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Survey results of the German bottom trawl survey 1982-2020 with special reference to years

2016 - 2019

by

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Abstract

Technical problems with the FRV Walther Herwig III in 2016-2018 limited the capacity to carry out a sufficient survey with the long-term minimum of 22 hauls in 2016 and 7 in 2017 in West Greenland and no survey in 2018. In 2019, 39 hauls were conducted, but survey coverage was confined to NAFO SA 1E and 1F, most of the effort carried out in NAFO SA 1F (Table 2). In 2020, 43 hauls were taken in SA 1C-1F, although with low coverage in 1E-1F.

The 2020 indices for American plaice (*Hippoglossoides platessoides*) are at a low level, for Atlantic wolffish (*Anarhichas lupus*) and Starry ray (*Amblyraja radiata*) at a very low level, and for spotted wolffish (and *A. minor*) at intermediate level.



Results

American plaice (*Hippoglossoides platessoides*)

Table 3 shows that American plaice has a strong presence in NAFO SA 1D. The stock stagnates at about 1000 t in the years until 2015 and in 2020. A survey index cannot be calculated for the period 2016-19.

The relative length composition indicates a significant portion of incoming cohorts in 2016 and 2017. In 2019, size classes > 20 cm dominated, indicating the propagation of growth for the cohort observed in 2016 at 12 cm at age 1 now at age 4. This is further observed in 2020 now at a size of about 30 cm.

Atlantic and spotted wolfish (*Anarhichas lupus* and *A. minor*)

Data for *A. lupus* indicate a decline in abundance 2010 to 2015. The length distribution indicates a high proportion of specimens > 50 cm in 2019 (Fig. 2). The decline is further observed in 2020, with an all time low of 317 t.

Biomass for *A. minor* increased from 2010 to 2015, the value for 2014 being the second highest value in the time series after 1983. In 2015 3543 t were indicated, as compared to 3555 t in 2020.

Starry ray (*Amblyraja radiata*)

In 2019, the lowest stock size in the time series was measured, considering NAFO SA 1E and 1F only. However, it is unclear whether a northward shift in distribution has occurred. This negative trend is corroborated by the 2020 index value, indicating an all time low value of 19 t.

Tables and Figures

Table 1. Trawl parameters of the German bottom trawl survey off West Greenland.

	German survey
Gear	140-feet bottom trawl
Horizontal net opening	22 m
Standard trawling speed	4.5 kn
Towing time	30 minutes
Coefficient of catchability	1.0

Table 2. Survey areas and effort (hauls) of the German bottom trawl survey off West Greenland by stratum, 1982-2020. Strata 1.1 – 4.2 refer to West Greenland, corresponding NAFO SA's indicated.

NAFO SD	1C	1D	1E	1F						
Stratum	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	Sum	YEAR
Area	6805	1881	2350	1018	1938	742	2568	971		
(sqnm)										
N										
	20	11	16	7	9	6	13	2	84	1982
	26	11	25	11	17	5	18	4	117	1983
	25	13	26	8	18	6	21	4	121	1984
	10	8	26	10	17	5	21	4	101	1985
	27	9	21	9	16	7	18	3	112	1986
	25	11	21	4	18	3	21	3	117	1987
	34	21	28	5	18	5	18	2	131	1988
	26	14	30	9	8	3	25	3	118	1989
	19	7	23	8	16	3	21	6	103	1990
	19	11	23	7	12	6	14	5	98	1991
	6	6	6	5	6	6	7	5	47	1992
	9	6	9	6	10	8	7		56	1993
	16	13	13	8	10	6	7	5	78	1994
			3		10	7	10	5	35	1995
	5	5	8	5	12	5	10	5	55	1996
	5	6	5	5	6	5	8	5	45	1997
	9	5	10	7	11	6	10	5	63	1998
	8	6	14	8	13	6	9	3	68	1999
	13	6	14	7	14	5	9	5	73	2000
			15	7	15	5	11	6	59	2001
			7	2	5	6	8	4	32	2002
			7	6	7	7	6	5	39	2003
	9	7	11	9	9	6	9	5	65	2004
			9	7	8	6	6	5	41	2005
	6	5	7	5	7	7	8	5	50	2006
	5	5	7	5	6	5	9	6	47	2007
	5		7	7	8	9	8	6	50	2008
	2		5	5	6	6	5	5	34	2009
	5	5	10	5	7	9	10	6	57	2010
			5	5	5	5	6	6	32	2011
	5	5	10	8	9	7	10	6	60	2012
	6	6	8	6	10	7	9	6	58	2013
	5	5	10	8	10	7	10	6	61	2014
	7	7	7	4	5	5	8	6	49	2015
	.	.	.	.	3	2	11	6	22	2016
							7		7	2017
					9	7	16	7	39	2018
	9	6	12	4	2	4	6		43	2019
										2020

