LING

Molva molva

GENERAL INFORMATION

The common ling is one of the largest fish of the Gadiformes order reaching a maximum length of 200 cm, with a mean length of about 70-90 cm according to data from the annual Icelandic spring groundfish survey. It is a demersal fish that preys on fish and invertebrates and can be found at depths 10 and 1300 meters but is most commonly caught at depths between 100 and 400 meters. It reaches sexual maturity at the age of 5-8 years and 60-80 cm total length. Ling spawns in May and June mostly along the edges of the south, southwest and west of the Icelandic continental shelf.

THE FISHERY

LANDINGS TRENDS

In 1947 to 1971, landings of ling from Icelandic waters ranged between 7000 to more than 15000 tonnes. Landings decreased between 1972 and 2000 to as little as 3000 tonnes as a result of most foreign vessels being excluded from the Icelandic EEZ. In 2001-2010, catches increased constantly and reached 11 000 tonnes in 2010 and remained at that level for the most part until 2014, when the catches increased to 14 000 tonnes. Since 2014, ling catches have reduced and were around 7000 tonnes in 2020 (Table 1 and Figure 1).

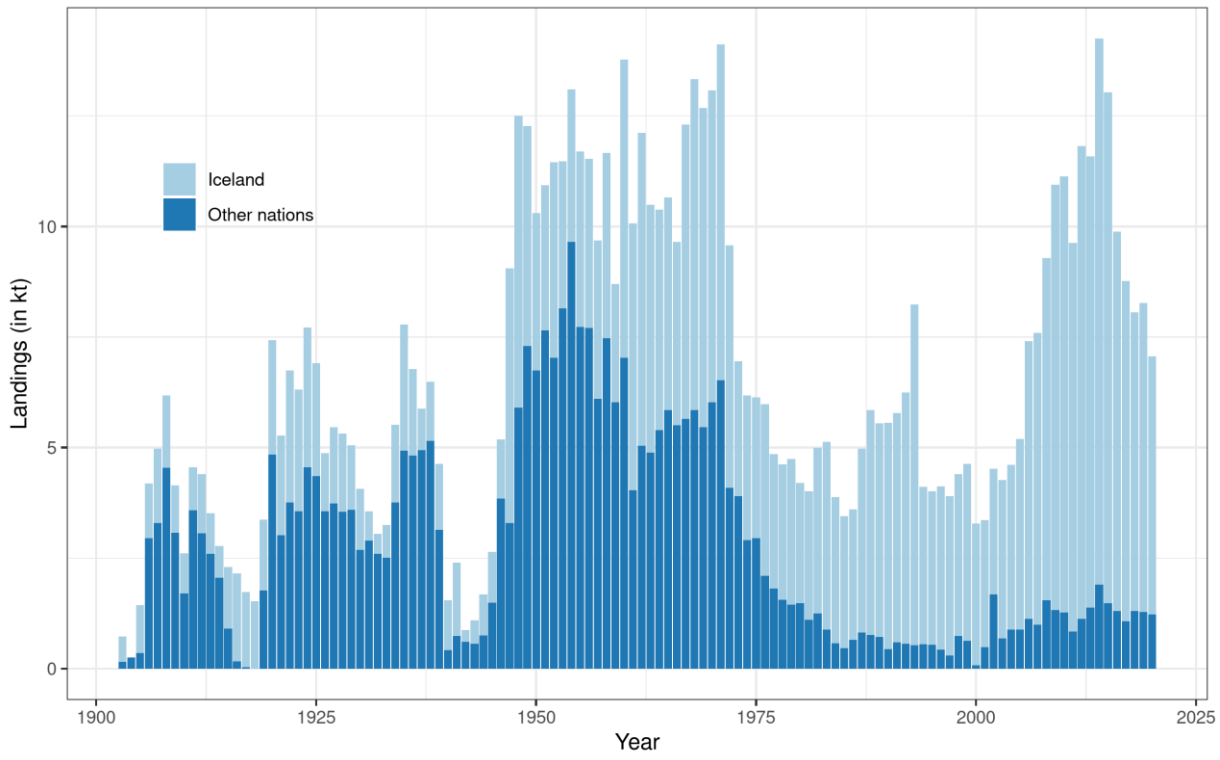

Figure 1. Ling. Nominal landings from Icelandic waters.

The fishery for ling in Icelandic waters has not changed substantially in recent years. Around 130-160 longliners annually report catches of ling, around 20-50 gillnetters and around 60 trawlers. Most of ling is caught on longlines (Figure 2, Table 1) which has increased since 2000 to around 67% in 2020. At the same time the proportion caught by gillnets has decreased from 20–30% in 2000–2007 to only 2% in 2020. Catches in trawls have varied less and have been at around 20% of Icelandic catches (Figure 2, Table 1).

Most of the ling caught by Icelandic longliners is caught at depths less than 300 m, and by trawlers at less than 400 m (Figure 3). The main fishing grounds for ling as observed from logbooks are in the south, southwestern and western part of the Icelandic shelf (Figure 4). The main trend in the spatial distribution of catches according to logbook entries is the decreased proportion of catches in the southeast and increased catches on the western part of the shelf two decades ago. Around 40% of ling catches are caught on the southwestern part of the shelf (Figure 5). In recent years, the main fishing pressure has shifted towards shallower waters (Figure 3).

Table 1. Ling. Number of Icelandic boats and catches by fleet segment participating in the ling fishery from logbooks.

YEAR	NUMBER OF BOATS			CATCHES IN TONNES				SUM
	Longliners	Gillnetters	Trawlers	Longline	Gillnet	Trawl	Others	
2000	165	88	68	1537	703	729	236	**3526**
2001	146	114	57	1086	1056	492	223	**3174**
2002	128	92	56	1277	649	661	248	**3111**
2003	137	73	54	2207	453	580	336	**3840**
2004	144	67	68	2011	548	656	506	**4000**
2005	152	60	72	1948	517	1081	766	**4596**
2006	167	51	81	3733	634	1242	669	**6577**
2007	155	59	76	4044	667	1396	492	**6889**
2008	138	43	78	5002	509	1509	714	**7993**
2009	141	46	67	6230	747	1540	1096	**9867**
2010	156	50	68	6531	390	1537	1411	**10143**
2011	151	58	59	5595	241	1677	1279	**9060**
2012	156	48	58	7477	264	1398	1551	**10952**
2013	163	45	57	6781	354	2805	254	**10194**
2014	128	30	60	10 342	673	2722	228	**13965**
2015	159	44	58	7765	655	1913	1218	**11551**
2016	137	46	60	6545	689	2426	224	**9884**
2017	132	40	61	5975	561	2063	167	**8766**
2018	128	22	55	5365	397	2114	186	**8062**
2019	149	32	61	5964	115	1667	523	**8269**
2020	124	36	68	4765	138	1985	162	**7061**

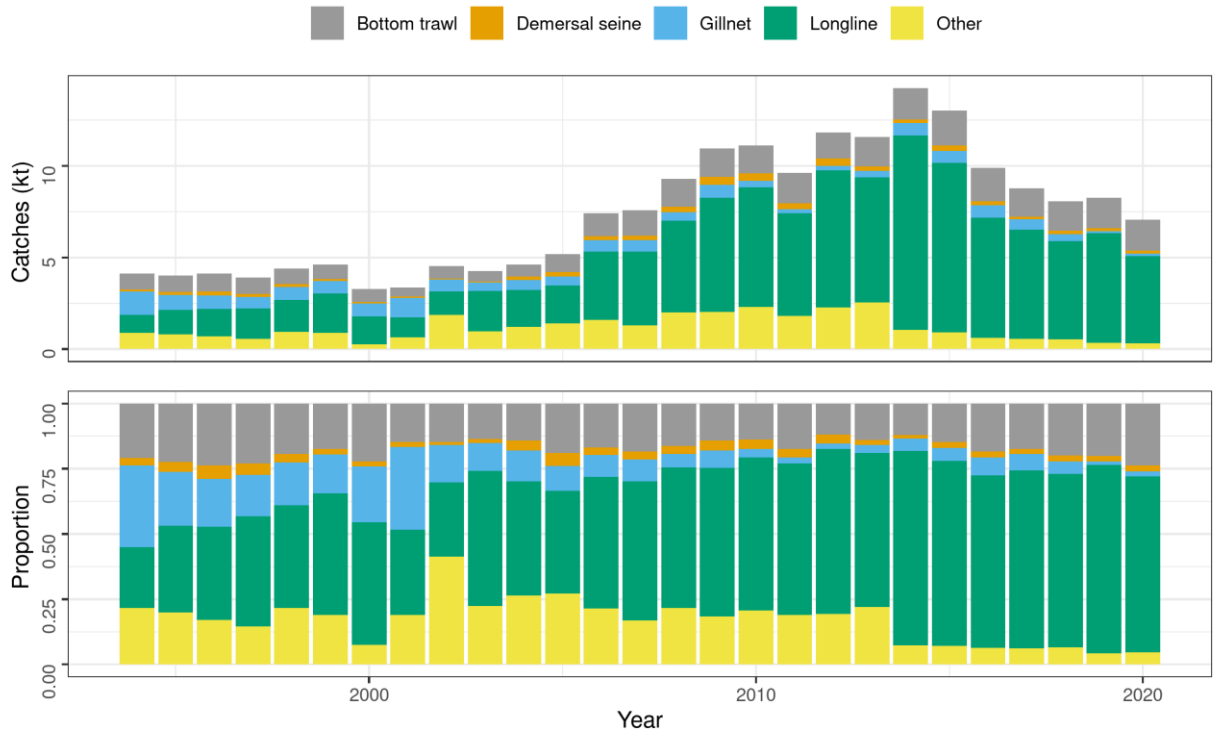

Figure 2. Ling. Total catch (landings) by fishing gear since 1994, according to statistics from the Directorate of Fisheries.

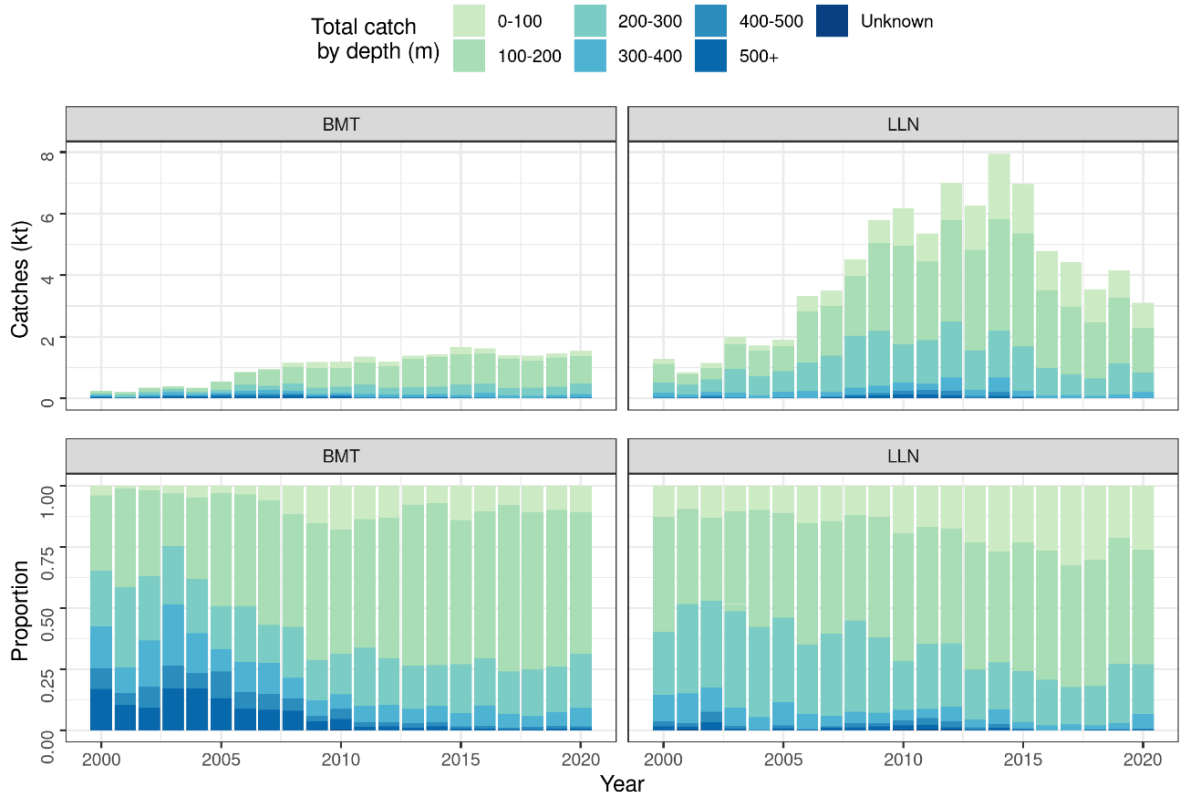

Figure 3. Ling. Depth distribution of ling catches from longlines and trawls from Icelandic logbooks.

