

BLUE LING - BLÁLANGA

Molva dypterygia

GENERAL INFORMATION

Blue ling is most common in south, west and northwest of Iceland along the Icelandic continental shelf, in deeper areas than most of the other gadoids. It is smaller than the common ling, reaching an average length of ~80 cm and a maximum of 152 cm according to the Icelandic autumn groundfish survey 1996-2019. Sexual maturity is reached at 75-90 cm, males mature smaller/younger than females.

THE FISHERY

The change in geographical distribution of the Icelandic blue ling fisheries from 2000 to 2019 (Figures 1-2), indicates an expansion of the fishery of blue ling to northwestern waters. This increase may partly be the result of increased availability of blue ling in the northwestern area.



Figure 1. Blue ling. Geographic distribution of the Icelandic fishery since 2000 as reported in logbooks.

Mynd 1. Blálanga. Útbreiðsla á Íslandsmiðum frá 2000 samkvæmt afladagbókum.

Before 2008, the majority of blue ling catches were by trawlers, as bycatch in fisheries targeting Greenland halibut, redfish, cod and other demersal species (Table 1). Most of the catches by trawlers are taken in waters shallower than 700 m and by longliners until 2008 mostly at depths shallower than 600 m.

After 2007 there was a substantial change in the fishery for blue ling (Table 1 and Figure 4). The proportion of catches taken by longliners increased from 7–20% in 2001–2007 to around 70% in 2011 as longliners started targeting blue ling. The trend has reversed and in 2015–2019 the proportion of longline catches decreased to 20–30%. At the same time longliners started fishing in deeper waters than before 2008 and until 2013 the bulk of the longline catches were taken at depths greater than 500 m. In recent years, the depth distribution resembles the distribution observed before 2008, or at depths less than 400 m (Figure 3).

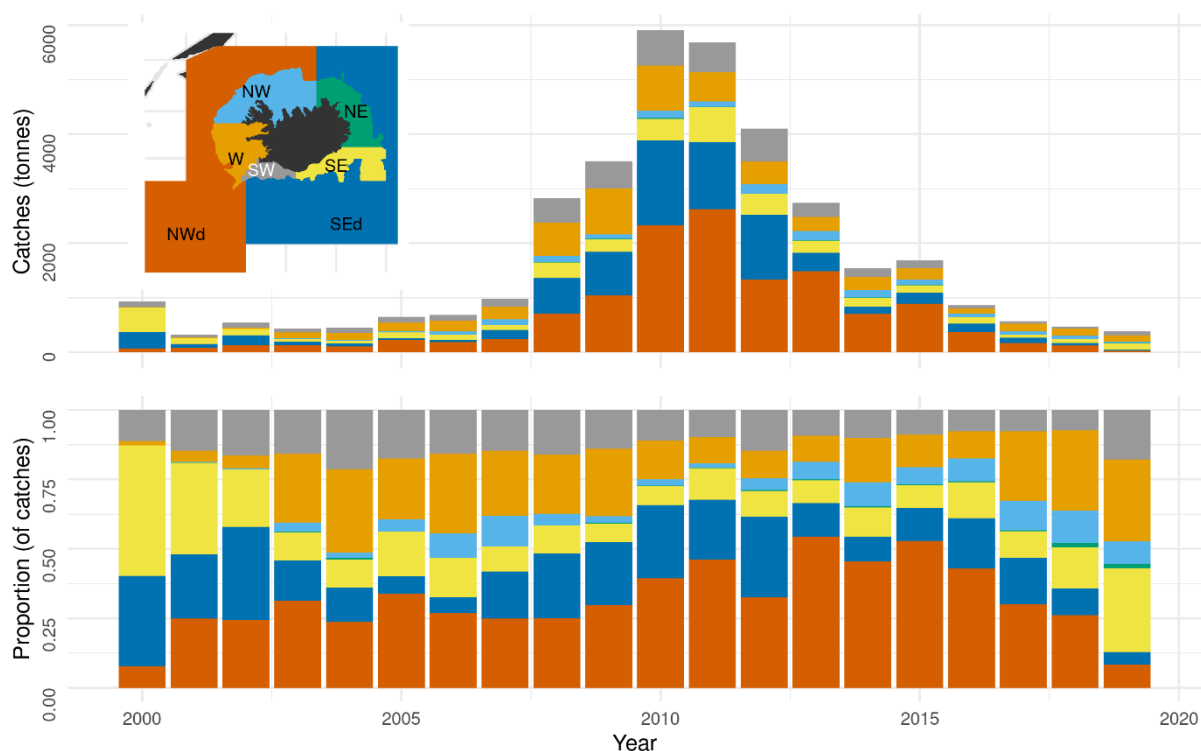


Figure 2. Blue ling. Spatial distribution of reported catches in tonnes (upper) and as annual proportions (lower). The inserted map shows the area division.

Mynd 2. Blálanga. Afli eftir svæðum ásamt hlutfalli innan hvers svæðis frá árinu 2000 samkvæmt afladagbókum.

The preliminary total landings in 2019 were 424 t of which the Icelandic fleet caught 415 t (Table 4). Catches of blue ling increased by more than 370% between 2006 and 2010, the main part of this increase can be attributed to increased targeting of blue ling by the longline fleet. Since then catches decreased compared to 2010 or by around 5900 tonnes (Table 1).