Table 3. *Hippoglossoides platessoides*, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2020. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland. Survey totals are not calculated for years with overall low stratum coverage.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	15949	2756	15277	2874	1283	1250	494	112	39995	31
1983	18948	3015	23106	1251	3753	229	803	292	51397	44
1984	9741	2989	28310	2309	1792	1133	693	210	47177	52
1985	9616	2627	11253	3560	1289	118	1425	1078	30966	28
1986	10024	6178	26557	4647	1336	1131	2036	401	52310	47
1987	12368	1505	13387	5853	1200	552	496	245	35606	30
1988	5267	1746	4260	2799	1870	436	540	635	17553	21
1989	4433	2406	6386	1993	4384	630	639	328	21199	24
1990	4811	4143	4467	1674	635	1016	888	336	17970	30
1991	4327	2503	2625	1086	782	404	737	424	12888	21
1992	4284	2938	1835	1731	817	1136	873	86	13700	24
1993	3471	1930	799	867	380	463	219	.	8129	20
1994	1035	1787	725	725	307	137	819	103	5638	28
1995	.	.	468	.	452	581	526	654	2681	44
1996	2010	744	526	770	1033	448	840	277	6648	21
1997	4272	1649	1303	1747	1508	700	1268	57	12504	24
1998	3276	2106	3124	1517	929	598	1210	106	12866	27
1999	2845	1258	2692	1570	959	221	733	188	10466	25
2000	1235	2161	1073	1924	567	198	682	21	7861	28
2001	.	.	6224	2139	614	211	2011	213	11412	41
2002	.	.	3841	6360	618	1191	882	272	13164	47
2003	.	.	10804	6371	601	1131	1124	10	20041	46
2004	10326	4647	9932	3541	524	657	940	35	30602	29
2005	.	.	9080	4663	780	621	542	436	16122	43
2006	2649	2733	5325	4182	614	643	649	27	16822	34
2007	4981	2876	2005	1563	340	224	112	21	12122	32
2008	2760	.	1591	2386	248	434	227	19	7665	45
2009	4087	.	1425	1614	410	320	424	29	8309	38
2010	11875	3051	2618	4037	319	258	428	0	22586	34
2011	.	.	1569	3871	276	485	268	15	6484	63
2012	1549	1933	1890	2261	84	309	341	0	8367	34
2013	3370	2101	1367	1905	44	375	32	4	9198	35
2014	706	894	614	3639	41	550	16	0	6460	57
2015	2133	936	905	2660	71	752	87	0	7544	37
2016					68	0	150	22		
2017							570			
2018										
2019					25	324	51	23		
2020	1696	1124	782	1110	41	1134	27		5914	33

Biomass										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	3102	504	3888	582	405	225	74	42	8822	34
1983	3035	544	4962	263	1609	44	140	57	10654	41
1984	888	366	4514	425	357	197	129	48	6924	58
1985	878	266	1889	602	252	24	149	280	4340	33
1986	987	609	3827	676	324	214	205	129	6971	47
1987	1669	156	2832	703	319	82	107	60	5928	37
1988	443	150	875	396	426	73	117	220	2700	31
1989	253	161	837	195	1051	97	128	75	2797	35
1990	236	262	661	200	123	174	186	124	1966	42
1991	188	218	252	152	145	79	111	76	1221	26
1992	308	232	136	131	106	165	79	13	1170	27
1993	193	147	53	72	41	48	14	.	568	22
1994	70	215	65	69	32	16	55	15	537	41
1995	.	.	44	.	36	74	64	48	266	52
1996	116	56	37	89	84	45	81	22	530	27
1997	242	134	105	169	179	92	98	3	1022	30
1998	160	135	193	130	97	83	98	10	906	26
1999	127	75	178	145	95	20	48	12	700	25
2000	68	184	77	180	58	20	30	3	620	34
2001	.	.	357	166	52	24	82	12	693	36
2002	.	.	218	474	63	112	59	14	940	49
2003	.	.	768	587	65	136	93	2	1651	40
2004	639	383	897	426	71	98	119	3	2636	28
2005	.	.	1175	780	128	76	85	56	2300	45
2006	148	256	574	612	70	64	118	5	1847	45
2007	300	250	347	216	45	33	27	4	1222	41
2008	183	.	202	264	30	49	29	3	760	51
2009	247	.	155	128	46	39	26	5	646	37
2010	819	202	204	347	46	31	40	0	1689	34
2011	.	.	172	343	38	59	36	2	650	63
2012	208	245	257	252	14	54	35	0	1065	33
2013	274	252	170	215	7	72	5	0	995	35
2014	97	131	90	461	5	99	3	0	886	55
2015	227	100	115	408	13	186	14	0	1063	47
2016					1	0	18	1		
2017							21			
2018										
2019					7	70	9	3		
2020	240	156	108	162	9	275	13	.	963	35

Table 4. *Hippoglossoides platessoides*. Length composition by year ('1000), 2013-2020, all available values considered.

Length	2011	2012	2013	2014	2015	2016	2017	2019	2020
0.5	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0
3.5	2	0	0	0	0	0	0	0	0
4.5	4	4	0	3	21	0	0	0	13
5.5	12	8	0	8	0	0	0	0	6
6.5	38	38	0	0	0	0	0	0	0
7.5	9	14	0	11	0	0	0	0	0
8.5	6	17	0	0	7	0	0	0	16
9.5	27	38	0	8	15	4	22	0	0
10.5	102	74	23	5	33	4	37	0	0
11.5	135	75	33	8	31	13	66	0	13
12.5	88	116	114	13	129	28	44	3	7
13.5	132	192	224	56	144	29	30	0	29
14.5	244	210	435	202	242	42	37	0	69
15.5	409	210	418	218	310	9	82	0	134
16.5	475	294	522	342	488	31	86	0	260
17.5	449	400	786	445	531	0	42	3	456
18.5	490	444	849	475	466	0	35	2	508
19.5	292	428	771	408	507	9	26	7	236
20.5	305	294	496	464	488	7	36	24	274
21.5	279	374	589	350	423	11	13	24	242
22.5	336	299	362	377	313	4	0	40	304
23.5	219	371	362	360	296	8	7	29	235
24.5	165	324	573	286	295	4	0	37	345
25.5	226	300	386	266	229	0	0	41	200
26.5	192	288	438	296	319	0	0	29	222
27.5	221	234	425	165	294	0	0	36	195
28.5	198	196	272	239	263	0	0	29	316
29.5	161	211	214	246	238	0	0	6	269
30.5	164	246	370	173	296	9	7	5	280
31.5	105	235	178	252	210	0	0	10	204
32.5	138	221	57	231	204	9	0	10	240
33.5	132	145	97	160	168	0	0	14	171
34.5	80	167	71	186	143	9	0	12	139
35.5	85	166	36	61	125	4	0	12	130
36.5	54	183	39	58	99	0	0	10	61
37.5	29	159	52	54	48	0	0	12	62
38.5	41	187	4	10	60	0	0	7	35
39.5	18	154	0	3	44	5	0	11	12
40.5	19	173	10	9	29	0	0	5	8
41.5	32	131	0	2	13	0	0	0	9
42.5	24	103	0	0	13	0	0	0	0

