

# LING - LANGA

## *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 ~80 cm according to data from the annual Icelandic spring groundfish survey. It has a grey dorsal side with a light-coloured ventral side and a touch of yellow in between. 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 centimetres 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

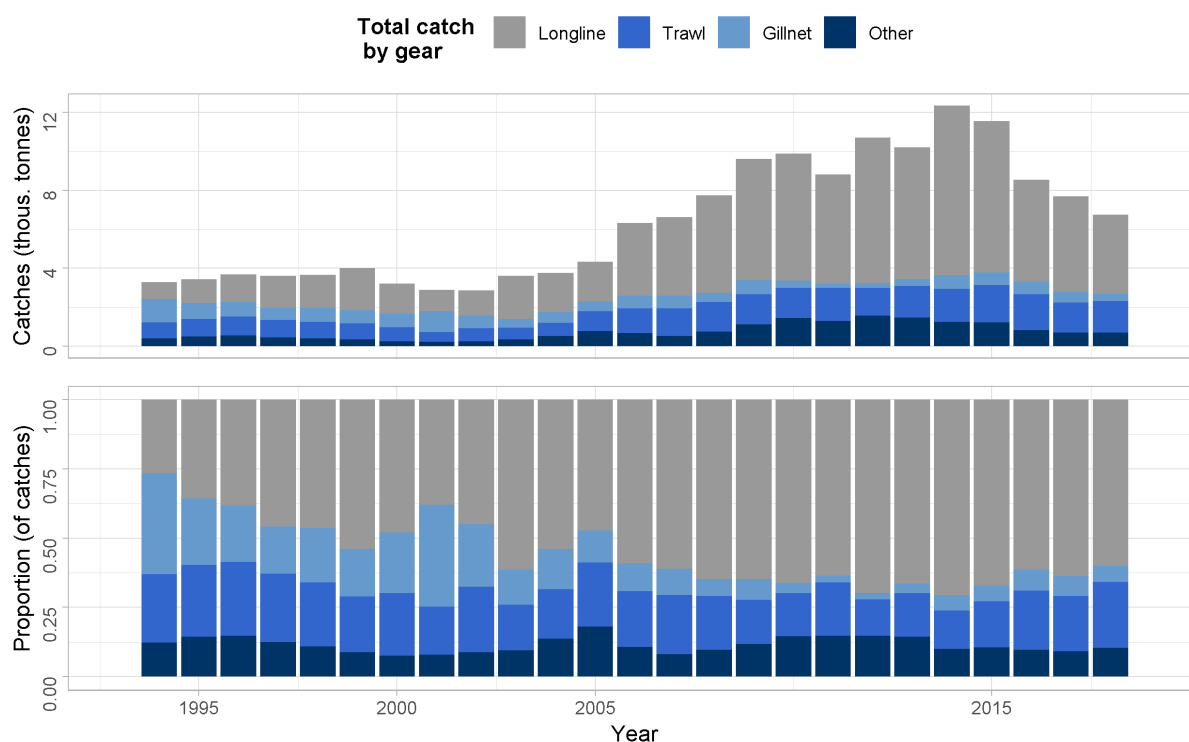
The fishery for ling in Icelandic waters has not changed substantially in recent years. Around 130-160 longliners annually report catches of ling, around 20-50 gillnetters and around 60 trawlers. Most of ling is caught on longlines (Figure 1, Table 1) which has increased since 2000 to around 60% in 2018. At the same time the proportion caught by gillnets has decreased from 20–30% in 2000–2007 to around 6% in 2018. Catches in trawls have varied less and have been at around 20% of Icelandic catches until 2018 when they increased to 24% (Figure 1, 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 2). The main fishing grounds for ling as observed from logbooks are in the south, southwestern and western part of the Icelandic shelf (Figure 3). The main trend in the spatial distribution of catches according to logbook entries is the decreased proportion of catches caught 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 4). In recent years the main fishing pressure has shifted towards shallower waters (Figure 2).