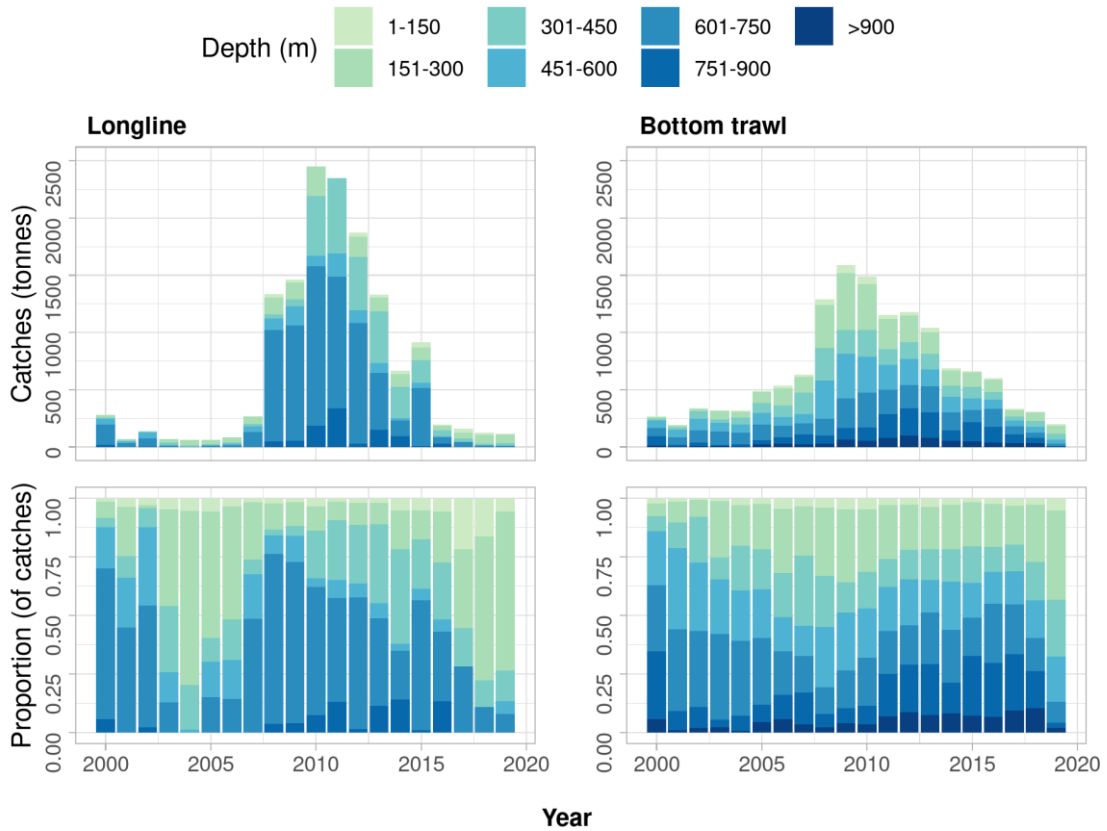


Figure 3. Blue ling. Depth distribution and proportion of longlines (left) and trawls (right) catches according to logbook entries.

Mynd 3. Blálanga. Afli og hlutfall afla eftir dýpi línuveiða (vinstri) og botnvörpu (hægri) samkvæmt afladagbókum.

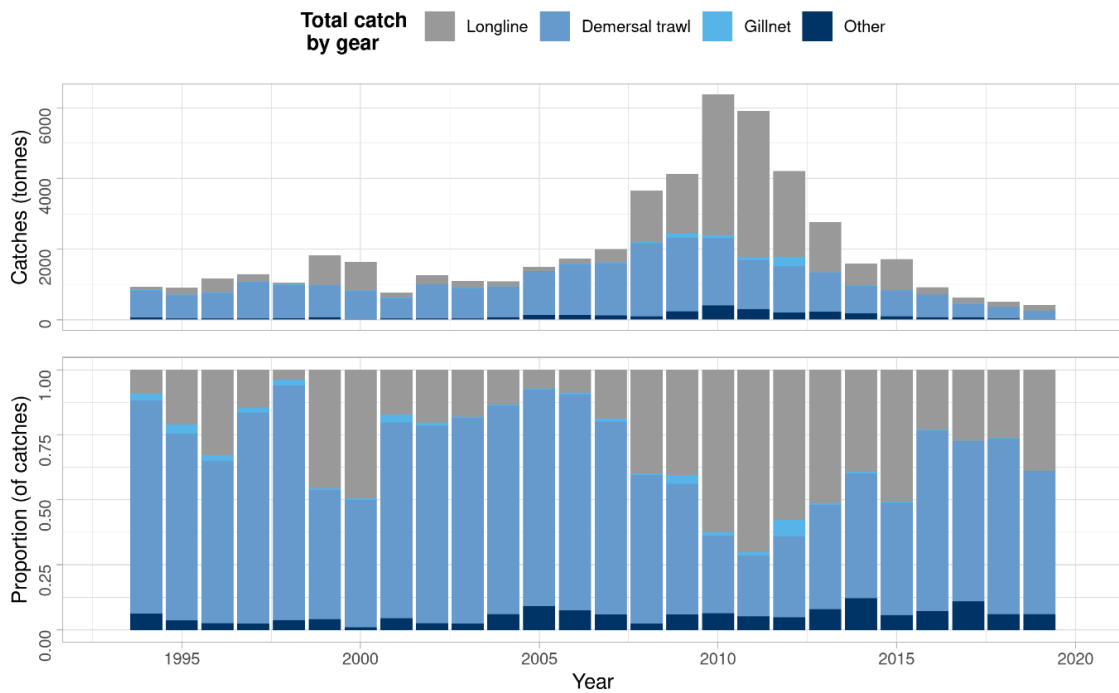


Figure 4. Blue ling. Total catch (landings) and proportion by fishing gear since 2000, according to statistics from the Directorate of Fisheries.

Mynd 4. Blálanga. Landaður afli ásamt hlutfalli eftir veiðarfærum frá árinu 2000, samkvæmt aflskráningarkerfi Fiskistofu.

Table 1. Blue ling. Catches by gear type, number of boats participating in the blue ling fishery (with catch over 1000 kg), total number of hooks (in millions), and total hours towed (thousand) .

Tafla 1. Blálanga. Afli eftir veiðarfærum og fjöldi báta sem stundar blálönguveiðar (afli >1000kg), heildarfjöldi króka (í milljónum) og heildar tog tími (þúsund klst.).

YEAR	LONGLINE	TRAWL	OTHER GEAR	TOTAL LANDINGS	LONGLINERS	TRAWLERS
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	NO BOATS	NO BOATS
2000	804	797	25	1626	14	11
2001	129	576	51	756	10	7
2002	255	980	22	1257	7	9
2003	197	879	22	1098	5	10
2004	145	891	44	1080	6	11
2005	102	1260	143	1505	6	20
2006	151	1461	121	1733	10	17
2007	373	1537	81	1991	9	23
2008	1453	2111	88	3652	14	29
2009	1678	2245	208	4131	19	29
2010	3977	2184	213	6374	26	29
2011	4138	1618	144	5900	21	23
2012	2425	1306	476	4207	21	20
2013	1421	1293	53	2767	16	22
2014	622	911	54	1588	14	14
2015	868	841	25	1734	18	13
2016	213	681	30	925	11	9
2017	169	436	14	619	12	5
2018	134	372	7	513	9	7
2019	170	238	16	425	13	4

DATA AVAILABLE

In general sampling is considered adequate from commercial catches from the main gears (longlines and trawls). The sampling does seem to cover the spatial distribution of catches for longlines and trawls. Similarly, sampling does seem to follow the temporal distribution of catches (WGDEEP 2012).

LANDINGS AND DISCARDS

Landings data are given in Tables 1 and 3. Discarding is banned in the Icelandic fishery. There is no available information on discarding of blue ling. Being a relatively valuable species and not being subjected to TAC constraints before 2013/2014 fishing year nor minimum landing size there should be little incentive to discard blue ling.