Table 5. *Anarhichas lupus*, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2020. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland. Survey totals are not calculated for years with overall low stratum coverage.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	5656	1992	1852	1188	892	350	433	248	12611	19
1983	3250	1442	751	206	1399	131	495	448	8122	20
1984	3162	612	766	103	673	52	434	237	6039	17
1985	2304	1206	785	172	449	505	440	701	6562	19
1986	2185	843	922	291	641	243	359	330	5814	25
1987	2543	503	410	305	478	28	333	530	5130	19
1988	2366	1030	428	202	582	308	386	322	5624	25
1989	1829	356	1031	268	1236	218	521	142	5601	21
1990	2175	639	1059	179	956	74	659	328	6069	22
1991	1694	544	489	513	1293	342	362	223	5460	27
1992	1625	235	857	915	1688	475	803	994	7592	31
1993	2704	932	471	243	337	232	224	.	5143	29
1994	733	632	811	284	598	78	2237	607	5980	46
1995	.	.	489	.	686	308	273	479	2235	31
1996	406	533	136	209	1408	390	421	632	4135	33
1997	1532	640	535	168	1924	647	837	1440	7723	36
1998	1686	505	427	359	1038	410	538	550	5513	28
1999	2346	525	1033	370	3227	712	572	446	9231	46
2000	1038	964	228	230	1160	642	260	1587	6109	34
2001	.	.	560	624	1981	650	394	1029	5238	34
2002	.	.	1606	418	1807	231	278	2224	6564	40
2003	.	.	703	1014	3894	304	323	874	7112	46
2004	4452	1218	953	467	1711	570	690	1044	11105	23
2005	.	.	1977	261	3299	687	1424	374	8022	41
2006	1062	805	904	454	839	626	787	787	6264	32
2007	1388	330	634	420	1135	497	214	577	5195	34
2008	706	.	345	183	339	179	107	444	2303	27
2009	933	.	517	95	549	230	69	350	2743	39
2010	1412	234	717	64	641	307	199	551	4125	37
2011	.	.	504	186	791	224	297	423	2425	37
2012	250	186	439	152	386	80	323	775	2591	38
2013	534	211	333	178	262	81	216	591	2406	24
2014	574	168	132	145	124	213	48	316	1720	27
2015	385	111	319	148	51	89	190	398	1691	30
2016					344	75	103	836		
2017							15			
2018										
2019					62	20	42	132		
2020	139	374	95	68	0	0	63	.	739	37

Biomass										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	5090	1764	2701	2052	1086	361	565	339	13958	26
1983	1611	1537	914	199	2110	171	689	634	7865	27
1984	1653	332	648	104	401	35	519	197	3889	18
1985	804	499	513	95	267	278	308	572	3336	19
1986	793	448	668	196	427	213	342	360	3447	23
1987	1064	158	269	119	496	17	311	511	2945	20
1988	534	215	381	135	454	194	351	281	2545	20
1989	370	116	366	137	786	99	482	85	2441	27
1990	452	102	267	63	350	34	428	170	1866	22
1991	272	87	81	105	338	81	185	97	1246	30
1992	243	52	173	261	450	103	198	303	1783	33
1993	392	171	66	50	78	48	65	.	870	24
1994	102	111	176	49	141	13	429	99	1120	45
1995	.	.	100	.	127	38	69	74	408	29
1996	36	149	23	38	266	71	89	139	811	33
1997	154	122	43	39	345	93	193	189	1178	39
1998	194	102	68	79	150	68	92	139	892	25
1999	173	127	171	83	536	123	93	130	1436	45
2000	123	167	38	47	200	97	94	334	1100	39
2001	.	.	117	148	516	122	99	325	1327	37
2002	.	.	315	76	459	53	74	475	1452	38
2003	.	.	261	258	1308	83	107	384	2401	47
2004	696	229	304	137	515	180	305	390	2756	22
2005	.	.	766	94	946	181	721	232	2940	28
2006	168	189	402	180	350	121	590	495	2495	32
2007	329	82	273	151	423	116	166	415	1955	35
2008	80	.	184	39	166	51	60	189	769	37
2009	84	.	187	29	128	54	21	196	699	43
2010	246	63	105	20	234	96	117	499	1380	66
2011	.	.	134	61	234	76	104	232	841	36
2012	101	55	172	37	155	33	243	359	1155	38
2013	197	93	147	81	166	28	166	439	1317	31
2014	46	83	93	51	104	101	53	278	809	32
2015	121	55	199	64	71	15	158	149	832	27
2016					695	29	68	393		
2017							8			
2018										
2019					65	24	89	129		
2020	48	66	64	35	0	0	104	.	317	32

Table 6. *Anarhichas lupus*. Length composition by year ('1000), 2013-2020, all available values considered.

