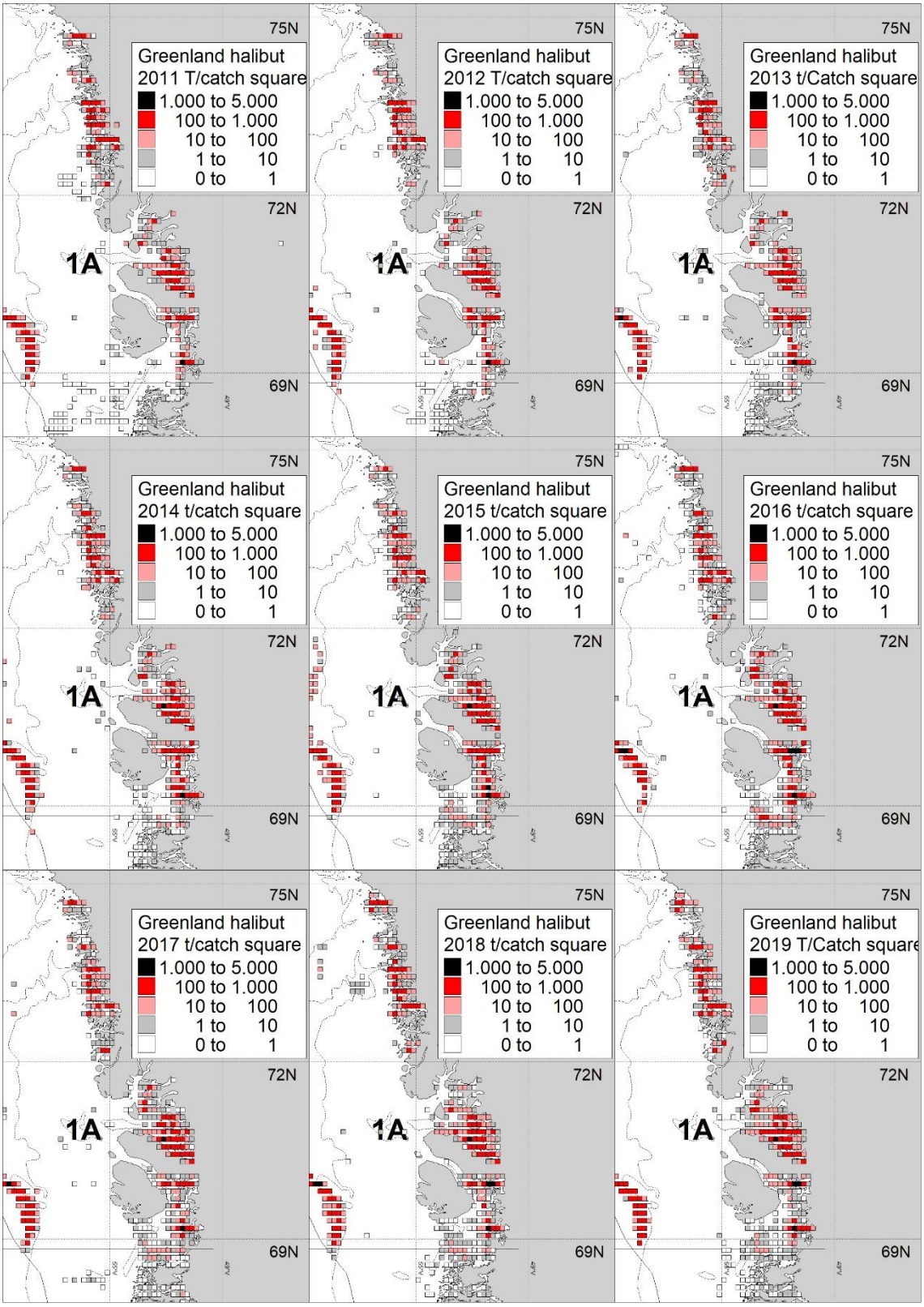

Figure 3. Greenland halibut catch by statistical square in the Disko Bay.