LENGTH COMPOSITIONS

Only one samples was collected from each gear in 2019 (from commercial catches) and does therefore not cover the spatial distribution of catches (Table 2, Figure 5). Length distributions from the Icelandic trawl and longline catches for the period 2004–2019 are shown in Figure 6. Due to a mistake, no length

measures were called for from commercial catches in 2017. Mean length from trawls increased from 86 cm in 2012 to 92 cm in 2019. On average mean length from longlines is higher than from trawls.

Table 2. Blue ling. Number of available length measurements from Icelandic commercial catches.

Tafla 2. Blálanga. Fjöldi lengdarmælinga úr afla íslenskra skipa.

YEAR	LONGLINE		TRAWLS	
	Samples	Measured	Samples	Measured
2005	1	94	12	1164
2006	0	0	9	824
2007	2	238	12	1461
2008	14	1960	13	1685
2009	15	1940	23	2894
2010	38	5191	29	3161
2011	44	6513	12	1364
2012	27	3829	11	1135
2013	15	1564	6	757
2014	11	1222	5	411
2015	0	0	4	394
2016	0	0	3	309
2017	0	0	0	0
2018	1	120	2	240
2019	1	120	1	114

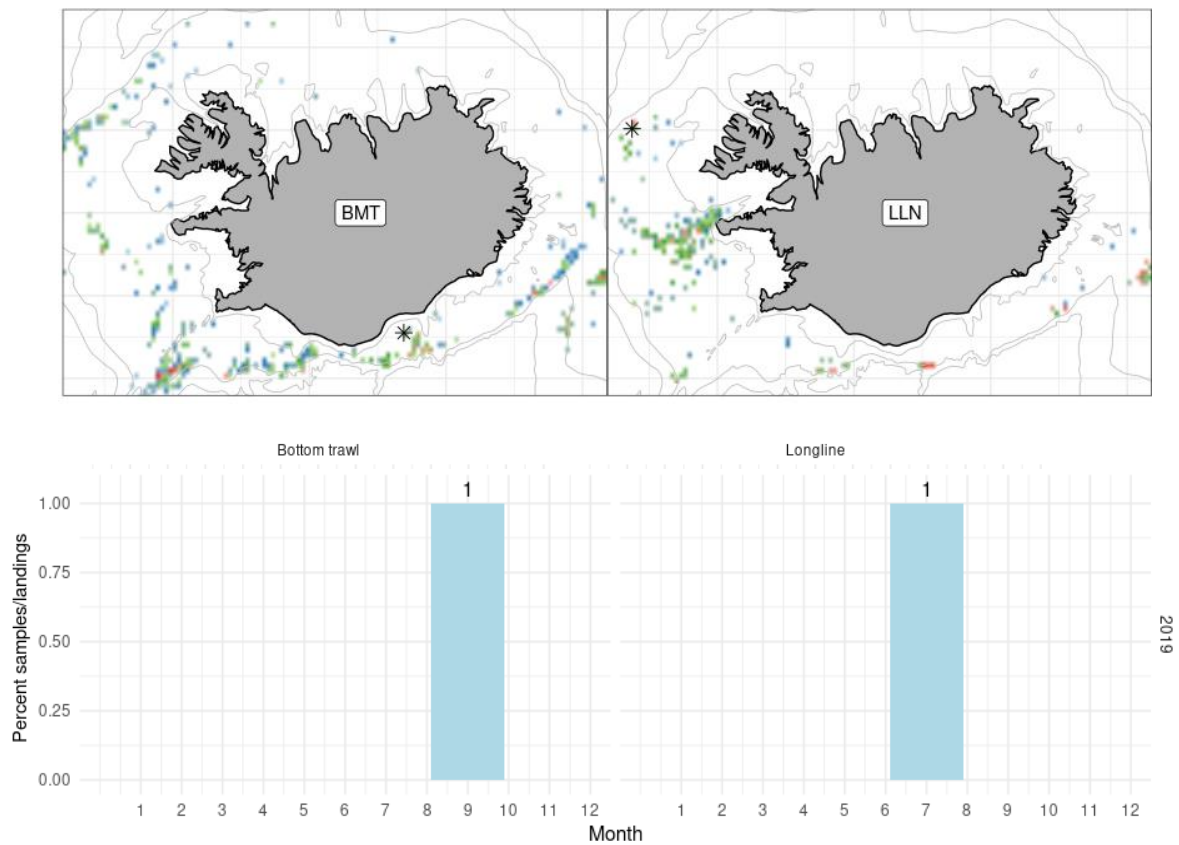


Figure 5. Blue ling. Spatial distribution of length samples (black dots) from commercial catches in Icelandic waters. (upper) and number of samples collected per month in 2019.

Mynd 5. Blálanga. Dreifing lengdarmælinga (svartar stjörnur) og afla á Íslandsmiðum auk fjölda safnaðra sýna á mánuði árið 2019.