Length	2013	2014	2015	2016	2017	2019	2020
0.5	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0
3.5	0	0	0	0	0	0	0
4.5	0	0	0	0	0	0	0
5.5	0	29	9	0	0	0	0
6.5	11	141	0	3	0	0	0
7.5	0	7	24	0	0	5	11
8.5	37	29	25	7	7	5	0
9.5	41	0	27	0	0	0	0
10.5	35	8	0	11	0	2	11
11.5	66	4	11	22	0	7	0
12.5	20	83	21	36	0	0	7
13.5	24	7	6	44	0	15	7
14.5	30	27	17	14	0	7	0
15.5	41	37	51	42	0	6	16
16.5	65	96	47	48	0	12	25
17.5	55	53	67	20	0	14	0
18.5	89	48	45	62	0	3	10
19.5	20	26	44	66	0	0	19
20.5	93	36	48	88	0	11	29
21.5	112	32	43	93	0	3	0
22.5	83	59	75	74	0	6	0
23.5	70	78	47	24	0	0	4
24.5	79	10	33	34	0	5	7
25.5	54	63	49	56	0	0	12
26.5	75	64	27	43	0	0	7
27.5	55	51	47	35	0	0	9
28.5	60	14	84	39	0	0	33
29.5	72	42	14	11	0	0	11
30.5	12	15	45	33	0	0	7
31.5	51	74	9	7	0	8	22
32.5	62	33	22	14	0	0	0
33.5	61	37	47	19	0	8	233
34.5	57	14	44	0	0	9	5
35.5	46	15	33	3	0	0	38
36.5	65	39	48	10	0	0	0
37.5	7	35	22	12	0	0	0
38.5	10	24	44	14	0	0	6
39.5	25	8	39	7	0	3	9
40.5	32	36	7	3	0	0	16
41.5	58	31	26	21	0	6	4

42.5	25	31	39	0	0	0	0
43.5	46	6	48	11	0	0	22
44.5	47	6	12	3	0	0	27
45.5	44	19	44	14	0	4	6
46.5	44	6	7	15	0	0	4
47.5	21	12	6	3	7	0	5
48.5	60	7	35	0	0	0	23
49.5	19	22	7	16	0	0	30
50.5	46	15	19	31	0	0	0
51.5	25	9	15	20	0	6	0
52.5	6	19	4	7	0	0	0
53.5	15	12	22	7	0	2	0
54.5	16	28	18	10	0	6	7
55.5	19	19	25	3	0	9	5
56.5	52	4	48	0	0	4	9
57.5	13	14	7	22	0	14	4
58.5	32	10	19	33	0	12	9
59.5	4	10	6	10	0	22	0
60.5	0	26	18	14	0	5	11
61.5	26	3	9	4	0	2	9

Table 7. *Anarhichas minor*, abundance ('1000) and biomass (tons) for West Greenland by stratum and total, 1982-2020. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland. Survey totals are not calculated for years with overall low stratum coverage.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	188	106	196	77	58	7	154	88	874	28
1983	98	16	62	2	57	24	615	76	950	35
1984	101	30	97	9	47	11	154	18	467	24
1985	100	51	54	2	13	31	52	20	323	28
1986	206	98	51	19	32	8	56	10	480	21
1987	152	68	29	0	61	13	119	30	472	29
1988	115	83	24	7	75	19	179	22	524	29
1989	209	66	29	13	127	0	50	5	499	32
1990	60	123	20	11	53	0	102	3	372	32
1991	178	82	16	20	27	4	44	24	395	26
1992	19	32	7	75	16	11	7	14	181	61
1993	46	118	30	31	20	11	35	.	291	43
1994	30	56	28	30	9	5	14	4	176	36
1995	.	.	78	.	9	2	9	0	98	72
1996	0	34	30	22	9	7	0	4	106	59
1997	56	31	8	19	30	10	20	37	211	39
1998	62	15	14	6	14	16	21	23	171	36
1999	16	44	30	21	26	9	15	27	188	37
2000	120	94	15	52	19	6	29	28	363	22
2001	.	.	26	15	42	3	23	7	116	30
2002	.	.	57	10	40	13	0	12	132	40
2003	.	.	34	19	16	5	7	4	85	49
2004	69	34	35	46	35	16	71	50	356	29
2005	.	.	64	39	19	8	155	18	303	39
2006	243	8	52	27	98	22	73	57	580	35
2007	113	17	86	9	79	10	55	35	404	31
2008	112	.	18	3	53	15	66	28	295	43
2009	0	.	71	9	44	11	16	11	162	47
2010	59	10	27	4	40	6	56	26	228	38
2011	.	.	0	29	50	0	26	21	126	52
2012	92	17	29	14	47	12	45	54	310	30
2013	49	16	170	8	135	20	49	115	562	38
2014	0	41	306	14	74	23	130	97	685	42
2015	21	13	42	47	181	13	50	82	449	47
2016					118	51	134	107		
2017							90			
2018										
2019					90	12	79	28		
2020	49	13	92	27	144	0	45	.	370	42