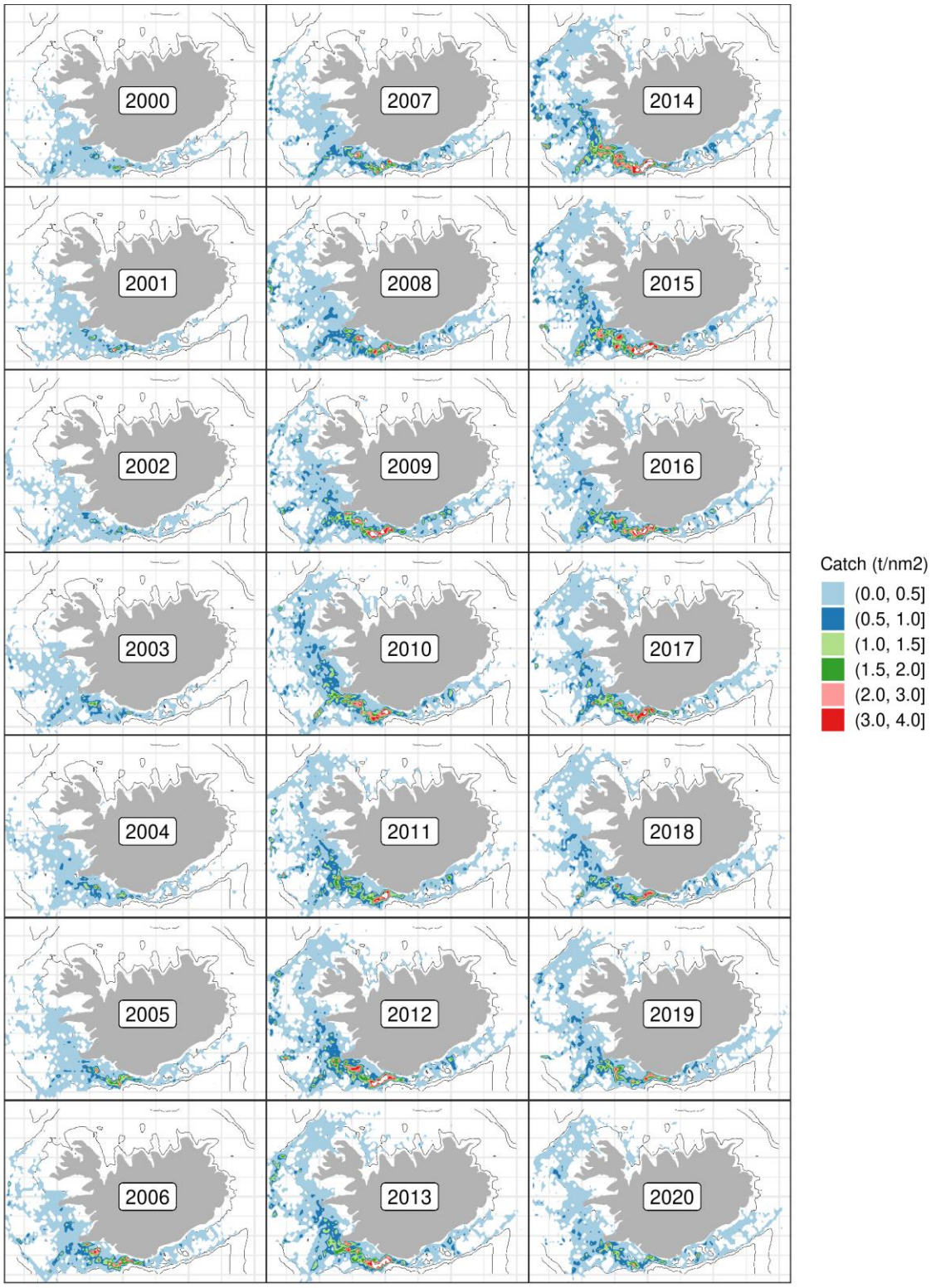

Figure 4. Ling. Geographical distribution (tonnes/square mile) of the Icelandic longline ling fishery since 2000 as reported in logbooks by the Icelandic fleet.

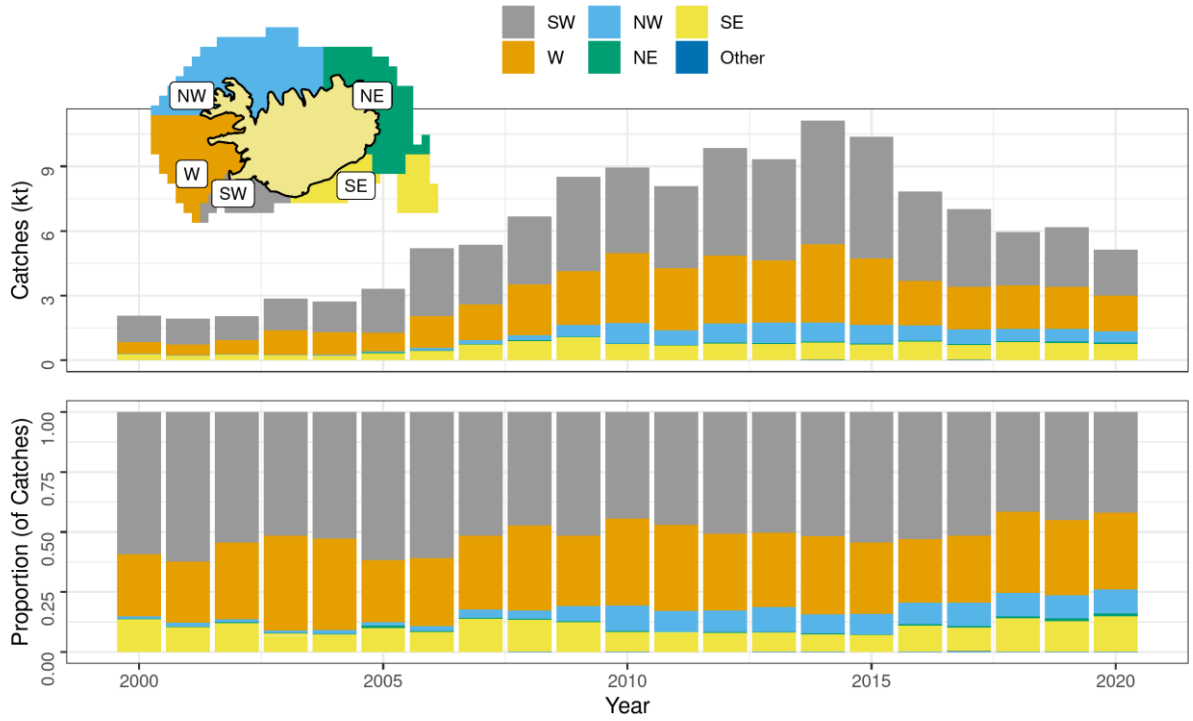

Figure 5. Ling. Catch distribution and proportions by area according to logbooks.

LANDING DATA AVAILABLE

In general sampling is considered good from commercial catches from the main gears (longlines and trawls). Sampling does seem to cover the spatial distribution of catches for longlines and trawls but less so for gillnets. Similarly, sampling does seem to follow the temporal distribution of catches (Figure 6, WGDEEP 2012).

LANDINGS AND DISCARDS

Landings by Icelandic vessels are given by the Icelandic Directorate of Fisheries. Landings of Norwegian and Faroese vessels are given by the Icelandic Coast Guard. Discarding is banned by law in the Icelandic demersal fishery. Based on limited data, discard rates in the Icelandic longline fishery for ling are estimated very low (<1% in either numbers or weight) (WGDEEP, 2011:WD02). Measures in the management system such as converting quota share from one species to another are used by the fleet to a large extent and this is thought to discourage discarding in mixed fisheries. A description of the management system is given in the area overview (ICES 2019).

LENGTH COMPOSITIONS

An overview of available length measurements is given in Table 2. Most of the measurements are from longlines and bottom trawls. The number of available length measurements increased in recent years in line with increased landings but in 2020 they were fewer (due to the covid pandemic). Length distributions from the Icelandic longline and trawling fleet are presented in Figure 7. Sampling from commercial catches of ling is considered good; both in terms of spatial and temporal distribution of samples (Figure 6). Mean length as observed in length samples from longlines and trawls decreased from 2006-2008 from around 86 to 80 cm (Figure 7). This may be the result of increased recruitment in recent years rather than increased fishing effort. Mean length has increased in the period and in 2020, the highest mean length was recorded, or 96cm (Figure 7).

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

YEAR	LONGLINES	GILLNETS	DEMERSAL SEINE	TRAWLS	SUM
2000	1624	566	0	383	**2573**
2001	1661	493	0	37	2191
2002	1504	366	0	221	2091
2003	2404	300	0	280	2984
2004	2640	348	46	141	3175
2005	2323	31	101	499	2954
2006	3354	645	0	1558	5557
2007	3661	0	76	400	4137
2008	5847	357	15	969	7188
2009	9014	410	0	966	10 390
2010	7322	57	0	2345	9724
2011	7248	0	150	1995	9393
2012	12 770	85	150	2748	15 753
2013	10 771	267	122	2337	13 497
2014	6448	1286	120	5053	13 610
2015	3315	1563	0	5667	10 545
2016	2483	2039	0	3673	8195
2017	1637	485	0	3189	5310
2018	1424	559	0	1603	4298
2019	3598	0	0	1830	6247
2020	1099	4	0	1718	2821