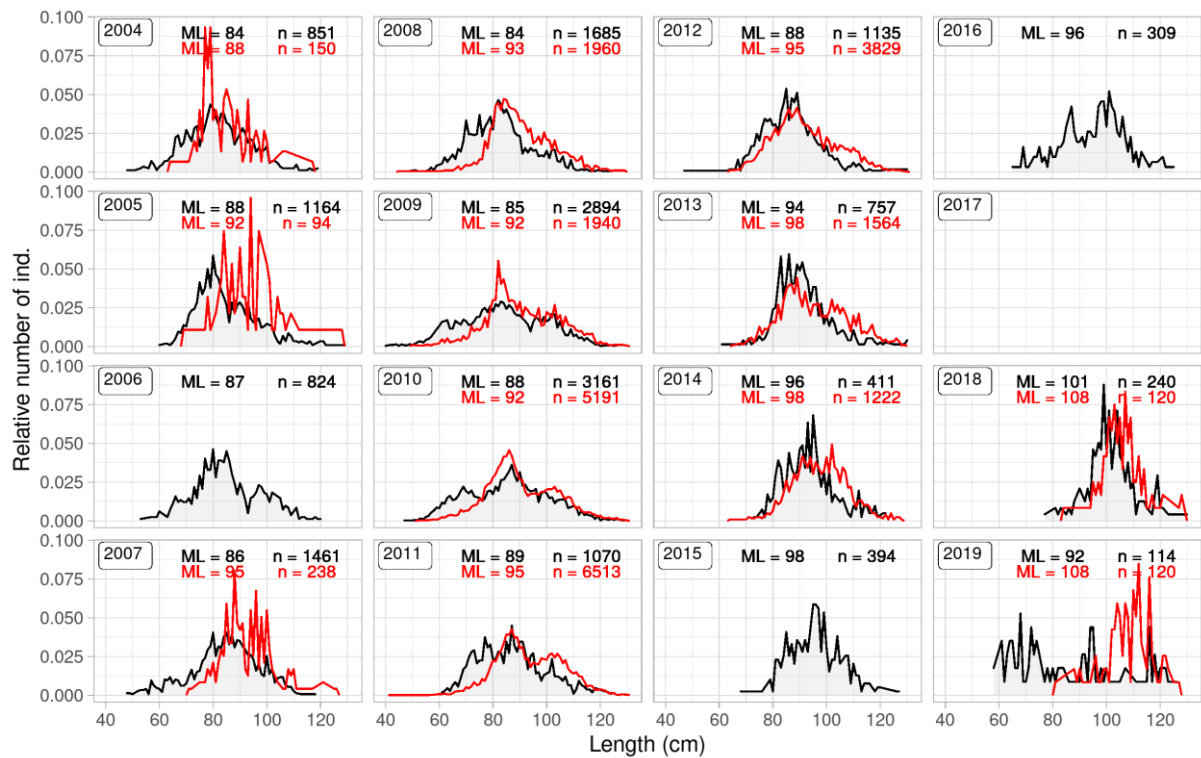


Figure 6. Blue ling. Length distribution of blue ling from trawls (grey area) and longlines (red lines) of the Icelandic fleet since 2004-2019. No data available in 2017.

Mynd 6. Blálanga. Lengdardreifing frá 2004-2019 á botnvörpuveiðum (grá svæði) og línuveiðum (rauð lína) samkvæmt afladagbókum. Engin gögn fengust árið 2017.

AGE COMPOSITIONS

No new data were available. Existing data are not presented due to the difficulties in the ageing of this species.

WEIGHT-AT-AGE

No new data were available. Existing data are not presented because of difficulty in ageing.

MATURITY AND NATURAL MORTALITY

Length at 50% maturity is estimated at roughly 77 cm and the range for 10–90% maturity is 65–90 cm.

No information is available on natural mortality (M).

CATCH, EFFORT AND SURVEY DATA

Effort and nominal CPUE data from the Icelandic trawl and longline fleet are given in Figure 7. Due to changes in the fishery (expansion into new areas, fleet behaviour, etc.) and technical innovations CPUE is not considered a reliable index of biomass abundance of blue ling and therefore no attempt has been made to standardize the series. However, looking at fluctuations in CPUE and effort may be informative regarding the development of the fishery. CPUE from longlines was high from 2008 to 2013 but has decreased markedly since. CPUE from trawls has been gradually decreasing in the period. Effort from longlines peaked in 2009 but has since then decreased sharply. Effort from trawls peaked in 2011 but has remained relatively stable since.

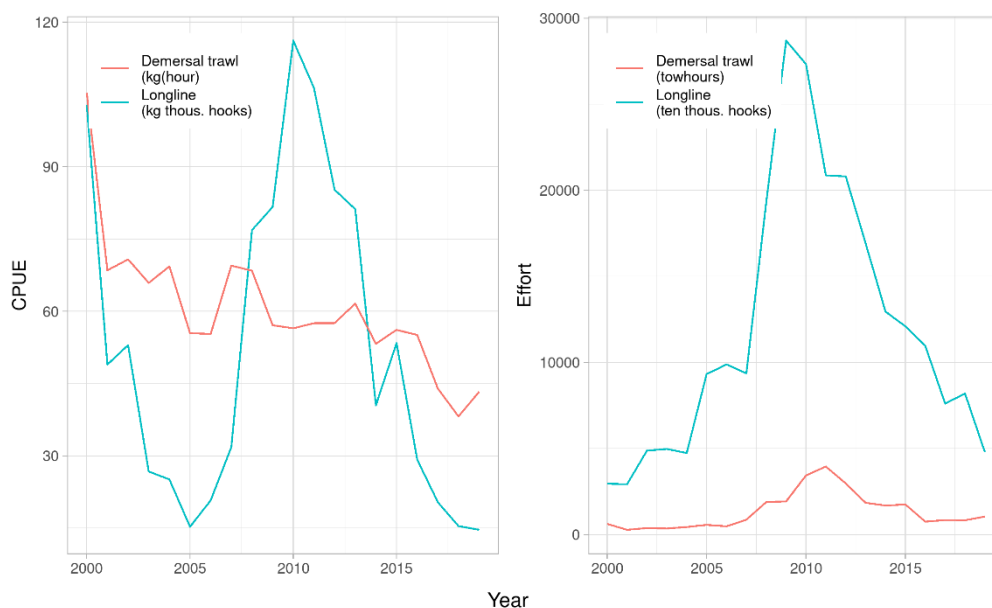


Figure 7. Blue ling. Non-standardised estimates of CPUE (left) and fishing effort (right) from longlines and trawls based on logbook data where blue ling was recorded in catches.

Mynd 7. Blálanga. Afli á sóknareiningu (vinstri) og sókn (hægri) með línu og botnvörpu samkvæmt afladagbókum þar sem blálanga var skráð í afla.

Time-series stratified abundance and biomass indices from the spring and autumn trawl surveys are shown in Figure 8 and length distributions from the autumn survey and its spatial distribution in Figures 8 and 9. Due to industrial action in 2011 the autumn survey was cancelled after about one week of survey time. Therefore, no estimates are presented for 2011.