Biomass										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	1086	333	1149	438	242	21	946	925	5140	37
1983	895	105	283	3	380	103	4106	564	6439	36
1984	451	107	571	10	229	25	901	119	2413	27
1985	6	51	254	0	59	155	336	118	979	36
1986	524	157	268	29	169	20	467	118	1752	29
1987	337	54	150	0	491	59	1033	186	2310	38
1988	-39	43	105	38	585	59	1711	45	2547	66
1989	276	17	92	22	625	0	388	20	1440	41
1990	53	47	106	4	361	0	821	1	1393	50
1991	13	17	1	5	134	4	391	78	643	73
1992	3	5	0	5	12	2	18	17	62	85
1993	28	22	8	20	21	11	120	.	230	68
1994	14	13	34	13	5	1	79	2	161	73
1995	.	.	68	.	35	24	101	0	228	91
1996	0	73	18	23	20	5	0	5	144	71
1997	38	5	12	19	19	1	12	30	136	51
1998	12	1	56	15	61	2	137	25	309	65
1999	17	25	75	16	56	6	83	76	354	44
2000	133	56	51	104	120	49	139	117	769	40
2001	.	.	86	35	250	21	121	30	543	35
2002	.	.	109	1	306	64	0	83	563	55
2003	.	.	131	39	46	30	25	62	333	53
2004	57	23	153	106	245	117	410	324	1435	40
2005	.	.	224	179	186	84	855	125	1653	41
2006	736	9	152	111	473	122	225	323	2151	36
2007	876	118	476	8	579	47	608	284	2996	35
2008	376	.	25	0	298	132	566	256	1653	48
2009	0	.	201	88	257	62	131	64	803	54
2010	390	10	73	5	321	35	531	244	1609	50
2011	.	.	0	123	421	0	250	192	986	48
2012	372	138	144	70	357	44	488	343	1956	43
2013	177	39	1207	29	1121	134	696	1016	4419	41
2014	0	201	2711	48	706	160	1466	790	6082	45
2015	86	17	148	232	1660	115	516	769	3543	53
2016					228	381	1301	953		
2017							1116			
2018										
2019					861	75	777	305		37
2020	210	9	984	194	1754	0	404	.	3555	57

Table 8. *Anarhichas minor*. Length composition by year ('1000), 2014-2020, all available values considered.

Length	2014	2015	2016	2017	2019	2020
10.5	0	0	0	0	0	0
11.5	0	0	0	0	0	0
12.5	0	0	26	0	0	0
13.5	0	0	0	0	0	0
14.5	0	0	0	0	0	0
15.5	0	7	0	0	0	0
16.5	0	0	0	0	0	0
17.5	0	0	7	0	0	0
18.5	0	0	13	0	0	0
19.5	0	0	0	0	0	0
20.5	0	0	0	0	0	0
21.5	0	0	13	0	0	0
22.5	0	0	0	0	0	0
23.5	0	0	13	0	0	0
24.5	0	0	13	0	0	0
25.5	0	0	0	0	0	0
26.5	0	0	0	0	0	0
27.5	0	0	0	0	0	0
28.5	0	0	0	0	0	0
29.5	0	0	0	0	0	0
30.5	0	6	0	0	0	0
31.5	3	0	13	0	0	0
32.5	0	0	0	0	0	0
33.5	0	0	0	0	0	0
34.5	0	0	0	0	0	0
35.5	8	0	13	0	0	0
36.5	3	0	0	0	0	0
37.5	0	0	0	0	0	0
38.5	0	0	0	0	0	0
39.5	0	0	0	0	0	7
40.5	0	0	0	0	0	0
41.5	0	0	0	0	0	0
42.5	0	0	0	0	0	13
43.5	0	0	0	0	0	0
44.5	3	0	0	0	0	0
45.5	0	0	0	0	0	0
46.5	0	0	0	0	0	0
47.5	0	0	0	0	0	0
48.5	0	0	0	0	0	0
49.5	0	0	0	0	0	0
50.5	0	0	0	0	0	0
51.5	0	0	0	0	0	0
52.5	0	0	0	0	0	0
53.5	2	0	0	0	0	5
54.5	0	0	9	0	0	0
55.5	0	0	0	0	0	0
56.5	0	0	0	0	0	0
57.5	28	0	9	0	0	0
58.5	3	0	0	0	0	0
59.5	0	5	7	0	0	0
60.5	5	6	0	0	0	0
61.5	0	7	0	0	0	0
62.5	5	0	0	0	0	0
63.5	0	0	0	0	0	0

64.5	18	0	5	0	6	0
65.5	0	6	0	0	2	0
66.5	8	7	0	0	0	4
67.5	17	8	4	0	0	25
68.5	28	0	0	0	0	6
69.5	5	0	13	0	0	6
70.5	9	3	0	0	0	0
71.5	9	24	0	7	2	0
72.5	3	0	0	0	0	0
73.5	9	5	0	0	0	0
74.5	4	0	0	0	0	0
75.5	0	7	0	0	0	0
76.5	4	0	0	0	0	4
77.5	0	23	0	0	5	0
78.5	0	5	7	0	5	0
79.5	5	26	4	0	3	0
80.5	5	24	0	0	5	9
81.5	10	7	4	0	0	0
82.5	35	18	11	0	2	4
83.5	31	0	0	0	0	25
84.5	14	0	4	7	0	4
85.5	9	14	12	0	13	0
86.5	6	7	0	0	7	5
87.5	4	5	0	0	0	0
88.5	13	3	0	0	0	9
89.5	21	0	4	0	11	0
90.5	15	7	7	0	4	0
91.5	22	12	4	0	24	0
92.5	15	0	4	0	6	20
93.5	16	27	12	0	11	4
94.5	14	16	9	8	9	0
95.5	34	19	4	0	5	8
96.5	9	25	17	0	0	25
97.5	3	8	12	8	7	18
98.5	17	20	9	0	9	29
99.5	10	21	15	0	0	13
100.5	17	14	4	15	7	24
101.5	0	3	16	0	9	0
102.5	27	9	7	8	7	0
103.5	0	4	20	0	2	24
104.5	13	0	3	0	4	4
105.5	5	4	13	0	11	0
106.5	21	0	13	8	3	4
107.5	8	19	4	0	9	20
108.5	6	0	17	0	0	8