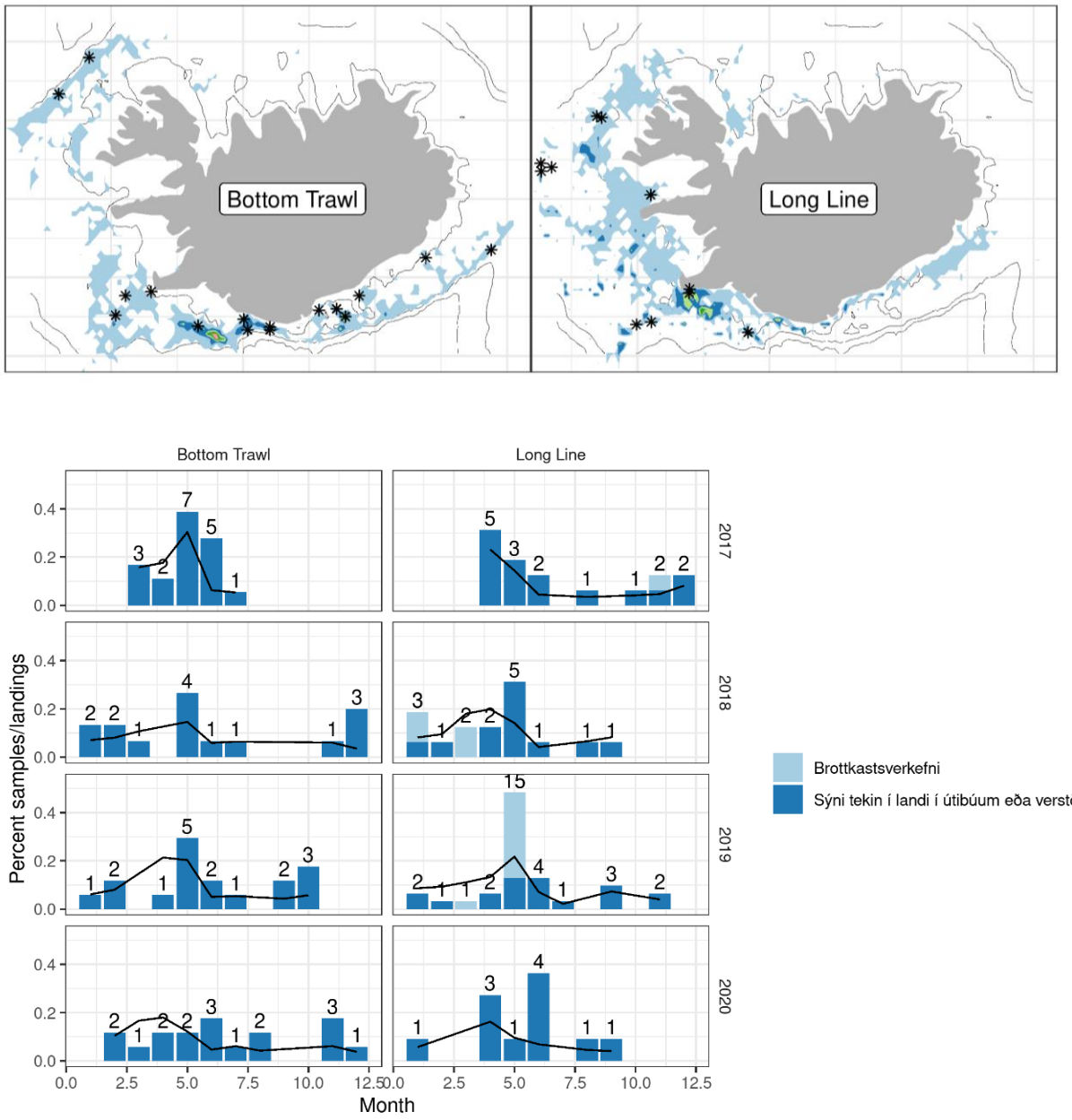

Figure 6. Ling. Spatial distribution of length samples (black dots) from commercial catches in Icelandic waters (upper) and numbers of samples taken per month by project (bars) and proportion of landings per months (black line) (lower).

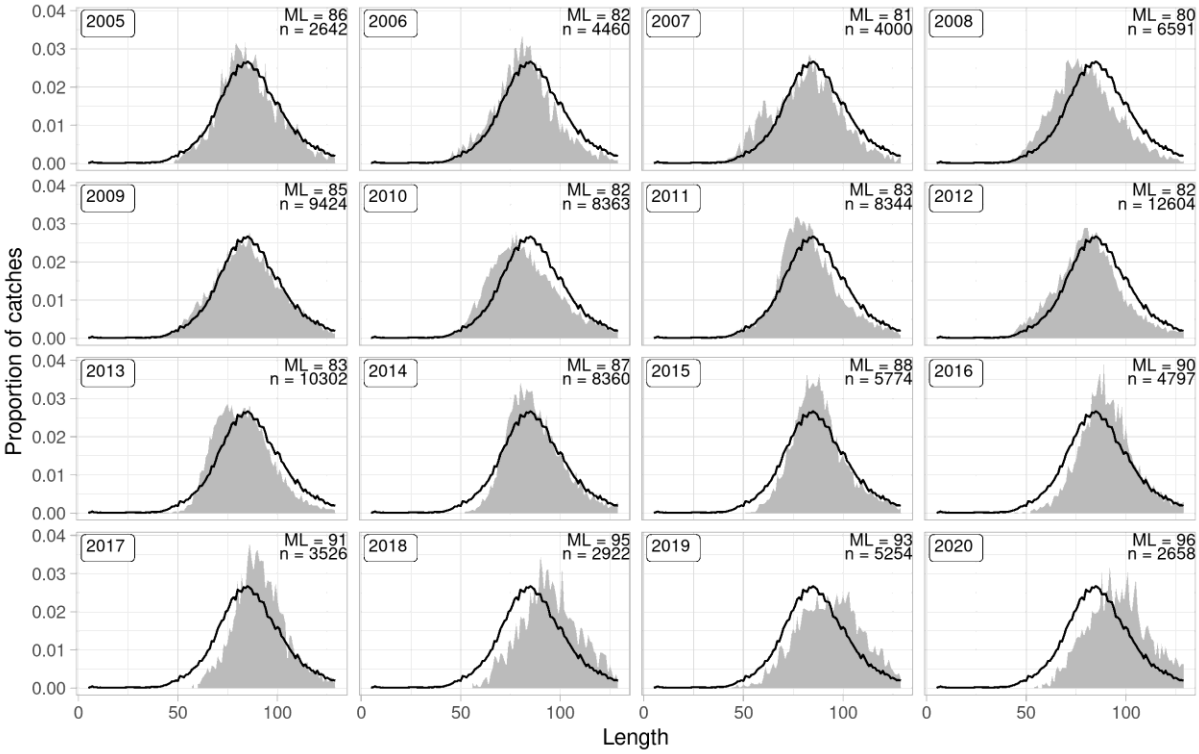

Figure 7. Ling. Length distributions from the Icelandic longline and trawl fleet (grey area) and mean length distribution (black lines) from 2005-2020.

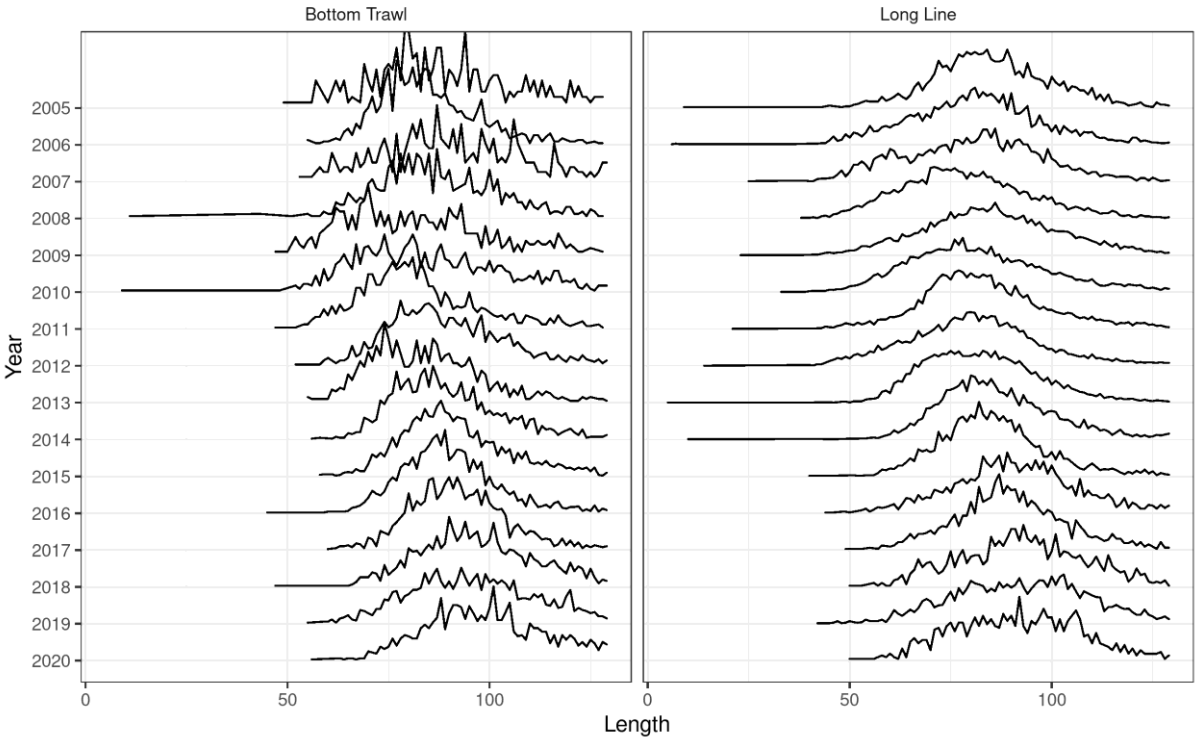

Figure 8. Ling. Length distributions from the Icelandic longline and trawl fleet from 2005-2020.

AGE COMPOSITIONS

Aged data are available from 2000 onwards (Table 3). In previous years, most of the ling caught in the Icelandic spring survey were between age 5 and 8 but from longlines the age was between 6 and 9. The past several years have shown a much larger composition of older fish, common up to 12, from both sample sources (see Survey Data, next section).

Table 3. Ling. Number of available aged otoliths from the commercial catches.

YEAR	LONGLINES	GILLNETS	D. SEINE	TRAWLS	TOTAL
2000	650	200	0	150	**1000**
2001	550	193	0	37	**780**
2002	519	166	0	150	**835**
2003	900	100	0	150	**1150**
2004	750	100	46	100	**996**
2005	750	0	0	231	**981**
2006	1137	288	0	550	**1975**
2007	1300	0	50	100	**1450**
2008	1950	150	0	365	**2465**
2009	2550	150	0	400	**3100**
2010	2498	50	0	850	**3398**
2011	2546	0	50	700	**3296**
2012	4031	50	50	941	**5072**
2013	2863	100	50	800	**3813**
2014	743	225	20	913	**1901**
2015	595	300	0	1003	**1898**
2016	440	345	0	680	**1465**
2017	**310**	**85**	**0**	**595**	**990**
2018	244	100	0	409	**753**
2019	**385**	**0**	**0**	**340**	**865**
2020	225	40	0	355	**620**

CATCH AND EFFORT

The CPUE estimates of ling from commercial fisheries in Icelandic waters have not been considered representative of stock abundance.

SURVEY DATA

The Icelandic spring groundfish survey, which has been conducted annually in March since 1985, covers the most important distribution area of the ling fishery. In addition, the autumn survey was commenced in 1996 and expanded in 2000, however a full autumn survey was not conducted in 2011 and therefore the results for 2011 are not presented.

Figure 9 shows distribution of ling in groundfish surveys in spring 2021 and autumn 2020. Figure 10 shows both a recruitment index and the trends in biomass from both surveys. Length distributions from the spring survey are shown in Figure 11 (abundance) and changes in spatial distribution in the spring survey are presented in Figure 12.

Ling in both the spring and autumn surveys are mainly found in the deeper waters south and west off Iceland. Both the total biomass index and the index of the fishable biomass (>40 cm) gradually decreased in the spring survey until 1995 (Figure 10). In the years 1995- 2003 these indices were half of the mean from 1985–1989. In 2003-2007, the recruitment indices increased and reached a peak in the time-series. The index of the large ling (80 cm and larger) shows a similar trend as the total biomass index (Figure 10). The recruitment index of ling, defined here as ling smaller than 40 cm, showed a considerable increase in 2003-2007 and remained high until 2010. Then the juvenile index fell to a very low level in 2014 and has been relatively low since then (Figure 10).

Length distributions from the spring survey show a similar pattern as survey indices, with the 2012-2018 peak in abundance observed as high proportions of fish in the range of 60–100 cm, that has slowly decreased as they have reached sizes 80–120 cm (Figure 11). This pattern is likely to have caused the increase in ling sizes observed in the trawl samples (Figure 7).

Biomass indices in the autumn survey were low in 1996-2000 but have increased since then (Figure 10). There is consistency between the two surveys; the autumn survey biomass indices are however derived from substantially fewer ling caught. Also, there is an inconsistency in recruitment indices (<40 cm), where the autumn survey shows much lower recruitment, in absolute terms compared with the spring survey (Figure 10). This discrepancy is likely a result of much lower catchability of small ling (due to different gears) in the autumn survey, where ling less than 40 cm has rarely been caught.