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

*Tafla 1. Langa. Fjöldi íslenskra báta og afli eftir flota, sem taka þátt í veiðum á löngu á Íslandsmiðum samkvæmt afladagbókum.*

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

**Figure 1. Ling. Commercial catches by gear as registered in Icelandic logbooks.**

*Mynd 1. Langa. Afli eftir veiðarfærum samkvæmt afladagbókum.*

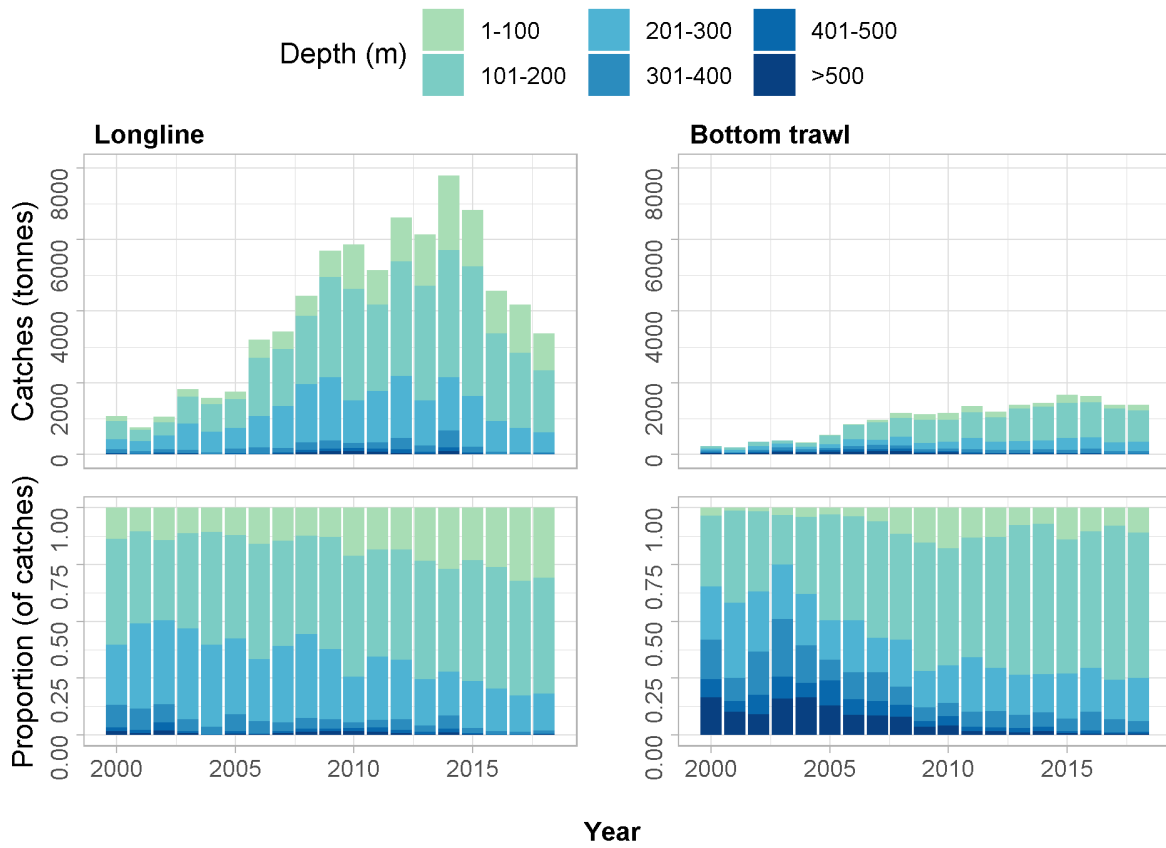


Figure 2. Ling. Depth distribution of ling catches from longlines and trawls from Icelandic logbooks.

Mynd 2. Langa. Afli línu- og botnvörpuveiða eftir dýpi samkvæmt afladagbókum.