Table 9. *Amblyraja radiata*, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2020. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	2709	965	773	234	258	61	76	47	5123	28
1983	1882	293	371	151	345	14	29	96	3181	54
1984	1617	931	401	271	76	241	81	32	3650	34
1985	1041	1066	900	361	186	29	122	70	3775	32
1986	945	1302	358	158	133	60	93	5	3054	36
1987	859	171	298	174	137	30	30	14	1713	22
1988	1953	523	572	380	170	21	39	0	3658	30
1989	6411	1099	2071	364	272	57	66	81	10421	26
1990	4872	1491	1337	345	166	92	334	193	8830	36
1991	1087	251	637	145	329	81	77	32	2639	22
1992	2068	332	1707	826	304	342	102	28	5709	38
1993	1374	251	399	191	122	176	58	.	2571	27
1994	1163	192	411	127	113	38	197	8	2249	31
1995	.	.	872	.	90	141	53	13	1169	74
1996	680	77	232	43	61	62	30	17	1202	24
1997	2431	253	426	23	62	68	93	0	3356	31
1998	894	290	251	106	135	27	26	8	1737	24
1999	1134	107	365	105	151	108	118	22	2110	27
2000	383	107	265	507	135	72	125	9	1603	42
2001	.	.	262	53	46	71	351	16	799	39
2002	.	.	353	95	60	109	66	12	695	40
2003	.	.	224	200	33	154	112	0	723	52
2004	501	50	339	125	60	539	105	13	1732	28
2005	.	.	415	121	113	196	132	0	977	39
2006	193	44	350	242	20	212	271	21	1353	43
2007	298	72	190	106	42	35	63	0	806	28
2008	116	.	311	110	86	111	76	4	814	43
2009	1434	.	865	133	66	116	93	0	2707	51
2010	553	40	412	134	18	91	15	0	1263	37
2011	.	.	254	117	42	53	16	0	482	55
2012	276	8	278	59	27	349	15	20	1032	88
2013	172	28	135	120	4	81	18	0	558	40
2014	292	8	15	22	0	7	5	0	349	42
2015	123	18	22	51	0	26	56	0	296	56
2016					13	0	35	14		
2017							51			
2018										
2019					0	7	13	0		
2020	42	7	6	0	0	4	9	.	68	49

Biomass										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	1548	496	733	168	194	43	73	33	3288	28
1983	405	92	326	58	333	14	27	72	1327	25
1984	412	178	217	52	67	64	69	41	1100	27
1985	224	189	395	104	73	25	26	43	1079	27
1986	226	272	193	40	56	29	17	3	836	27
1987	199	54	141	25	68	12	-84	15	430	39
1988	320	49	282	121	45	9	16	0	842	27
1989	1081	217	542	55	129	17	40	73	2154	24
1990	705	204	280	38	55	11	68	116	1477	34
1991	148	41	94	22	127	26	10	16	484	28
1992	167	55	84	85	128	55	13	13	600	30
1993	194	86	47	20	19	19	2	.	387	23
1994	108	37	67	15	45	7	28	6	313	22
1995	.	.	124	.	35	17	20	0	196	49
1996	51	14	20	13	11	9	4	7	129	26
1997	173	49	87	3	8	16	18	0	354	31
1998	93	49	50	24	29	7	5	8	265	29
1999	79	31	76	35	34	14	30	13	312	30
2000	59	27	71	177	55	7	15	7	418	54
2001	.	.	45	18	22	13	72	10	180	40
2002	.	.	75	30	13	18	7	11	154	35
2003	.	.	40	31	14	28	51	0	164	43
2004	40	11	78	26	19	93	18	6	291	34
2005	.	.	84	31	40	34	39	0	228	32
2006	14	8	84	76	4	39	82	6	313	46
2007	42	12	39	12	14	2	9	0	130	35
2008	5	.	23	10	15	14	4	3	74	56
2009	30	.	37	21	8	13	2	0	111	59
2010	32	17	68	20	3	9	4	0	153	45
2011	.	.	45	14	5	9	6	0	79	59
2012	30	2	49	9	3	45	6	11	155	78
2013	26	3	35	29	0	12	1	0	106	44
2014	27	6	3	7	0	0	0	0	43	48
2015	8	4	5	15	0	2	5	0	39	61
2016					0	0	11	5		
2017							7			
2018										
2019					0	0	3	0		
2020	7	0	1	0	0	1	10	.	19	90

Table 10. *Amblyraja radiata*. Length composition by year ('1000), 2013-2020, all available values considered.