Changes in spatial distribution as observed in surveys: According to the spring survey most of the increase during the 2012–2018 peak in ling abundance was in the western area, but an increase was seen in most areas. However, most of the index in terms of biomass comes from the southwestern area or around 40% compared to around 30% between 2003 and 2011. Since 2016, the amounts of biomass in the west and southwest have, however, reduced while the proportions in the southeast have increased, leading to a greater contribution of ling from the northwest and southeast to the total index. A similar pattern is observed in the autumn survey.

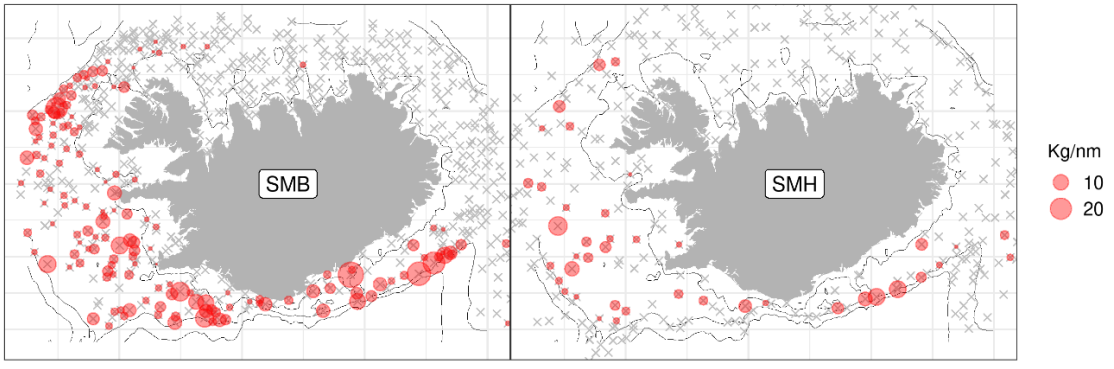

Figure 9. Ling. Location and abundance of ling in the spring survey (SMB) in 2021 and the autumn survey (SMH) in 2020.

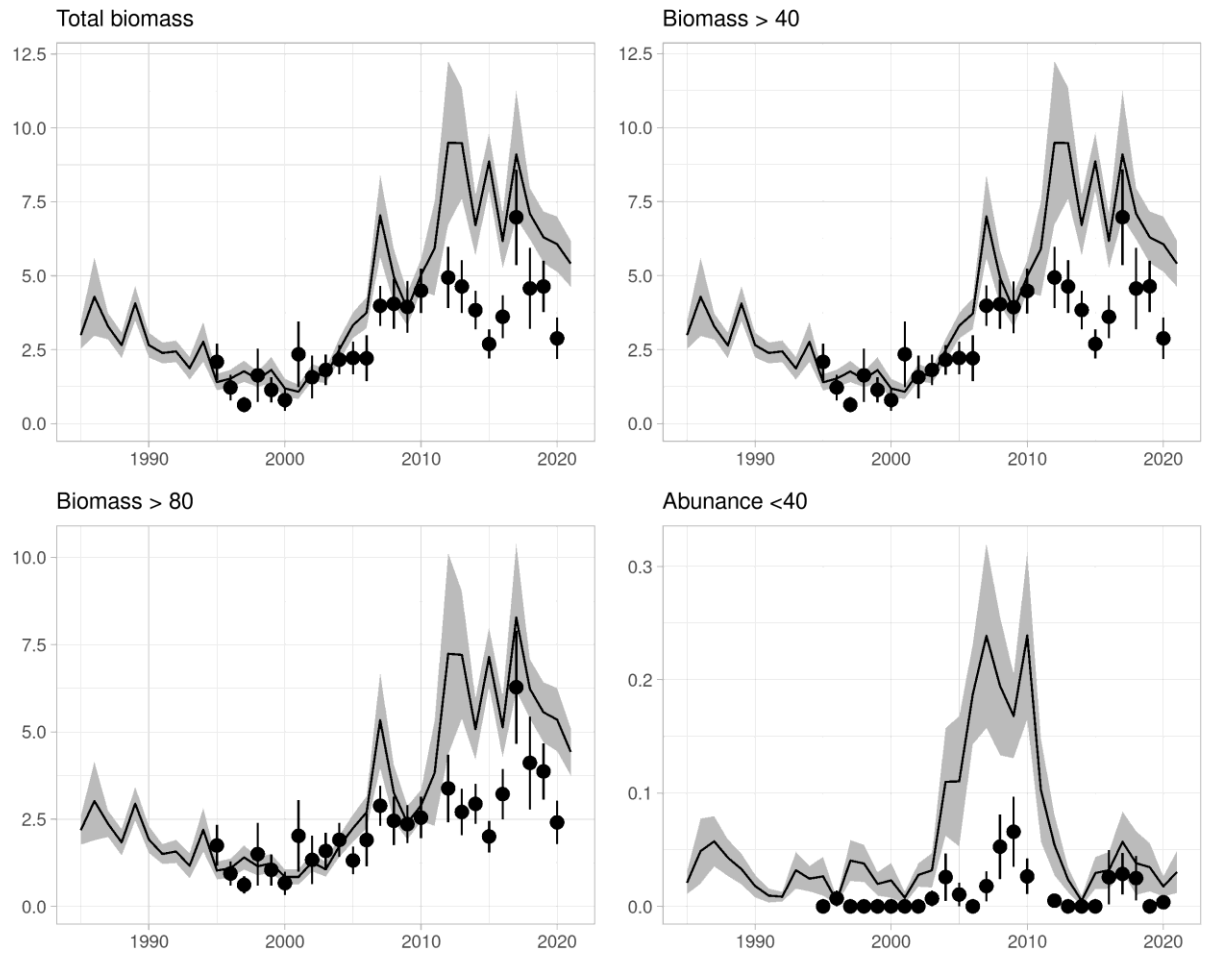

Figure 10. Ling. Total biomass indices, biomass indices >40 cm, biomass indices >80 cm, and abundance indices <40 cm. The lines with shaded area show the spring survey index from 1985 and the points with the vertical lines show the autumn survey from 1996. The shaded areas and vertical lines indicate +/- standard error.

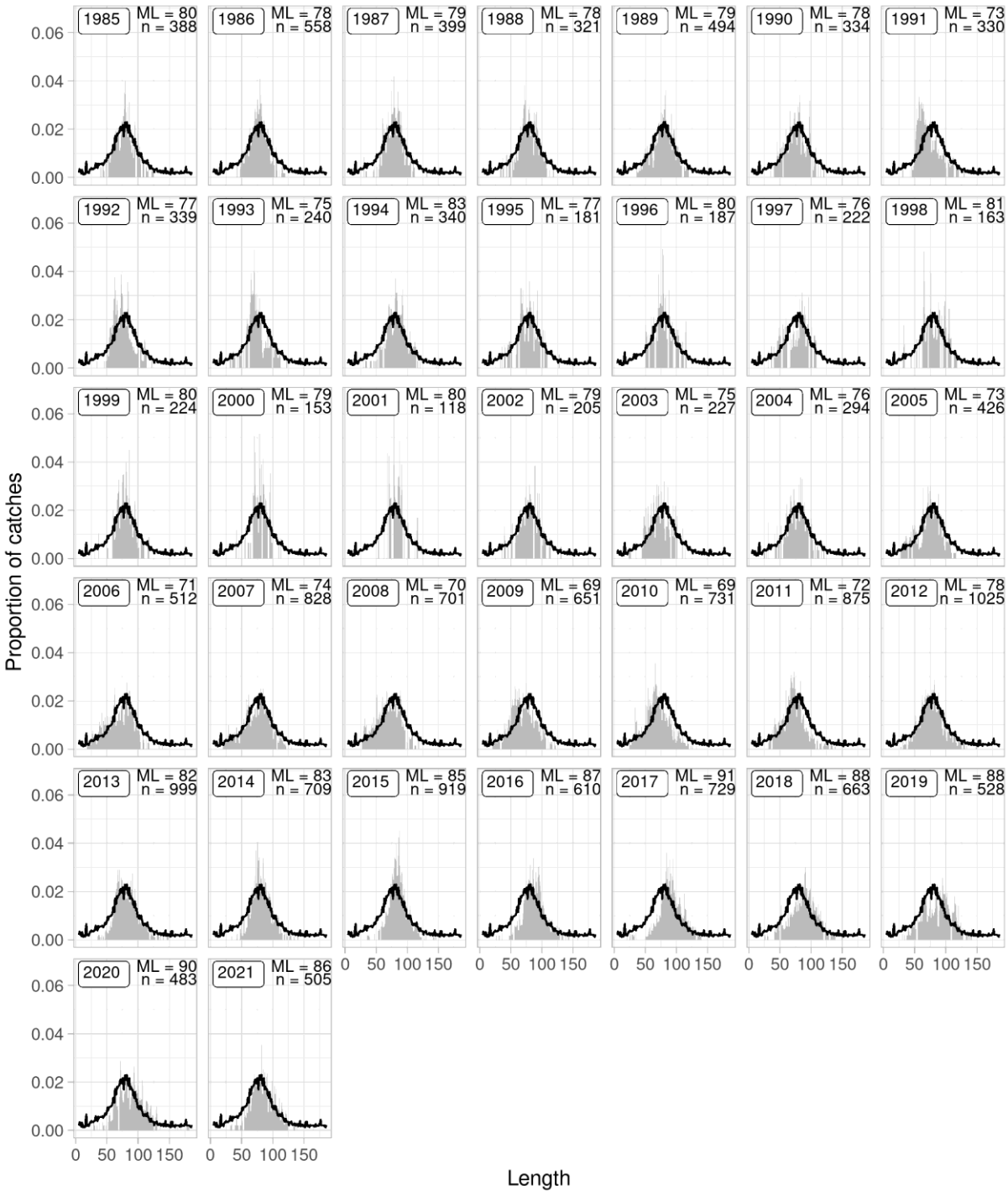

Figure 11. Ling. Length distributions (grey area) and mean length distribution (black line) from the spring survey.

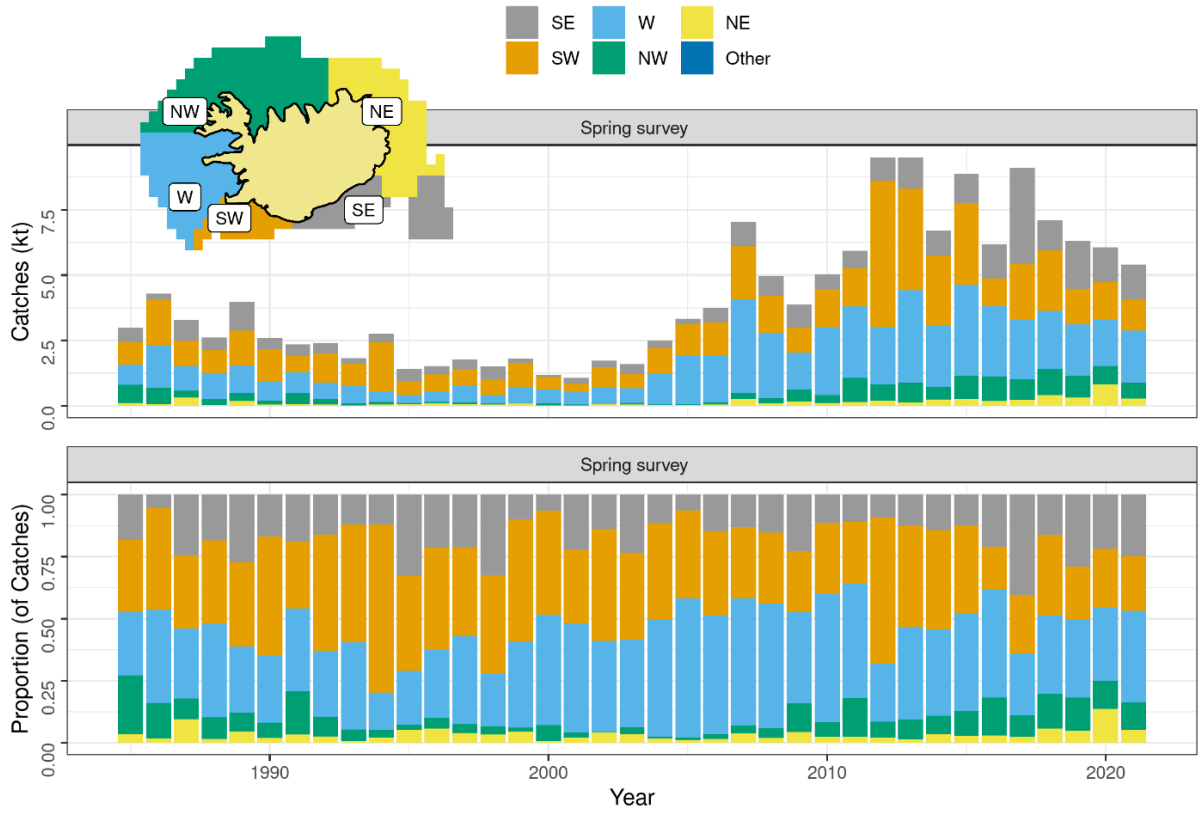

Figure 12. Ling. Estimated survey biomass in the spring survey by year from different parts of the continental shelf (upper figure) and as proportions of the total (lower figure).