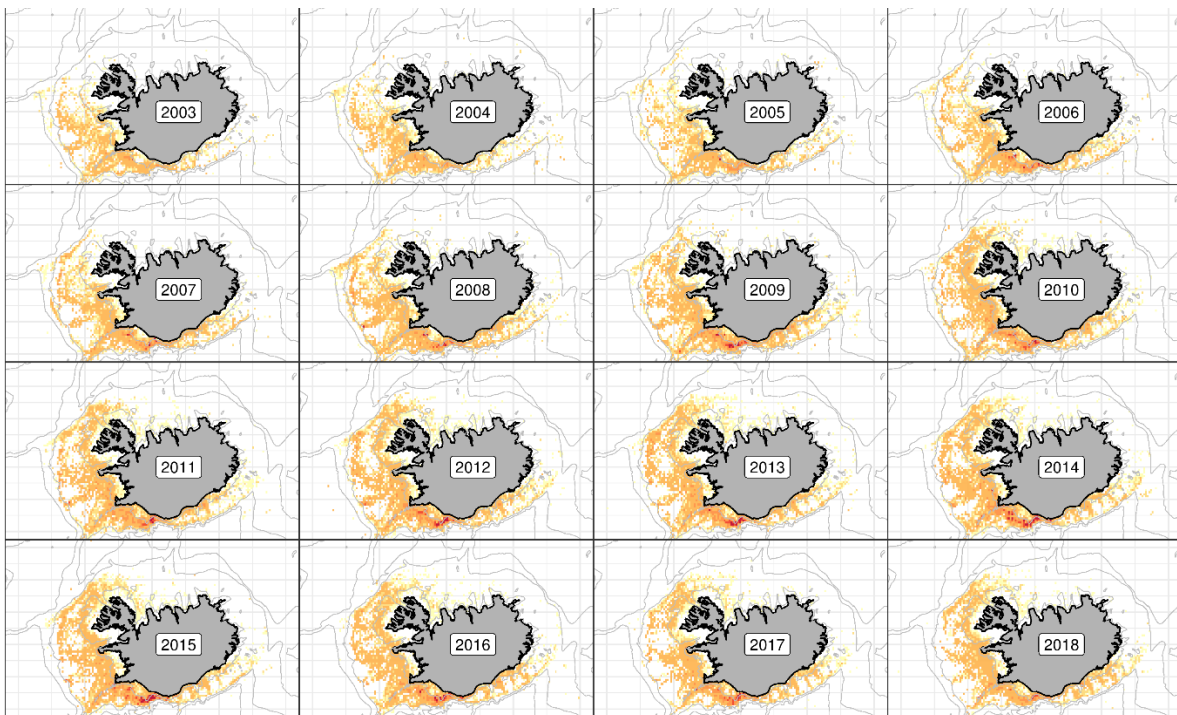
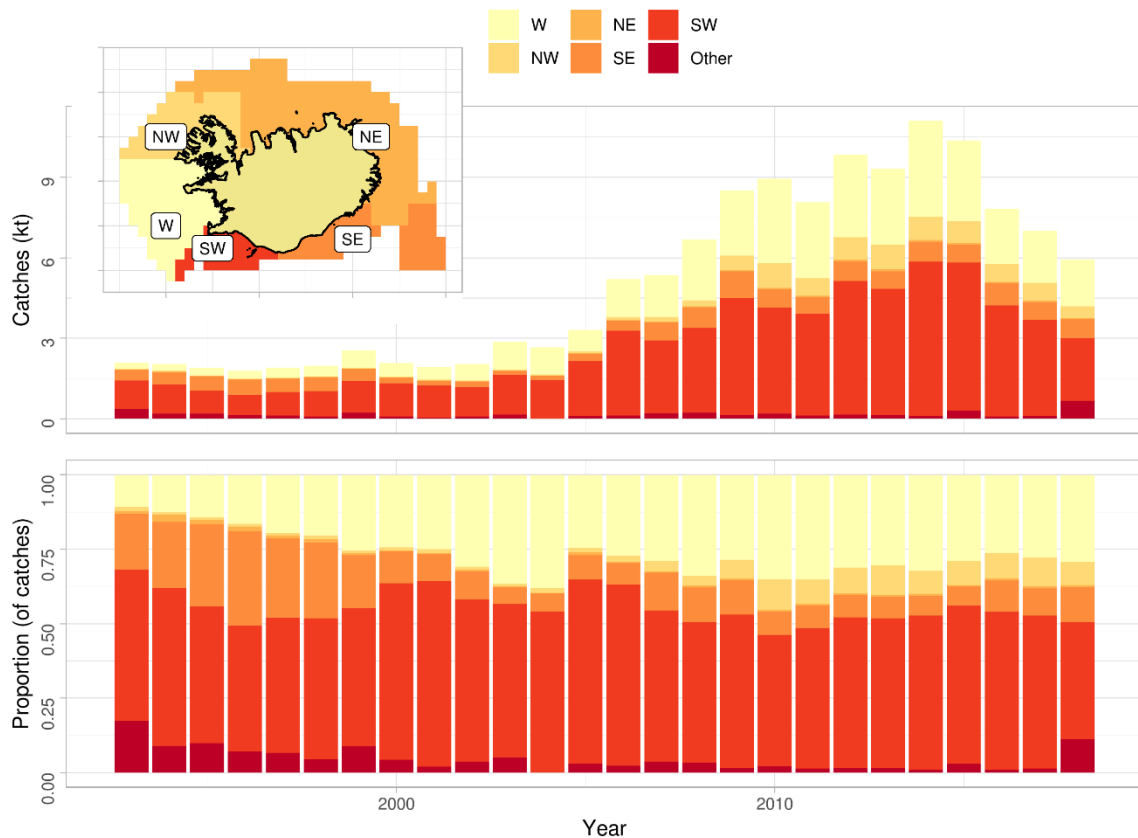


Figure 3. Ling. Geographical distribution (tonnes/square mile) of the Icelandic longline ling fishery since 2003 as reported in logbooks by the Icelandic fleet.