Length	2013	2014	2015	2016	2019	2020
0.5	0	0	0	0	0	0
1.5	0	0	0	0	0	0
2.5	0	0	0	0	0	0
3.5	0	0	0	0	0	0
4.5	0	0	0	0	0	0
5.5	0	0	0	0	0	0
6.5	0	0	0	0	0	0
7.5	0	0	0	0	0	0
8.5	0	0	0	0	0	0
9.5	0	0	0	0	0	7
10.5	29	3	21	7	5	25
11.5	48	0	28	0	8	0
12.5	15	0	0	13	0	0
13.5	18	37	5	0	0	0
14.5	25	34	7	0	0	0
15.5	15	0	27	0	0	0
16.5	16	29	35	0	3	0
17.5	20	71	21	0	0	0
18.5	5	2	31	4	0	0
19.5	44	61	6	0	0	0
20.5	38	0	7	9	0	0
21.5	42	0	0	0	0	0
22.5	6	0	14	0	0	0
23.5	29	5	0	4	0	0
24.5	35	0	7	0	0	4
25.5	5	3	11	4	0	0
26.5	24	48	26	0	0	6
27.5	16	0	0	4	0	0
28.5	7	0	0	0	0	0
29.5	7	5	6	0	0	0
30.5	2	5	0	0	0	0
31.5	14	0	0	0	0	0
32.5	0	0	0	3	0	0
33.5	15	0	6	0	0	17
34.5	0	3	0	0	0	0
35.5	4	29	7	0	0	0
36.5	0	0	6	0	0	0
37.5	7	0	0	0	0	0
38.5	2	0	7	0	0	0
39.5	25	0	0	0	0	0
40.5	0	11	6	0	0	0
41.5	10	0	6	0	0	0
42.5	0	3	0	0	0	0
43.5	18	0	0	4	0	0
44.5	4	0	0	5	0	0
45.5	11	0	6	3	3	0
46.5	4	0	0	0	0	9
47.5	0	0	0	0	0	0

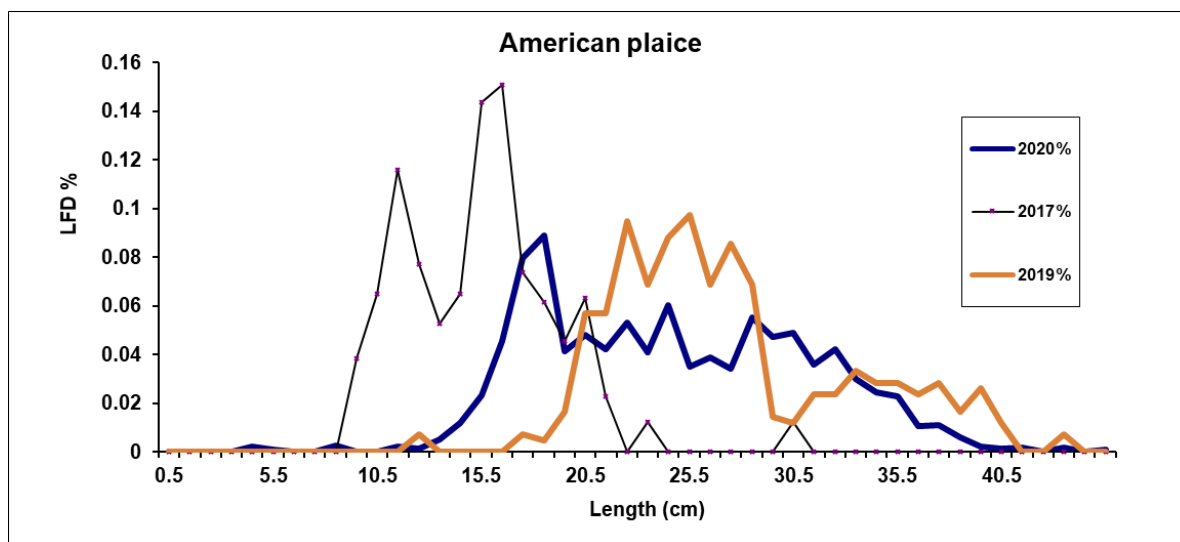


Figure 1. LFD proportional for *Hippoglossoides platessoides* off West Greenland, 2017-2020. Respective raw values are listed in Table 4.

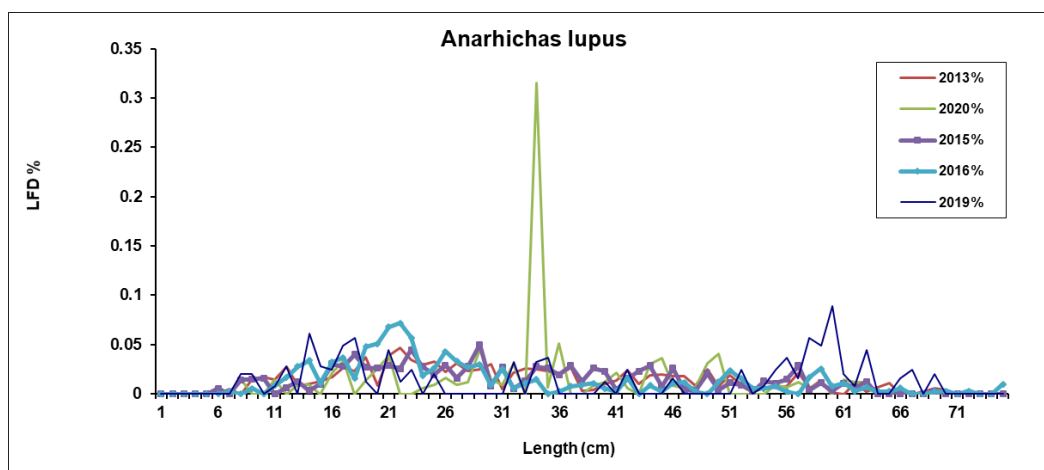


Figure 2. LFD proportional for *Anarhichas lupus* off West Greenland, 2013-2020. Respective values are listed in Table 6.