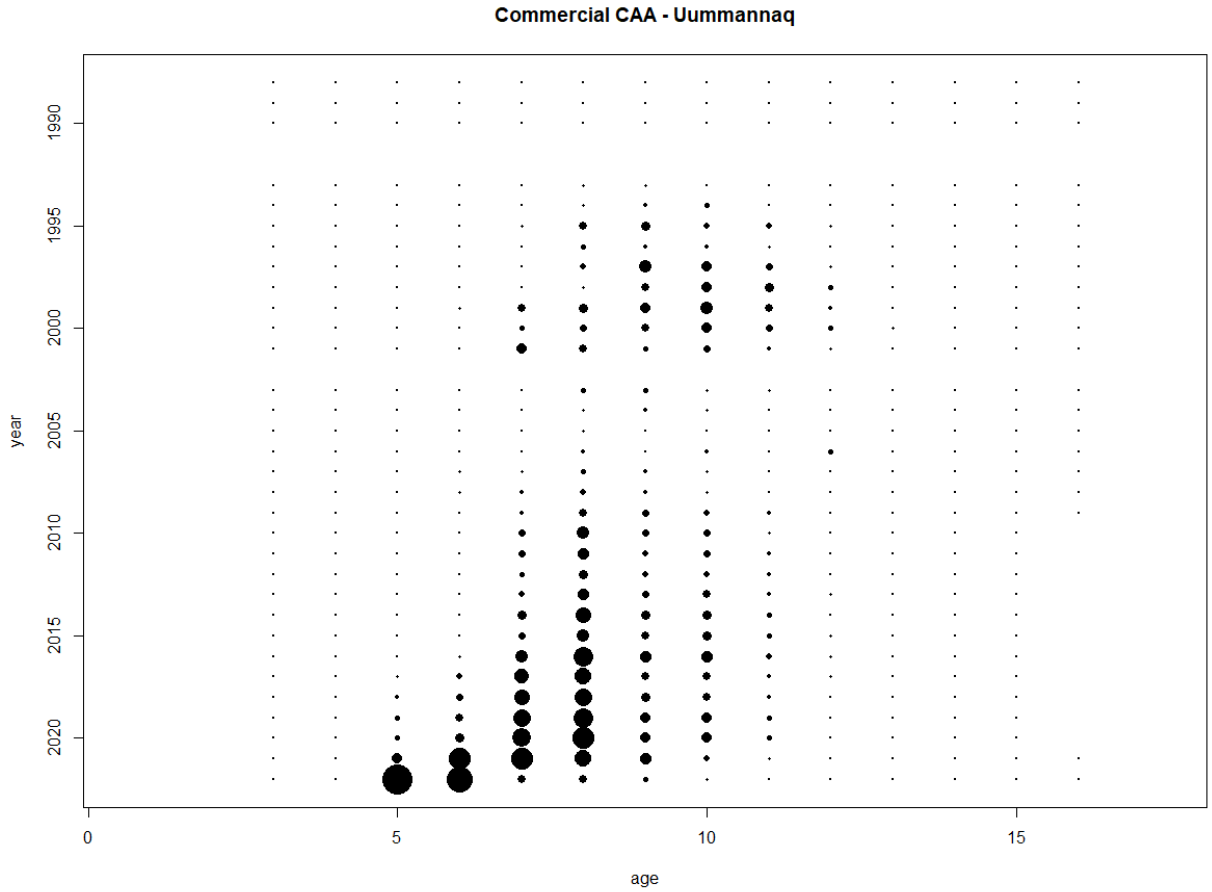

Figure 4. Catch At Age CAA bubble plot for the commercial landings in Uummannaq. Year 2021 have been recalculated by the new ALK from Uummannaq 2021.