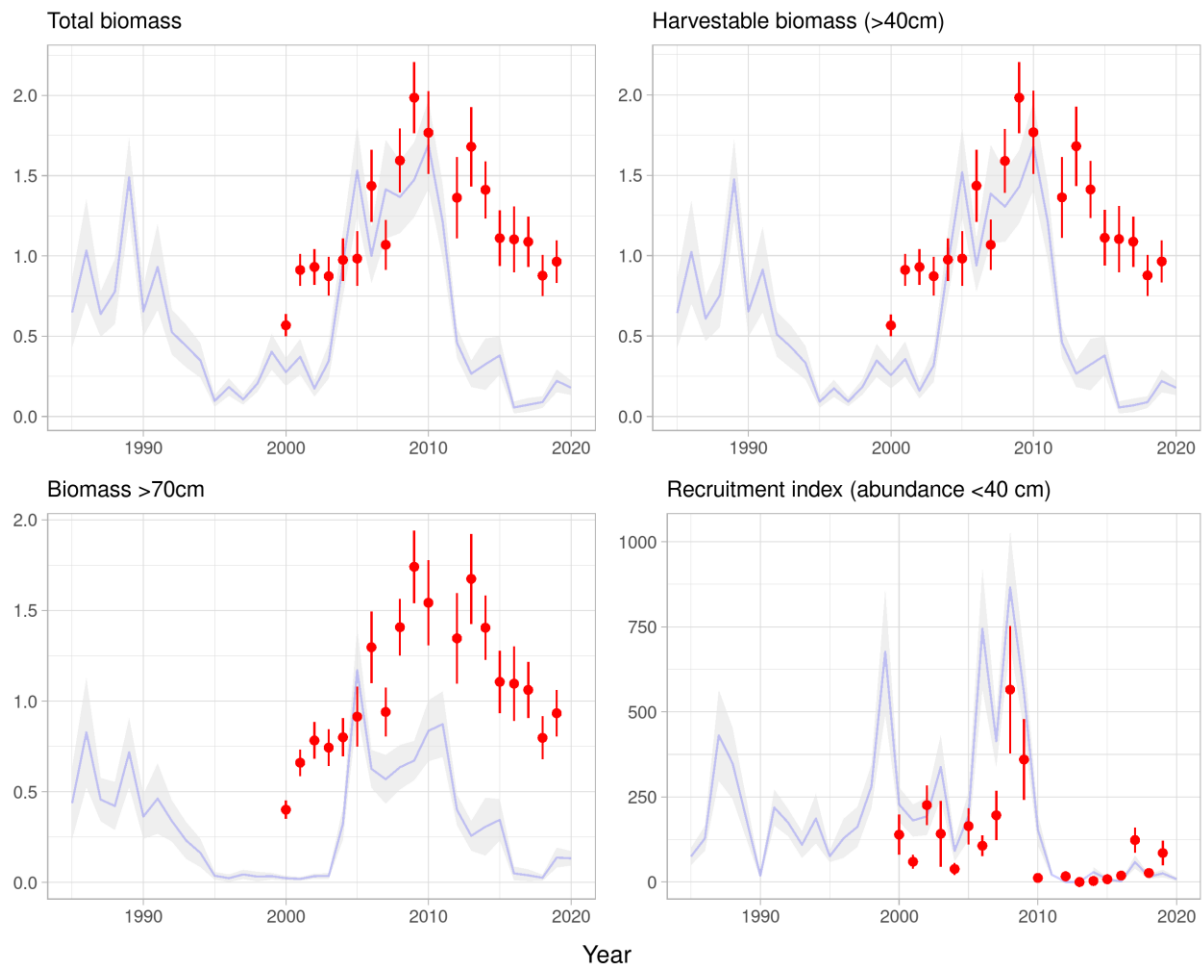


Figure 8. Blue ling. Abundance indices for blue ling in the Icelandic autumn survey since 2000 (red points and vertical lines) and the spring survey since 1985 (faded line and shaded area). Total biomass index (top-left), biomass of 40 cm and larger (top-right), biomass of 70 cm and larger (bottom-left) and abundance index of <40 cm (bottom-right). The shaded area and the vertical bar show +/- standard error of the estimate.

Mynd 8. Blálanga. Stofnviðisitala (efri til vinstri), viðisitala veiðistofns (40 cm og stærri, efri til hægri), viðisitala stærri einstaklinga (70 cm og stærri, neðri til vinstri) og nýliðunarviðisitala (neðri til hægri), úr stofnmælingum botnfiska að hausti (rauðir punktar) frá árinu 1996 og vori (ljósblá lína) frá árinu 1985, ásamt staðalfrávikum.

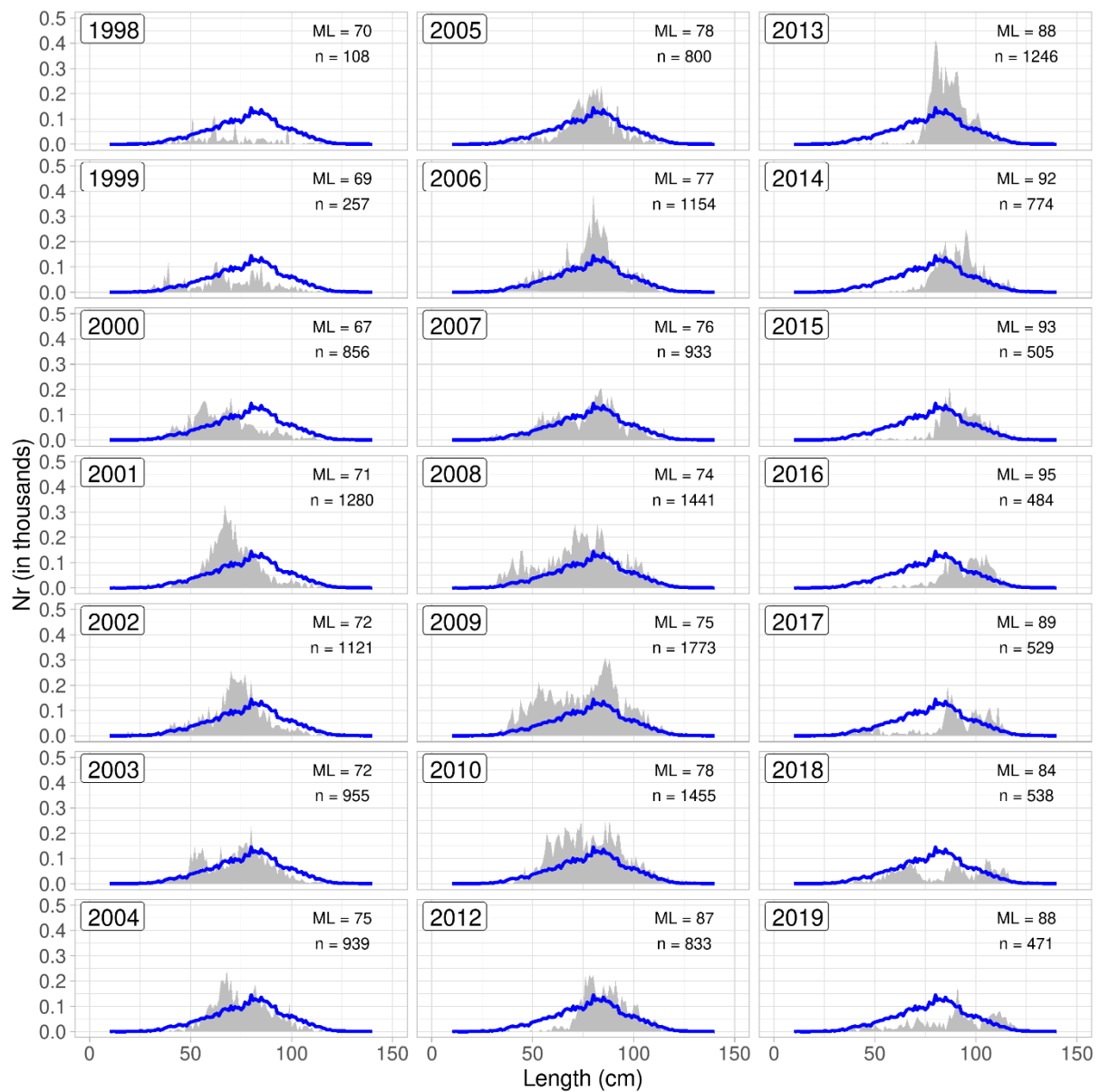


Figure 9. Blue ling. Length distributions from the Icelandic autumn survey since 1998. Black line is the average by length over the displayed period.