ANALYTICAL ASSESSMENT USING GADGET

In 2014, a model of ling in Icelandic waters developed in the Gadget framework (see http://www.hafro.is/gadget for further details) was benchmarked for the use in assessment. As part of a Harvest Control Evaluation requested by Iceland this stock was benchmarked in 2017 (ICES 2017a). Several changes were made to the model setup and settings which are described in the Stock Annex.

DATA USED AND MODEL SETTINGS

Data used for tuning are given in the stock annex (ICES 2017b).

Model settings used in the Gadget model are described in more detail in the stock annex (ICES 2017a).

DIAGNOSTICS

OBSERVED AND PREDICTED PROPORTIONS BY FLEET

Overall fit to the predicted proportional length and age–length distributions is close to the observed distributions (Figures 13-16). In the initial years of the spring the observed length proportions appear have greater noise in, however as the number of samples caught the noise level decreases. Similarly, for gears where only a small portion of the ling catch is caught, such as the gillnet, the overall noise is greater than for those gears with greater number of samples.

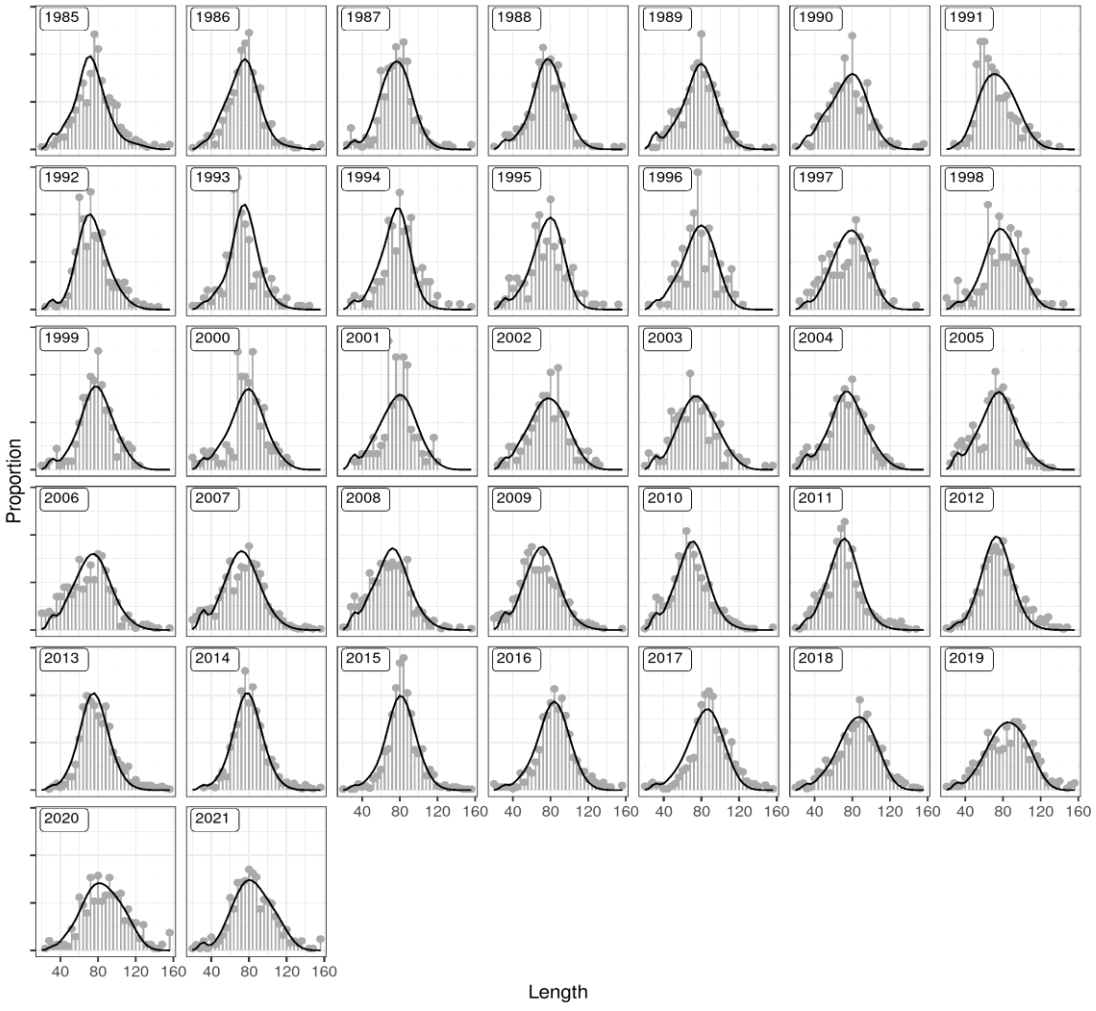

Figure 13. Ling. Fitted proportions-at-length from the Gadget model (black lines) compared to observed proportions in the spring survey (grey lines and points).

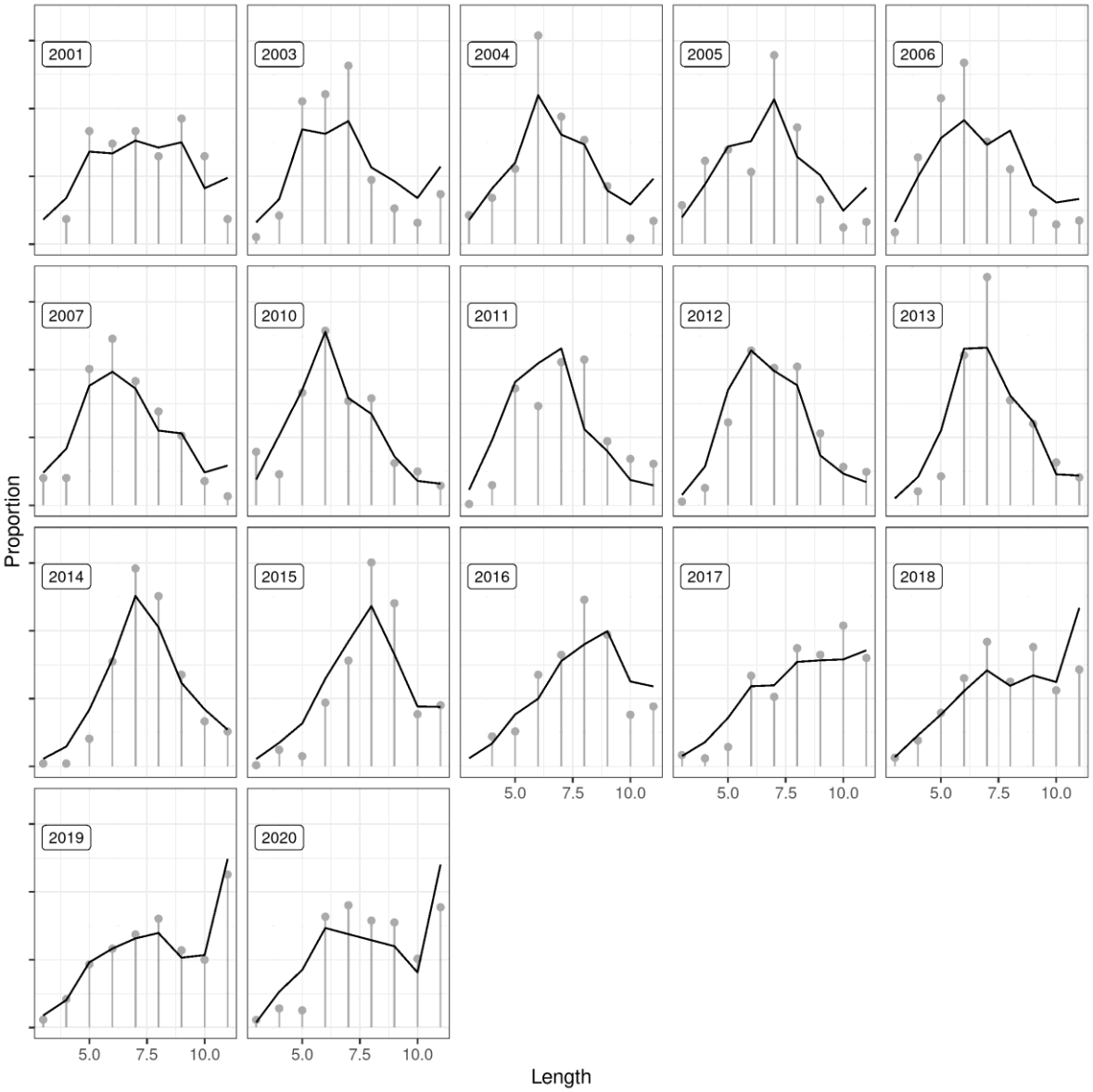

Figure 14. Ling. Fitted proportions-at-age from the Gadget model (black lines) compared to observed proportions in the spring survey catches (grey lines and points).