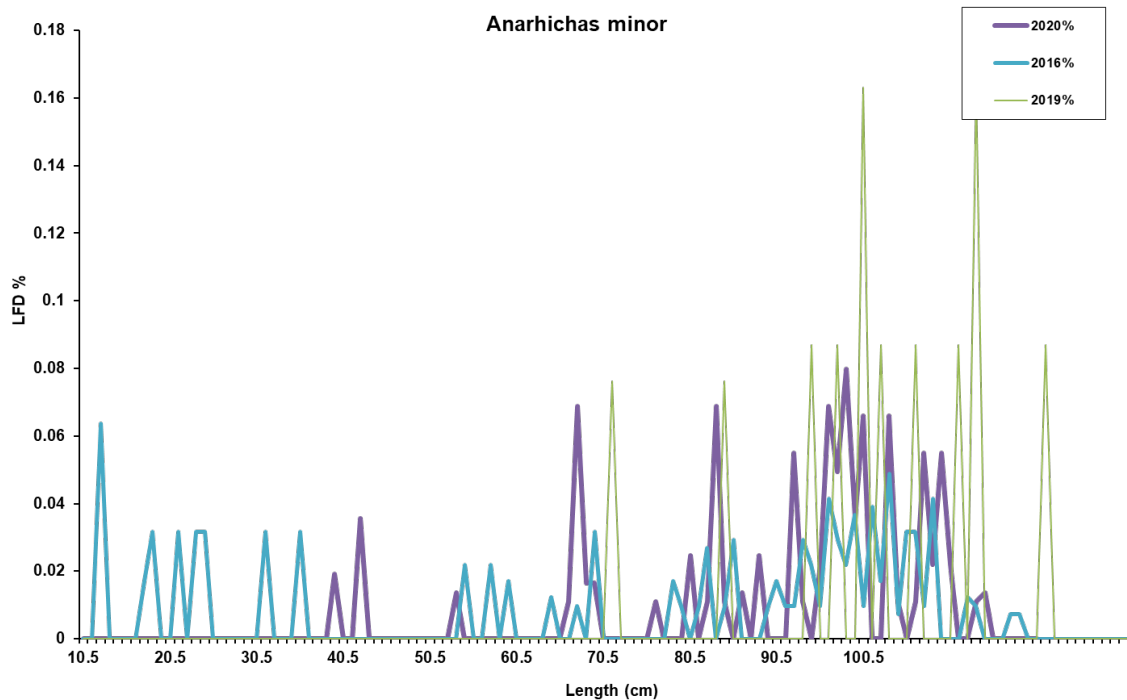


Figure 3. LFD proportional for *Anarhichas minor* off West Greenland, 2016-2020. Respective values are listed in Table 8.

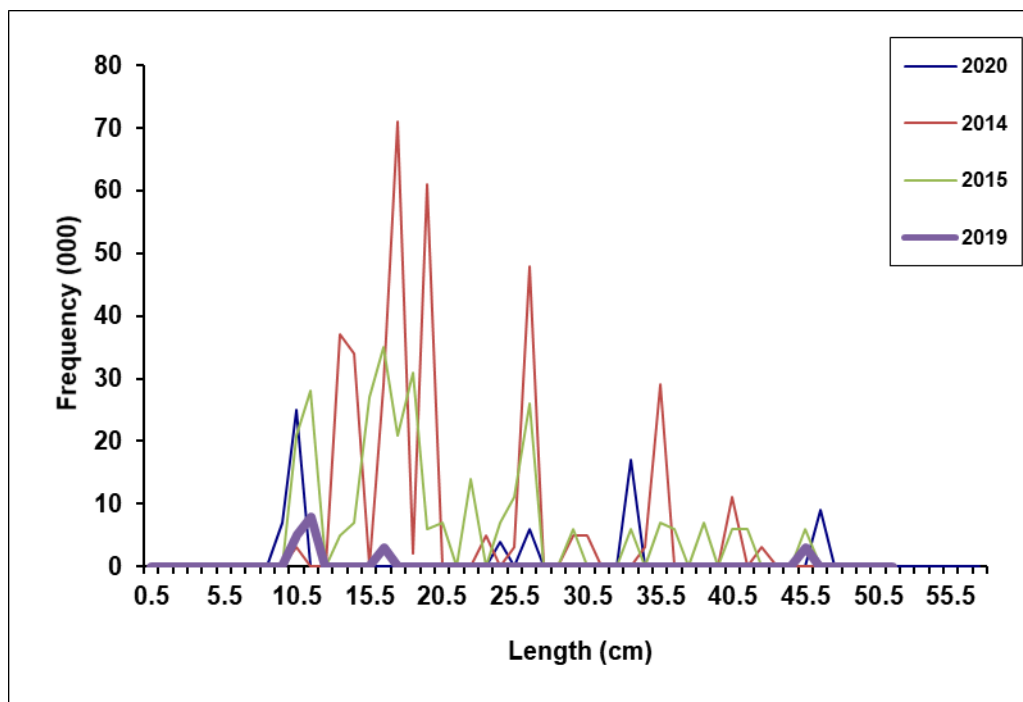


Figure 4. LFD proportional for *Raja radiata* off West Greenland, 2014-2020. Respective values are listed in Table 10.