Mynd 9. Blálanga. Lengdardreifing úr stofnmælingu botnfiska að hausti frá 1998 ásamt meðal lengdardreifingu tímabilsins.

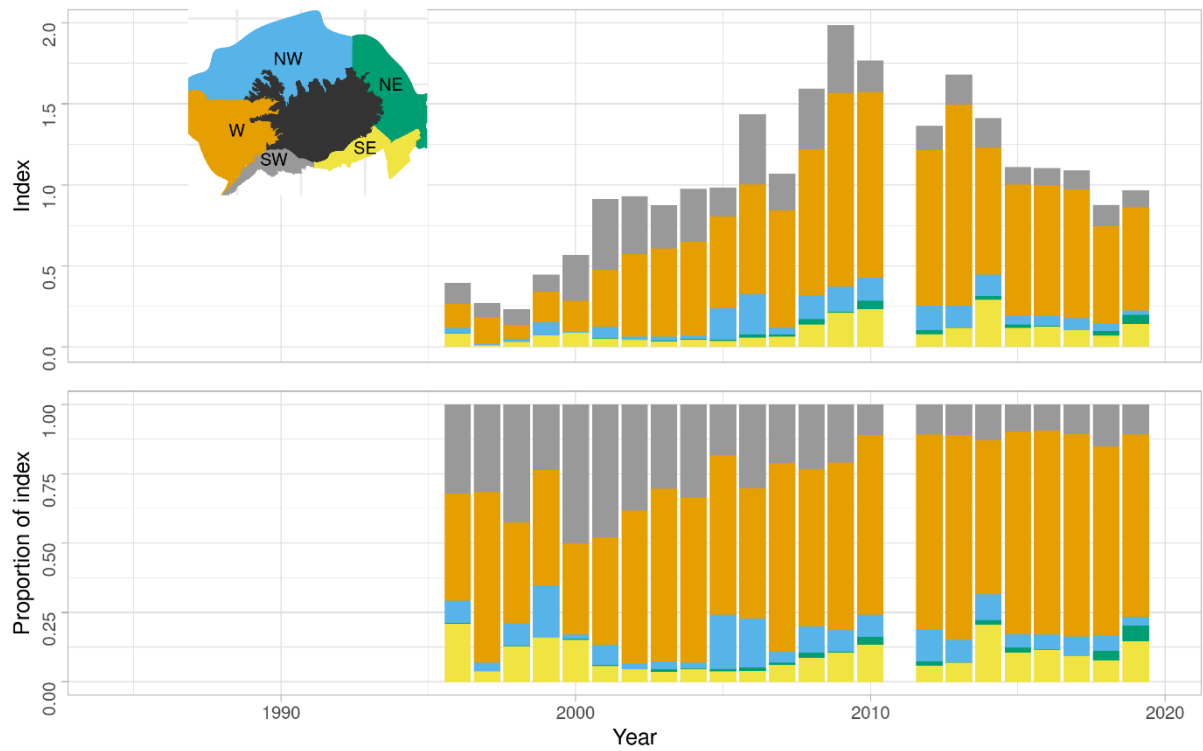


Figure 10. Blue ling. Spatial distribution of biomass index from the Icelandic autumn survey 1996-2019.

Mynd 10. Blálanga. Dreifing lífmassavísitölu í stofnmælingum botnfiska að hausti árin 1996-2019.

DATA ANALYSES

LANDINGS AND SAMPLING

Catches from the Icelandic longline fleet increased rapidly from 2007–2010 resulting in a rapid expansion of the fishing area and change in the selectivity of the fishery although there are now strong indications since 2012 that this may have reversed. This can be seen when looking at Table 1. In 2005 longliners caught 102 tonnes of blue ling when trawlers caught 1260 tonnes or 84% of the total catches (1505 tonnes). In 2011 trawlers caught 1618 tonnes, out of 5900 tonnes or 27%, but longliners 4138 tonnes or 70%. Since then the proportion taken by longliners has decreased and in 2019 longliners caught 40% of the catches, trawls 56% and other gear 4%.

As longliners take on average larger blue ling (Figure 6) this will have resulted in an overall change in the selection pattern in 2006–2015. Total catches by the Icelandic fleet decreased between 2010 and 2013 and this decrease is mainly the result of decrease in trawls in 2011 but in longlines in 2012 and 2013. The expansion of the longline fleet to deeper waters (Figure 3) may be the result of decreased catch rates in shallower areas.

CPUE AND EFFORT

As stated above cpue indices from commercial catches are not considered a reliable index of stock abundance. Therefore, the rapid increase in cpue from longlines should not be viewed as an increase in stock biomass but rather as the result of increased interest by the longline fleet and its expansion into deeper waters (Figure 7). In 2011 to 2012 there was a slight decrease in cpue from longline but the cpue increased again in 2013 to its highest value in the time-series. Cpue from trawling has remained at low levels while effort increased until about 2009 after which it has decreased (Figure 7).

SURVEYS

The spring survey covers only the shallower part of the depth distributional range of blue ling and shows high interannual variance (Figure 9). It is thus unknown to what extent the spring indices reflect actual changes in total blue ling biomass, given that it does not cover the depths where largest abundance of blue ling occur. It is however not driven by isolated large catches at a few survey stations.

The shorter autumn survey, which goes to greater depths and is therefore more likely to reflect the true biomass dynamics, does indicate that there was an increase in blue ling biomass 2007–2009 (Figure 9). Since 2010 the biomass index has decreased to similar levels as observed in 2002–2005. A large increase of more than 200% in the recruitment index was observed in 2008 but in the 2010 it had decreased again to its lowest observed value and has not increased again for nine years, with the exception of 2017, when an increase was observed (Figures 8 and 9). As a result, mean length measured in the autumn survey has been higher after 2009 than it was before. Due to industrial action, only part of the autumn survey was conducted in 2011.

F_{PROXY}

Relative fishing mortality ($F_{\text{proxy}} = \text{Yield}/\text{Survey biomass index}$) derived from the autumn survey (+40 cm) and the combined catches from Iceland and Greenland, indicates that fishing mortality may have increased by more than 150% between 2006–2010 (Figure 11 and Table 6). Since then there are indications that it has decreased by similar percentage between 2012 and 2014, to the same levels as observed in 2002 and 2009 but has decreased even further in 2015–2017.