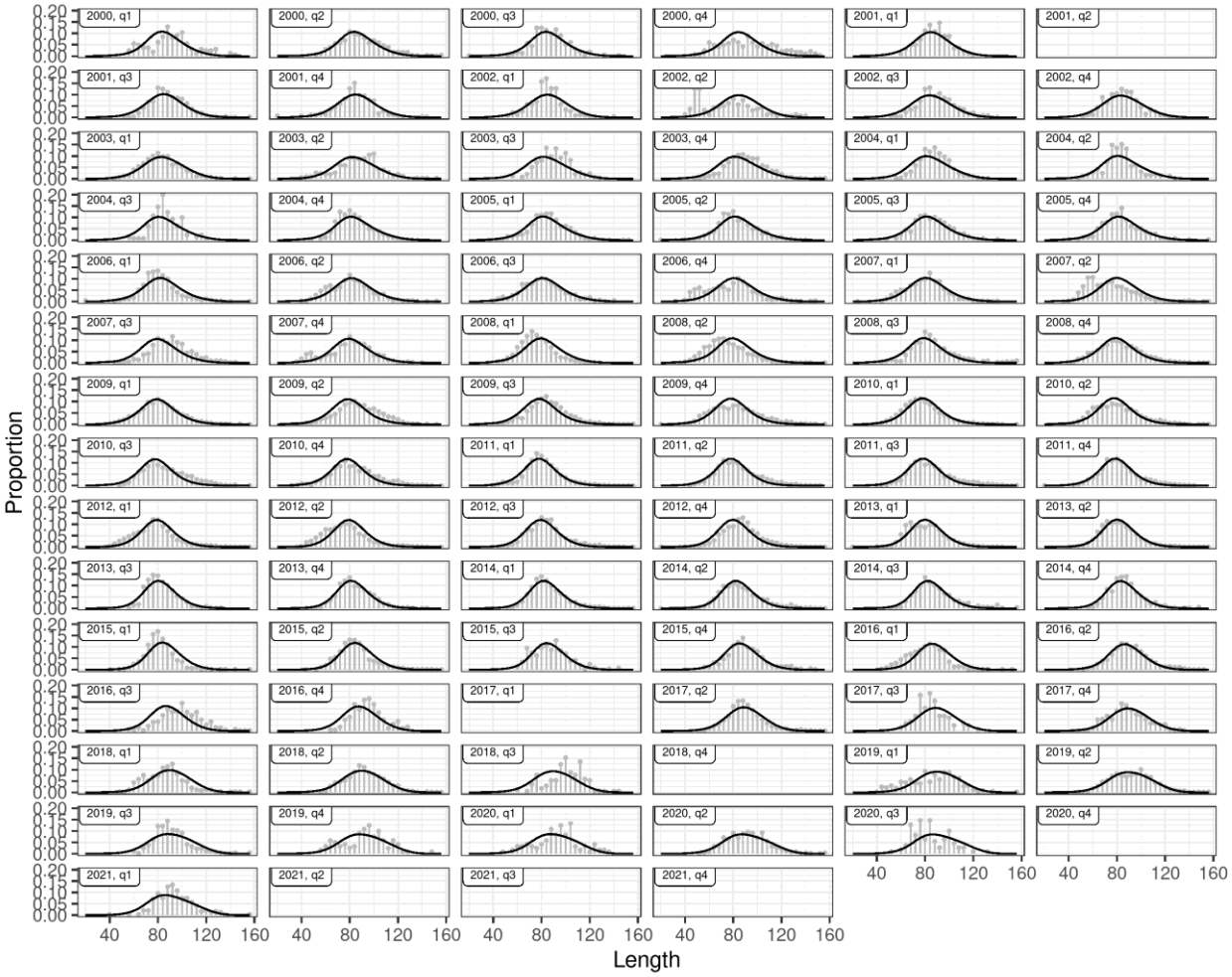

Figure 15. Ling. Fitted proportions-at-length from the Gadget model (black lines) compared to observed proportions from longline catches (vertical lines and points).

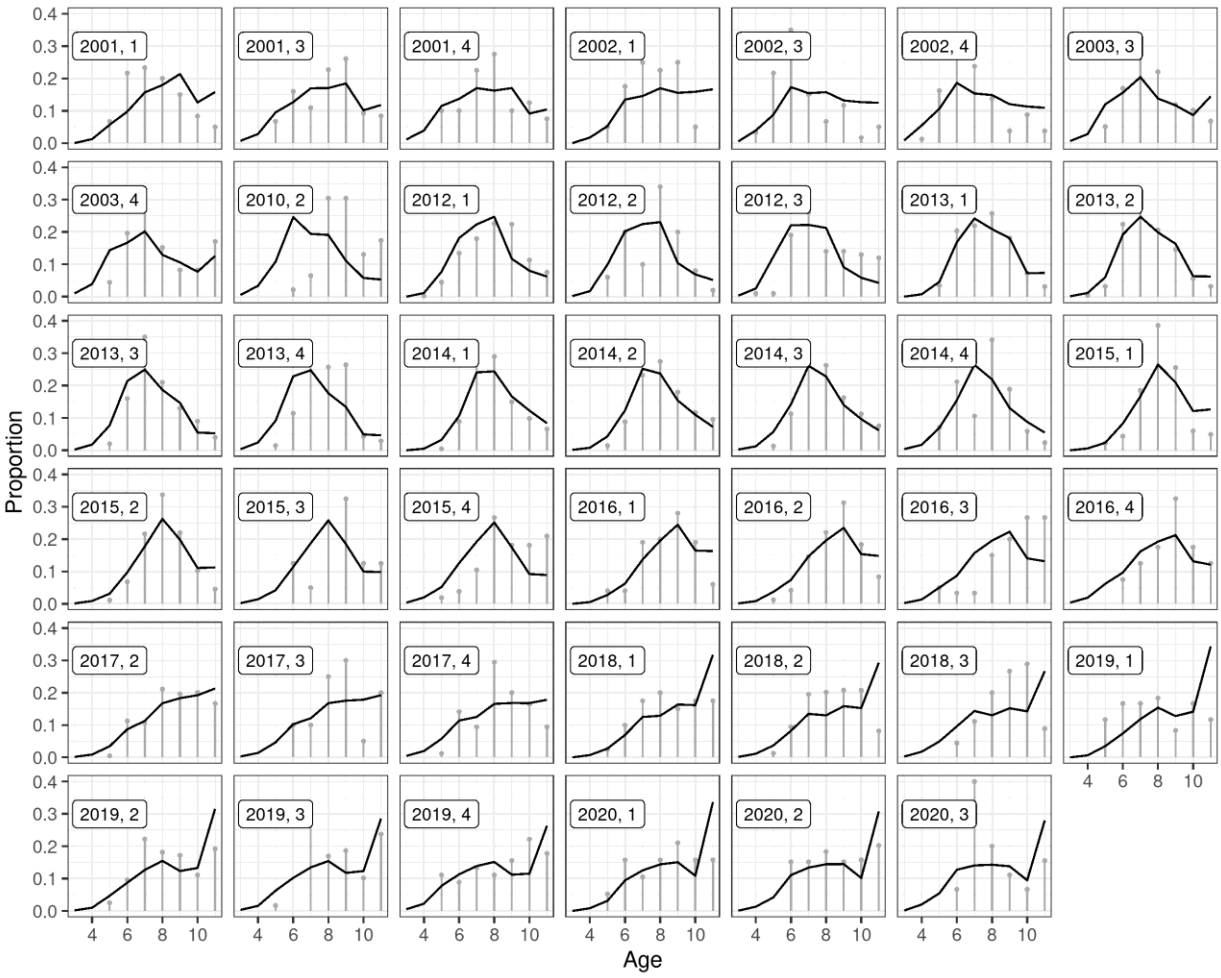

Figure 16. Ling. Fitted proportions-at-age from the Gadget model (black lines) compared to observed proportions in longline catches (vertical lines and points).

MODEL FIT

Figure 17 shows the overall fit to the survey indices described in the stock annex. In general, the model appears to follow the stock trends historically. Furthermore, the terminal estimate is not seen to deviate substantially from the observed value for most length groups, with model overestimating the abundance in the two largest length groups. Looking at the first three length groups (20–50, 50–60, 60–70) the model appears to discount the recruitment peak observed between 2005 and 2010 as the increase is not observed in the bigger length classes to the same degree. Summed up over survey biomass the model overestimates the biomass in the terminal years.

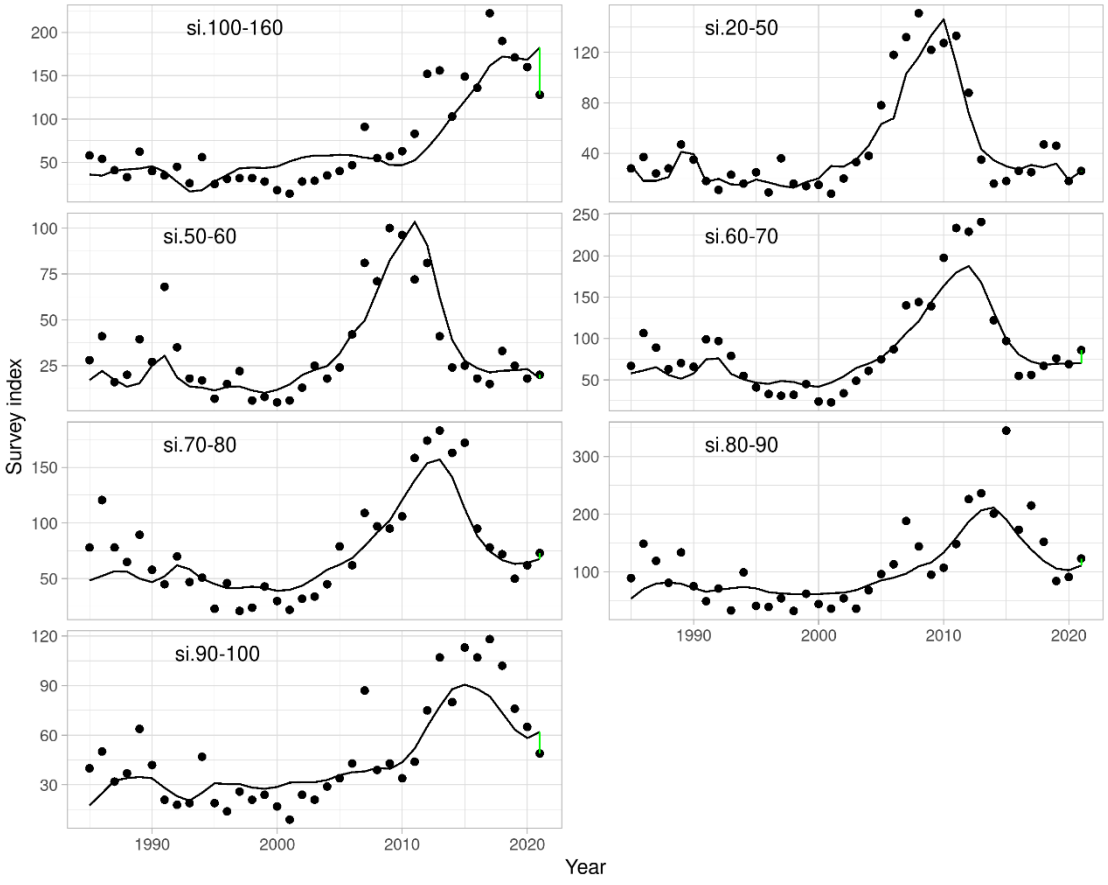

Figure 17. Ling. Fitted spring survey index by length group from the Gadget model (black line) and the observed number of ling caught in the survey (points). The green line indicates the difference between the terminal fit and the observations.

RESULTS

The results are presented in Table 6 and Figure 18. Recruitment peaked in 2007 to 2010 but has decreased and is estimated in 2013 to 2015 to be at a level similar to that observed before the peak. The 2021 recruitment estimate is high compared to last year. Spawning–stock biomass has increased since 2000 and was estimated to be at its highest during 2014–2019 but has decreased this year and is expected to continue to decrease. Similarly, harvestable biomass was estimated at its highest level in 2015 but shows a slow and steady decrease. Fishing mortality for fully selected ling (age 14–19) has decreased from 0.66 in 2009 to 0.22 in 2021.