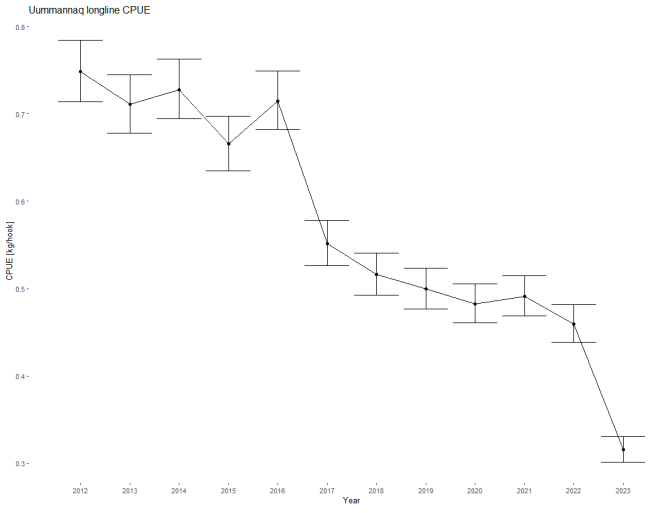

Figure 5. Commercial CPUE (Kg/hook) based on factory landing reports from all factories in Uummannaq.

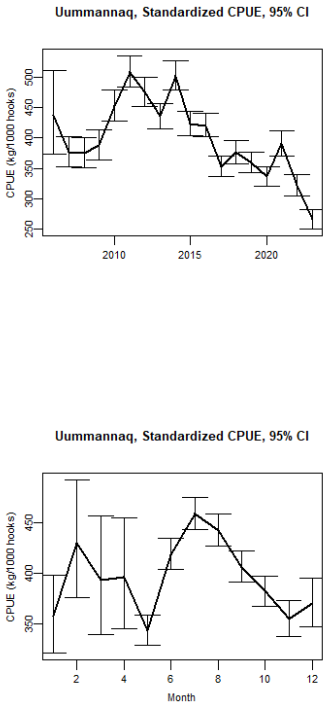

Figure 6. Standardized longline mean and 95% CI CPUE based on logbooks from vessels larger than 30ft in Uummannaq.

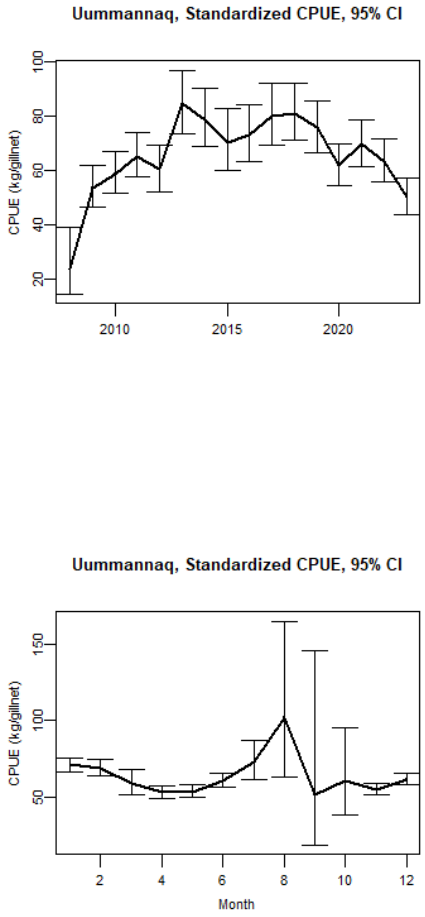

Figure 7. Gillnet Standardized mean and 95% CI CPUE based on logbooks from vessels larger than 30ft in Uummannaq.

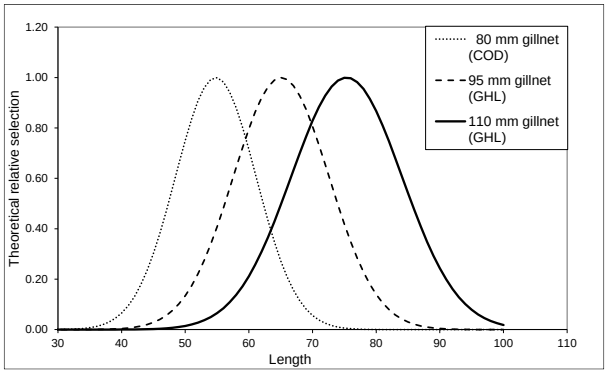

Figure 8. Relative selection curves for Greenland halibut with the most recently used gillnets. After a period with increasing use of illegal use of cod gillnets in the Disko bay used to target Greenland halibut, the legal meshsize was changed from 110 mm halfmesh to 95mm halfmesh in 2017.