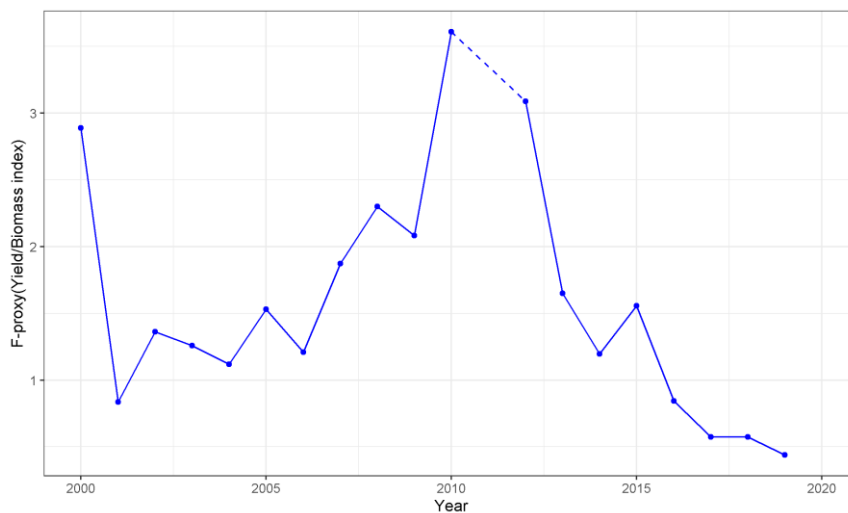


Figure 11. Blue ling. Changes in relative fishing mortality (Yield/Survey biomass >39 cm).

Mynd 11. Blálanga. Breytingar á vísitölu veiðihlutfalls (afli/vísitala stofnmælinga >39 cm).

ANALYTICAL ASSESSMENT

EXPLORATORY STOCK ASSESSMENT ON BLUE LING USING GADGET

An exploratory stock assessment of blue ling using the Gadget model was presented at WGDEEP 2012. Updated results of the model were not presented at WGDEEP 2019.

COMMENTS ON THE ASSESSMENT AND ADVICE

The assessment presented above is based on the ICES DLS approach for category 3 stocks. The Icelandic autumn trawl survey (IS-SMH) was used as the index for the stock development. The advice is based on the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B) multiplied by the last years advice. The index/ratio is estimated to have decreased by less than 20% and thus the uncertainty cap was not applied. The stock status relative to candidate reference points is unknown and the precautionary buffer was applied. The result is advice for 2020/2021 set at 406 t ((921/1101)*438), which is a 8% decrease from last year's advice.

The basis for the advice 2012-2019 was the following: The ICES framework for category 3.3 stocks was applied (ICES, 2012). The Icelandic autumn trawl survey was used together with the catch to calculate a harvest rate index. Based on this an F_{proxy} has been chosen from a reference period, 2002–2009, when the fishing pressure was relatively constant and the SSB increased steadily, which implies that the harvest was considered sustainable.

The advice was based first on a comparison of the latest index value (index A) with the preceding value (index B), combined with the F_{proxy} target (catch/survey biomass). When the index was estimated to have changed by more than 20% the uncertainty cap was applied.

However, following the close of the WGDEEP working group meeting in 2019 and during the preparation of the draft advice for 2020, there were discussions about the appropriateness of using the F_{proxy} in deriving the advice. It was concluded that the recruitment estimates of recent years were much lower than those observed during the period used for the calculation of the F_{proxy} and that the F_{proxy} is likely no longer appropriate. Consequently, the ICES framework for category 3 stocks using survey trends was applied instead.

MANAGEMENT

Before the 2013/2014 fishing year the Icelandic fishery was not regulated by a national TAC or ITQs. The only restrictions on the Icelandic fleet regarding the blue ling fishery were the introduction of closed areas in 2003 to protect known spawning locations of blue ling, which are in effect. As of the 2013/2014 fishing year, blue ling is regulated by the ITQ system (regulation 662/2013) used for many other Icelandic stocks such as cod, haddock, tusk and ling. The TAC for the 2018/2019 fishing year was set at 1520 based on the recommendations of MFRI using the same advisory procedure as for ICES category 3 stocks.

The difference between national TAC and landed catch in Icelandic waters can be attributed to species transformation which for blue ling is only from blue ling to other species and not *vice versa* as for other species in the ITQ system (Figure 12).

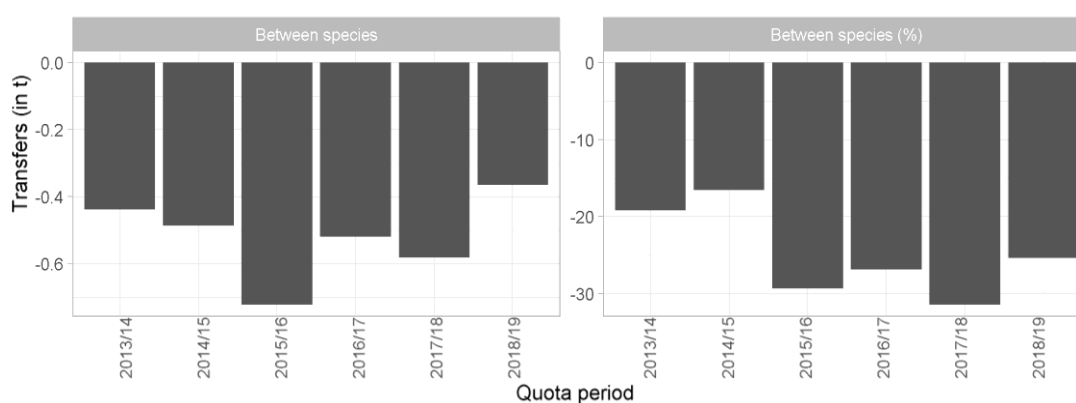


Figure 12. Blue ling. Net transfer of quota, from blue ling to other species, in the Icelandic ITQ system by fishing year.

Mynd 12. Blálanga. Nettó tilfærsla á kvóta, frá blálöngu yfir á aðrar tegundir, eftir fiskveiðiárum.

Table 3. Blue ling. Advised TAC, national TAC and total landings since the quota year 2013/2014.

Tafla 3. Blálanga. Tillögur Hafrannsóknastofnunar um hámarksafla, ákvörðun stjórnvalda um aflamark og landaður afli.

FISHING YEAR	ADVICE	NATIONAL TAC	ICELAND	OTHERS	LANDINGS
2013/2014	2400	2400	1655	6	1661
2014/2015	3100	3100	1900	105	2005
2015/2016	2550	2550	1097	10	1007
2016/2017	2032	2032	636	3	639
2017/2018	1956	1956	549	4	553
2018/2019	1520	1520	464	7	471
2019/2020	483	483			
2020/2021	406				

MANAGEMENT CONSIDERATIONS

Landings have decreased considerably in the last year and as blue ling is now part of the ITQ system such a rapid increase in landings as observed between 2006 and 2011 is unlikely. Blue ling is caught in mixed fisheries by the trawler fleet, mainly targeting redfish and Greenland halibut. After the inclusion of blue ling in the ITQ system the longliners have shifted from a directed fishery to a more mixed fishery for the species. Because of the restrictions of the TAC the implications of low blue ling TAC for the trawlers can be considerable, although the species is a low percentage in their catches.