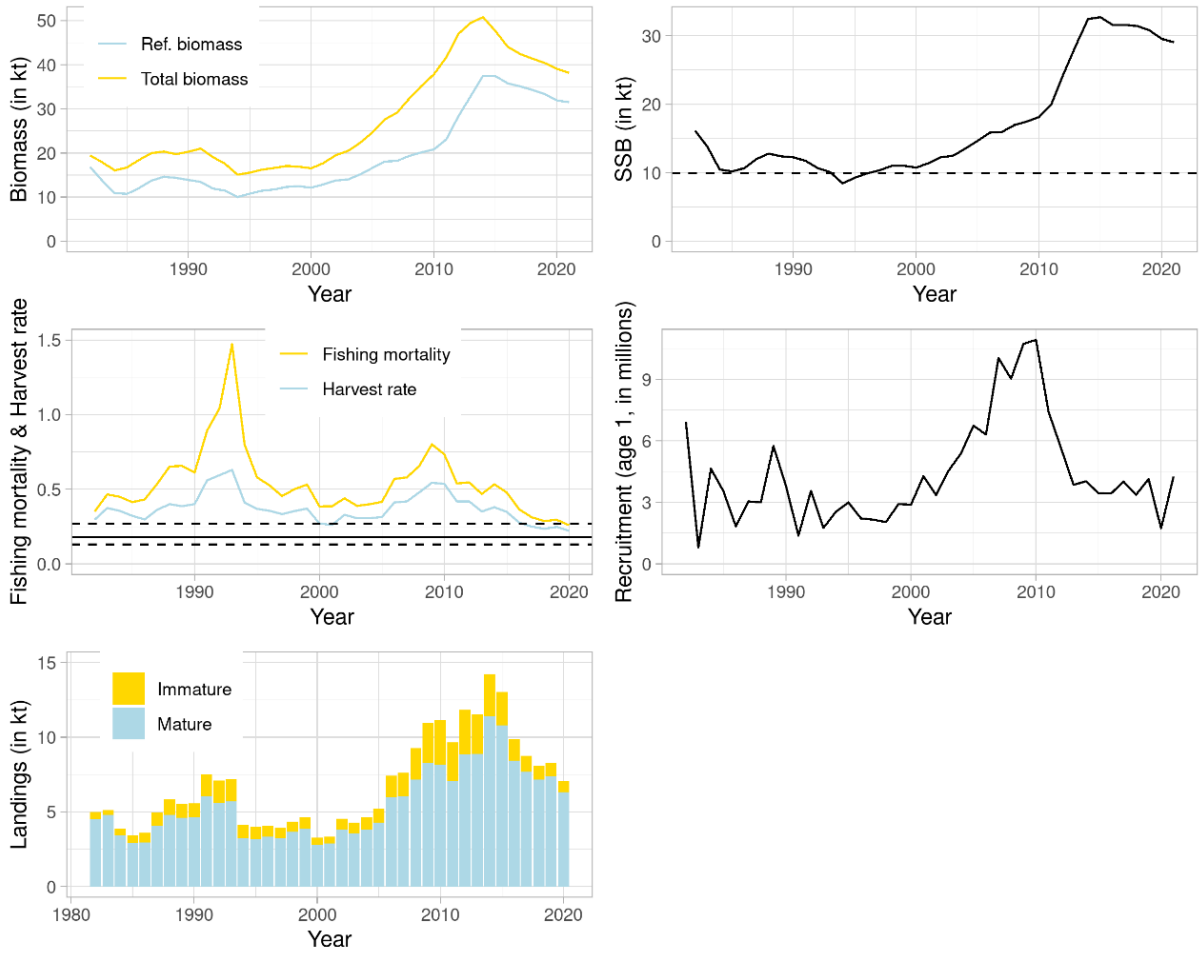

Figure 18. Ling. Estimated biomass, spawning stock biomass (SSB), fishing mortality for fully selected fishes and harvest rate, recruitment, and total catches. The dashed line in the SSB plot represents B_{pa}. The solid line in the harvest rate plot indicates the target harvest rate used in the harvest control rule, whereas the dashed lines indicate the bounds of the realized harvest rates resulting from the harvest control rule given the uncertainty in the assessment.

This year's assessment shows a downward revision of SSB and an upward revision of fishing mortality compared to last year's assessment (Figure 19). The downward revision is not unexpected, as assessments often exhibit downward revisions after passing a peak in biomass levels or an upward revision after passing a trough in biomass levels.

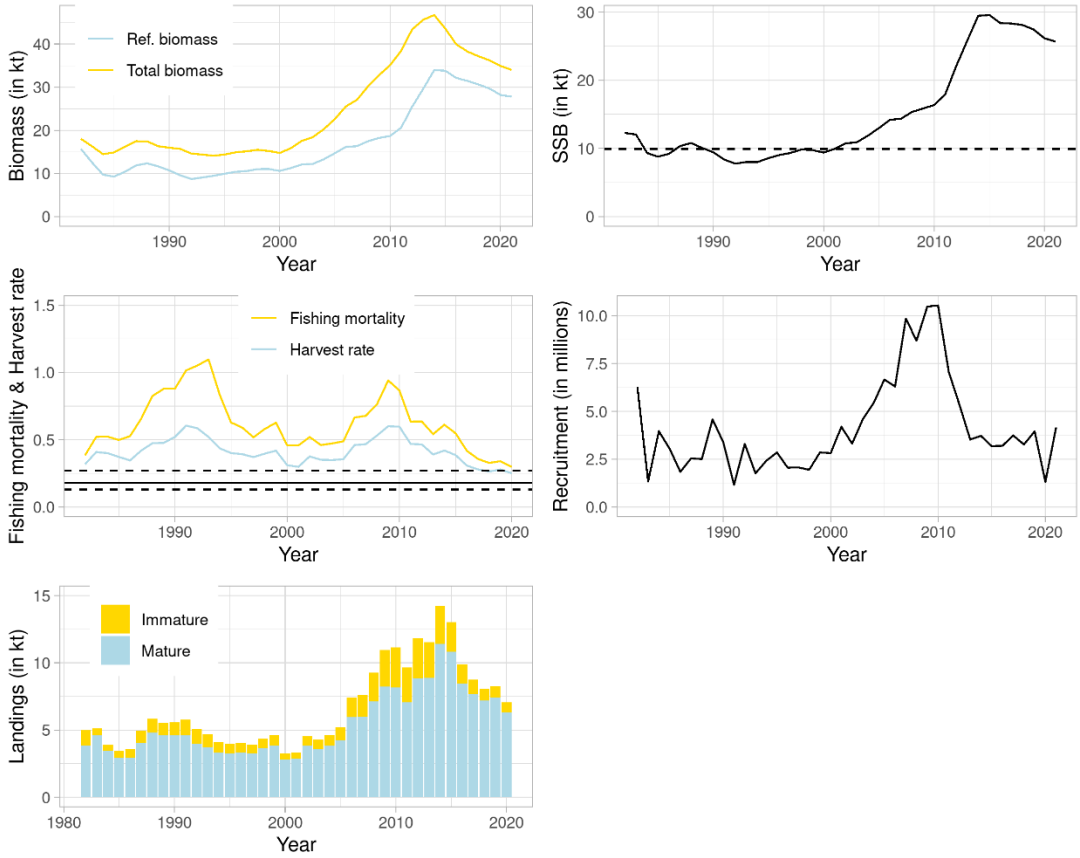

Figure 19. Ling. This year's assessment (blue and yellow lines) compared with the previous year's assessment (dashed lines). Estimated biomass, spawning stock biomass (SSB), fishing mortality for fully selected fishes and harvest rate and recruitment.

ANALYTICAL RETROSPECTIVE ANALYSIS

The results of an analytical retrospective analysis indicate that there was an upward revision of biomass from the 5th to the 4th peel, followed by a downward revision of biomass that was more stably estimated over the last 3 years. As a result, there was a downward then upward revision of F. Estimates of recruitment are decently stable except for the apparent peak in 2017-2018. As explained in reference to the survey indices, this is likely the influence of highly variable survey indices that, for the smallest sizes in the most recent years, have no repeated observations at larger sizes with which this influence can be tempered. Therefore, it is expected that these recruitment peaks may simply be the result of uncertainty in survey indices and are likely to disappear in the coming assessment years. In addition, the downward revision observed between peels 4 and 3 is the result of the population reaching its peak in biomass and now decreasing. As the steep decrease in age 3 recruitment observed in 2010-2013 is expected to now be observed as decreased spawning stock size, it is likely that more downward revisions will be observed over the next 3-5 annual assessment cycles.

Mohn's rho was estimated to be 0.0778 for SSB, 0.306 for F, and 0.134 or recruitment.

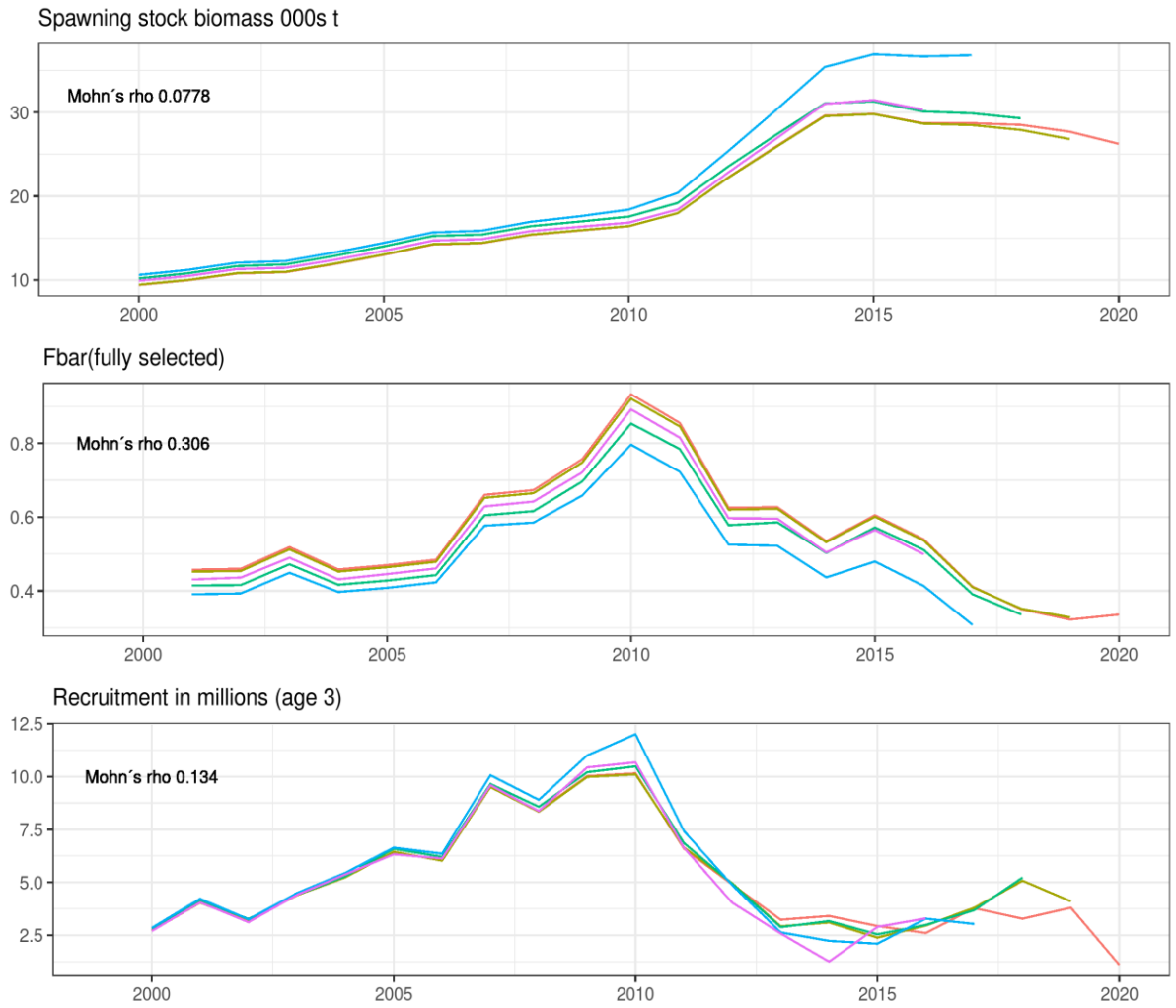

Figure 20: Ling. Retrospective plots illustrating stability in model estimates over a 5-year 'peel' in data. Results of spawning stock biomass, fishing mortality F, and recruitment (age 3) are shown.

REFERENCE POINTS

As part of the WKICEMSE 2017 HCR evaluations, the following reference points were defined for the stock.

Framework	*Reference point*	*Value*	*Basis*
Management plan	MGT $B_{trigger}$	9930	B_{pa}
	HR_{MGT}	0.18	*Percentage of biomass 75+ cm. Leads to long-term MSY. Realized HR can range from 0.12-0.28.*
MSY	MSY $B_{trigger}$	9930 t	B_{pa}
	HR_{MSY}	0.24	*Stochastic projections*
Precautionary approach	B_{lim}	7090 t	$B_{pa}/1.4$
	B_{pa}	9930 t	B_{loss}
	HR_{lim}	0.56	*Equilibrium HR which will maintain the stock above B_{lim} with a 50% probability*
	HR_{pa}	0.35	*95% probability that true HR is below HR_{lim}.*

1) Recently, ICES changed the definition of HR_{pa} to what was previously known as $HR_{p.05}$.

MANAGEMENT

The Icelandic Ministry of Industries and Innovation is responsible for management of the Icelandic fisheries and implementation of legislation. The Ministry issues regulations for commercial fishing for each fishing year (1 September–31 August), including an allocation of the TAC for each stock subject to such limitations. Ling in 5.a has been managed by TAC since the 2001/2002 fishing year.

Landings have exceeded both the advice given by MFRI and the set TAC from 2002/2003 to 2013/2014 but amounted to less than two thirds in 2015/2016 (Table 4). Overshoot in landings in relation to advice/TAC has been decreasing steadily since the 2009/2010 fishing year, with an overshoot of 53% to 35% in 2010/2011, 24% in 2011/2012 and 4% in 2012/2013. The reasons for the implementation errors are transfers of quota share between fishing years, conversion of TAC from one species to another (Figure 18) and catches by Norway and the Faroe Islands by bilateral agreement. The level of those catches is known in advance but has until recently not been taken into consideration by the Ministry when allocating TAC to Icelandic vessels. There is no minimum landing size for ling.

There are agreements between Iceland, Norway and the Faroe Islands relating to a fishery of vessels in restricted areas within the Icelandic EEZ. Faroese vessels are allowed to fish 5600 t of demersal fish species in Icelandic waters which includes maximum 1200 tonnes of cod and 40 t of Atlantic halibut. The rest of the Faroese demersal fishery in Icelandic waters is mainly directed at tusk, ling and blue ling. Further description of the Icelandic management system can be found in the stock annex.

Table 4. Ling. Recommended TAC, national TAC, and landings (tonnes) by fishing years.

FISHING YEAR	ADVICE	NATIONAL-TAC	LANDINGS
1999/2000			3961
2000/2001			3451
2001/2002	3000	3000	2968
2002/2003	3000	3000	3715
2003/2004	3000	3000	4608
2004/2005	4000	4000	5238
2005/2006	4500	5000	6961
2006/2007	5000	5000	7617
2007/2008	6000	7000	8560
2008/2009	6000	7000	10489
2009/2010	6000	7000	10713
2010/2011	7500	7500	10095
2011/2012	8800	9000	11133
2012/2013	12000	11500	12445
2013/2014	14000	13500	13400
2014/2015	14300	13800	12423
2015/2016	16200	15000	11229
2016/2017	9343	8143	8426
2017/2018	8598[1)]	7598	8573
2018/2019	6255[1)]	5200	8028
2019/2020	6599[1)]	5299	7155
2020/2021	5700[1)]	5700	

[1)] 18% harvest control rule.

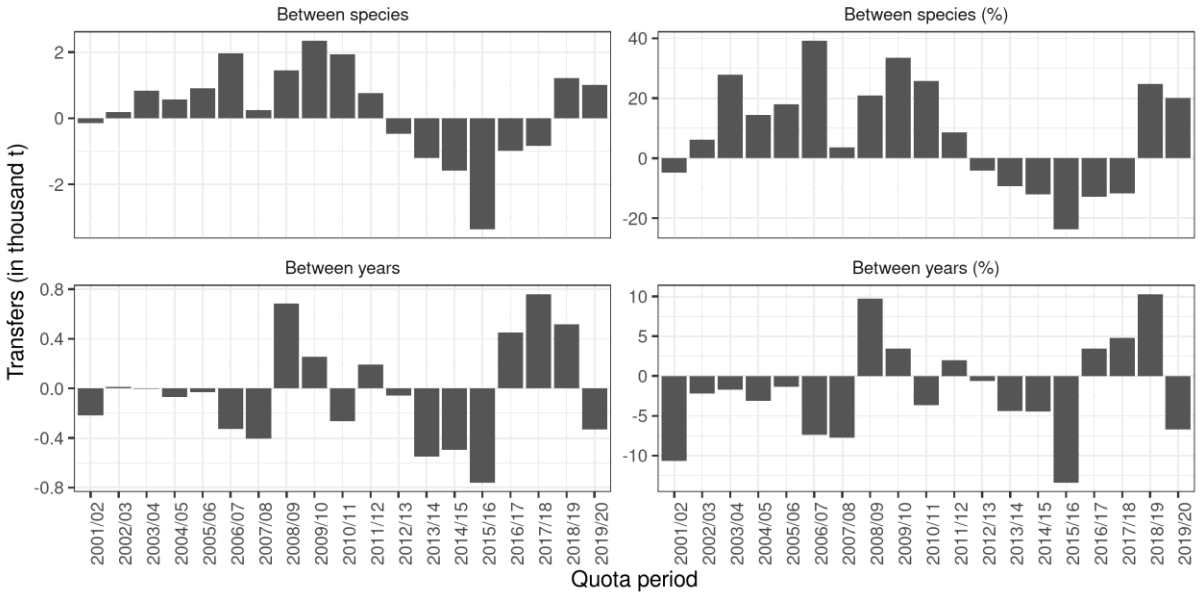

Figure 21. Ling. Net transfer of quota to and from ling in the Icelandic ITQ system by fishing year. Between species (upper): Positive values indicate a transfer of other species to ling, but negative values indicate a transfer of ling quota to other species. Between years (lower): Transfer of quota from given quota year to the next quota year.

MANAGEMENT CONSIDERATIONS

All the signs from commercial catch data and surveys indicate that ling is at present in a good state. This is confirmed in the Gadget assessment. However, the drop in recruitment since 2010 will result in a rapid decrease in sustainable catches in the near future.

Currently the longline and trawl fishery represent 95% of the total fishery, while the remainder is assigned to gillnets. Should those proportions change dramatically, so will the total catches as the selectivity of the gillnet fleet is substantially different from other fleets.

Table 5. Ling. Catches in Icelandic waters by country (Source STATLANT).

YEAR	BELGIUM	FAROE	GERMANY	ICELAND	NORWAY	UK	TOTAL
1980	445	607	0	3149	423	0	**4624**
1981	196	489	0	3348	415	0	**4448**
1982	116	524	0	3733	612	0	**4985**
1983	128	644	0	4256	115	0	**5143**
1984	103	450	0	3304	21	0	**3878**
1985	59	384	0	2980	17	0	**3440**
1986	88	556	0	2946	4	0	**3594**
1987	157	657	0	4161	6	0	**4981**
1988	134	619	0	5098	10	0	**5861**
1989	95	614	0	4896	5	0	**5610**
1990	42	399	0	5153	0	0	**5594**
1991	69	530	0	5206	0	0	**5805**
1992	34	526	0	4556	0	0	**5116**
1993	20	501	0	4333	0	0	**4854**
1994	3	548	0	4049	0	0	**4600**
1995	0	463	0	3729	0	0	**4192**
1996	0	358	0	3670	20	0	**4048**
1997	0	299	0	3634	0	0	**3933**
1998	0	699	0	3603	0	0	**4302**
1999	0	500	0	3973	120	1	**4594**
2000	0	0	0	3196	67	3	**3266**
2001	0	362	2	2852	116	1	**3333**
2002	0	1629	0	2779	45	0	**4453**
2003	0	565	2	3855	108	5	**4535**
2004	0	739	1	3721	139	0	**4600**
2005	0	682	1	4311	180	20	**5194**
2006	0	960	1	6283	158	0	**7402**
2007	0	807	0	6592	185	0	**7584**
2008	0	1366	0	7736	176	0	**9278**
2009	0	1157	0	9610	172	0	**10939**
2010	0	1095	0	9867	168	0	**11130**
2011	0	588	0	8743	249	0	**9580**
2012	0	875	0	10706	248	0	**11829**
2013	0	1030	0	10212	294	0	**11445**
2014	0	1738	0	12450	158	0	**13930**
2015	0	1233	0	11553	250	0	**12862**
2016	0	1072	0	8582	230	0	**9884**
2017	0	829	0	7692	244	0	**8766**
2018	0	1103	0	6756	203	0	**8062**
2019	0	1093	0	6992	184	0	**8269**
2020	**0**	**989**	**0**	**5836**	**237**	**0**	**7061**

***Preliminary.**

Table 6. Ling. Results from the Gadget assessment. Estimates of biomass, biomass 40+ cm, spawning–stock biomass (SSB) in thousands of tonnes and recruitment (millions), harvest rate (HR) and fully selected fishing mortality. Values from projections include fishing amounts and values for 2020, and all values after 2020, and result from assuming the current TAC is filled and that fishing occurs according to the HCR.

YEAR	BIOMASS	B75	SSB	REC3	CATCH	HR	F
1982	21,91	17,9	19,76	4,59	4,99	0,3	0,32
1983	20,23	14,71	16,79	1,83	5,12	0,38	0,4
1984	18,56	12,16	13,3	3,32	3,88	0,33	0,36
1985	18,93	11,76	12,59	2,86	3,45	0,29	0,33
1986	20,08	12,61	12,73	2,45	3,6	0,28	0,36
1987	21,2	13,7	13,42	1,95	4,97	0,36	0,48
1988	20,77	13,76	13,3	2,79	5,85	0,44	0,63
1989	19,53	12,9	12,45	4,55	5,55	0,44	0,7
1990	19,28	11,99	11,62	3,46	5,56	0,48	0,69
1991	19,11	10,88	10,56	1,87	5,79	0,56	0,76
1992	18,27	9,97	10,11	2,3	5,09	0,51	0,73
1993	17,99	10,33	10,49	2,63	4,71	0,45	0,75
1994	18,01	11,08	10,79	2,27	4,11	0,36	0,59
1995	18,47	11,94	11,37	2,99	3,97	0,32	0,45
1996	19,23	12,59	12,07	2,16	4,07	0,32	0,42
1997	19,65	12,99	12,6	2,28	3,91	0,3	0,37
1998	20,18	13,6	13,32	2,04	4,35	0,32	0,4
1999	20,06	13,81	13,4	2,99	4,62	0,34	0,43
2000	19,88	13,6	13,15	2,88	3,28	0,24	0,31
2001	21,19	14,5	13,94	4,09	3,36	0,23	0,32
2002	23,13	15,44	14,91	3,4	4,53	0,29	0,35
2003	24,14	15,64	15,22	4,5	4,28	0,27	0,31
2004	26,11	16,61	16,28	5,3	4,63	0,28	0,33
2005	28,56	17,84	17,37	6,86	5,2	0,29	0,34
2006	31,73	19,1	18,55	6,62	7,43	0,4	0,47
2007	33,56	19,03	18,66	10,08	7,62	0,41	0,48
2008	37,35	19,9	19,74	9,43	9,28	0,47	0,54
2009	40,83	20,64	20,49	11,05	10,95	0,54	0,65
2010	44,37	21,33	21,56	11,36	11,15	0,51	0,58
2011	49,17	23,71	23,92	7,62	9,65	0,39	0,43
2012	55,31	29,21	29,08	5,5	11,83	0,39	0,43
2013	58,33	34,35	34,03	3,02	11,54	0,33	0,38
2014	59,59	39,96	38,71	3,07	14,25	0,36	0,43
2015	56,2	41,4	39,67	2,44	13,04	0,32	0,38
2016	51,96	40,97	38,86	3,23	9,88	0,24	0,29
2017	49,66	40,65	38,73	3,86	8,77	0,22	0,25
2018	47,88	39,31	37,92	3,18	8,06	0,21	0,23
2019	46,12	37,39	36,45	3,18	8,27	0,24	0,19
2020	41,51	32,14	31,51	3,54	6,94	0,22	0,22
2021	41,48	31,73	31,19	3,05	5,71	0,18	0,19
2022	42,50	32,90	32,20	3,05	5,81	0,18	0,19

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