Recruitment index from the autumn survey indicates very little recruitment to the stock since 2010, resulting in a truncated length distribution from both the survey and commercial catches.

Closure of known spawning areas should be maintained and expanded where appropriate.

CONCLUSIONS

The biomass index is approaching its lowest values and only large blue ling are being caught, which is most likely because there has been no recruitment coming into the stock for nearly a decade.

The findings presented here support the general view of WGDEEP that advice should be more precautionary for as long as there is no recruitment.

Table 4. Blue ling: Landings from Icelandic fishing grounds.*Tafla 4. Blálanga. Landaður afli af Íslandsmiðum.*

YEAR	FAROE	GERMANY	ICELAND	NORWAY	UK	TOTAL
1974	34	1959	331	140	32	2496
1975	69	1418	434	366	89	2376
1976	29	1222	624	135	28	2038
1977	39	1253	700	317	0	2309
1978	38	0	1237	156	0	1431
1979	85	0	2019	98	0	2202
1980	183	0	8133	83	0	8399
1981	220	0	7952	229	0	8401
1982	224	0	5945	64	0	6233
1983	1195	0	5117	402	0	6714
1984	353	0	3122	31	0	3506
1985	59	0	1407	7	0	1473
1986	69	0	1774	8	0	1851
1987	75	0	1693	8	0	1776
1988	271	0	1093	7	0	1371
1989	403	0	2124	5	0	2532
1990	1029	0	1992	0	0	3021
1991	241	0	1582	0	0	1823
1992	321	0	2584	0	0	2905
1993	40	0	2193	0	0	2233
1994	89	1	1542	0	0	1632
1995	113	3	1519	0	0	1635
1996	36	3	1284	0	0	1323
1997	25	0	1319	0	0	1344
1998	59	9	1086	0	0	1154
1999	31	8	1525	8	11	1583
2000	0	7	1605	25	8	1645
2001	95	12	752	49	23	931
2002	28	4	1256	74	10	1372
2003	16	16	1098	6	24	1160
2004	38	9	1083	49	20	1199
2005	24	25	1497	20	26	1592
2006	63	22	1734	27	9	1855
2007	78	0	1999	4	10	2091
2008	88	0	3653	21	0	3763
2009	178	0	4132	5	0	4315
2010	515	0	6377	13	0	6905
2011	797	0	5903	2	0	6702
2012	312	0	4207	2	0	4521
2013	435	0	2769	2	0	3204
2014	71	0	1588	30	0	1689
2015	10	0	1734	4	0	1748
2016	6	0	925	0	0	931
2017	4	0	619	0	0	623
2018	28	0	513	0	0	541
2019 ¹⁾	5	0	415	4	0	424

¹⁾ Provisional figures.

Table 5. Blue ling. Landing in Greenlandic fishing grounds. Source: STATLANT database.

Tafla 5. Blálanga. Landaður afli á Grænlandsmiðum samkvæmt STATLANT gagnagrunni.

YEAR	FAROE	GERMANY	GREENLAND	ICELAND	NORWAY	RUSSIA	SPAIN	UK	DENMARK	TOTAL
1983	0	621	0	0	0	0	0	0	0	621
1984	0	537	0	0	0	0	0	0	0	537
1985	0	315	0	0	0	0	0	0	0	315
1986	214	149	0	0	0	0	0	0	0	363
1987	0	199	0	0	0	0	0	0	0	199
1988	21	218	3	0	0	0	0	0	0	242
1989	13	58	0	0	0	0	0	0	0	71
1990	0	64	5	0	0	0	0	10	0	79
1991	0	105	5	0	0	0	0	45	0	155
1992	0	27	2	0	50	0	0	32	0	111
1993	0	16	0	3124	103	0	0	22	0	3265
1994	1	15	0	300	11	0	0	57	0	384
1995	0	5	0	117	0	0	0	19	0	141
1996	0	12	0	0	0	0	0	2	0	14
1997	1	1	0	0	0	0	0	2	0	4
1998	48	1	0	0	1	0	0	6	0	56
1999	0	0	0	0	1	0	66	7	0	74
2000	0	1	2	4	0	0	889	2	0	898
2001	1	0	1	11	61	0	1631	6	0	1711
2002	0	0	0	11	1	0	0	0	0	12
2003	0	0	3	0	36	0	670	5	0	714
2004	0	0	7	0	1	0	0	7	0	15
2005	2	0	6	0	1	0	176	8	0	193
2006	0	0	6	0	3	1	0	0	0	10
2007	19	0	1	0	1	0	0	0	0	21
2008	1	0	5	0	2	0	381	0	1	390
2009	1	0	5	0	3	0	111	4	0	124
2010	1	0	8	0	9	0	34	0	3	55
2011	0	0	8	0	2	0	0	1	6	17
2012	0	0	13	367	9	0	0	0	3	392
2013	0	0	16	0	0	0	0	3	9	28
2014	0	0	14	0	3	0	0	0	0	17
2015	0	0	66	0	1	0	0	0	5	72
2016	0	0	9	0	0	0	0	0	7	16
2017	0	0	3,7	0	4	0	0	0	3	19
2018	0	0	34	0	12	0	0	0	5	51
2019 ¹⁾	0	6,5	20	0	35,6	0	0	0	0	62

¹⁾ Provisional figures.

Table 6. Blue ling. Catches along with survey biomass index (larger than 40 cm) from the Icelandic Autumn survey and the calculated F_{proxy} ((Catches in Iceland and Greenland)/Index).

Tafla 6. Blálanga. Afli og vísitala (40 cm og stærri) úr stofnmælingu botnfiska að hausti ásamt reiknuðu markgildi ((afli á Íslands- og Grænlandsmiðum)/vísitala).

YEAR	ICELAND	GREENLAND	INDEX	F _{PROXY}
2000	1645	898	574.5	4.43
2001	931	1711	950.2	2.78
2002	1372	12	988.3	1.40
2003	1160	714	930.1	2.01
2004	1199	15	1039.7	1.17
2005	1592	193	1051.4	1.70
2006	1855	10	1492.9	1.25
2007	2091	21	1128.1	1.87
2008	3758	390	1645.2	2.52
2009	4233	124	2073.8	2.10
2010	6905	55	1836.8	3.79
2011	6702	17	No survey	
2012	4521	392	1411.5	3.48
2013	3082	28	1762.3	1.76
2014	1588	17	1455.8	1.10
2015	1734	72	1161.1	1.56
2016	925	16	1118.0	0.84
2017	623	19	1086.0	0.59
2018	541	51	884.0	0.67
2019	424	62	964	0.50