Mynd 3. Langa. Útbreiðsla löngu (tonn/sjómílu<sup>2</sup>) á Íslandsmiðum frá 2003 samkvæmt afladagbókum íslenskra skipa.

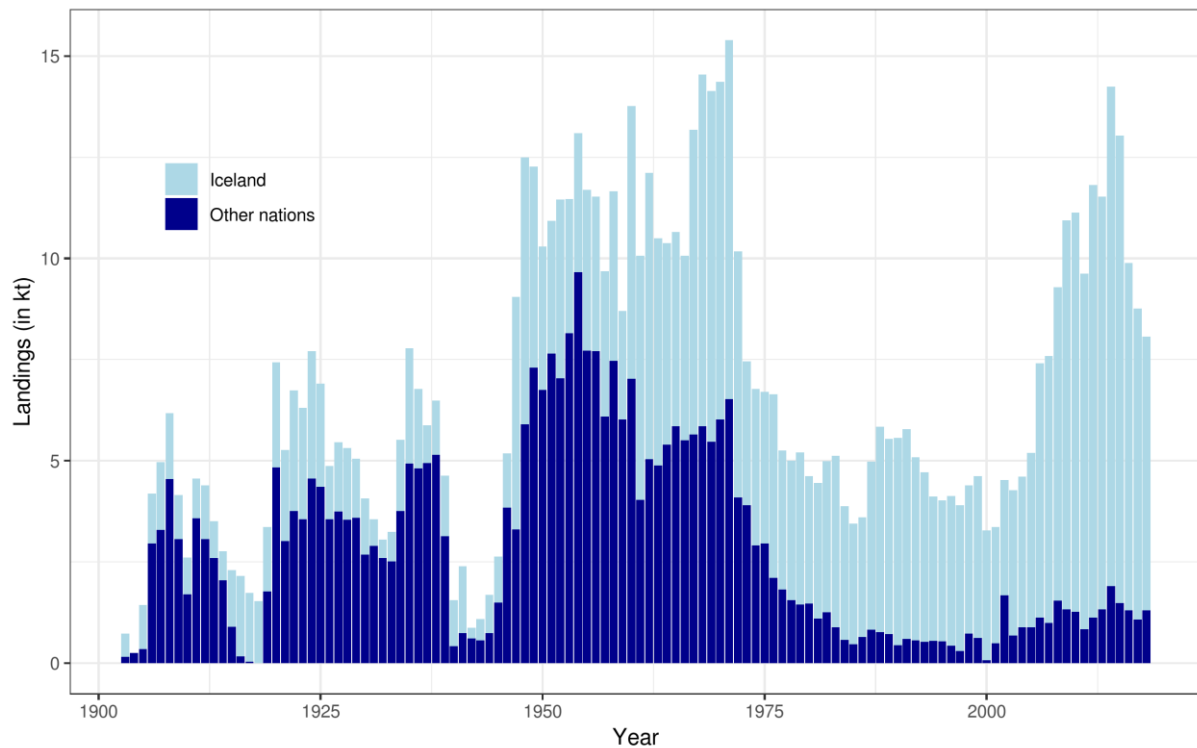


**Figure 4. Ling. Catch distribution and proportions by area according to logbooks.**

*Mynd 4. Langa. Afli eftir svæðum ásamt hlutfalli innan hvers svæðis samkvæmt afladagbókum.*

## LANDINGS TRENDS

In 1950 to 1971, landings of ling in 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 11000 tonnes in 2010 and remained at that level for the most part until 2014, when the catches increased to 14000 tonnes. Since 2014, ling catches have reduced and were around 8000 tonnes in 2018 (Table 5 and Figure 5).



**Figure 5. Ling. Nominal landings.**

*Mynd 5. Langa. Landaður afli.*

#### 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.

## LENGTH COMPOSITIONS

An overview of available length measurements is given in Table 2. Most of the measurements are from longlines. The number of available length measurements has been increasing in recent years in line with increased landings. 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 longliners decreased from 2000-2008 from around 91 to 80 cm (Figure 7). This may be the result of increased recruitment in recent years rather than increased fishing effort. Mean length has varied in the period 2009-2018 between 82-96 cm with no clear trend. It is premature to draw conclusions from the limited age-structured data. It can only be stated that most of the ling caught in the Icelandic spring survey is between age 5 and 10; but from longlines the age is between 6 to 11.

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

*Tafla 2. Langa. Fjöldi lengdarmælinga úr afla íslenskra skipa.*

YEAR	LOGLINES	GILLNETS	D. 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	1636	485	0	3189	5310
2018	1424	559	0	2315	4298

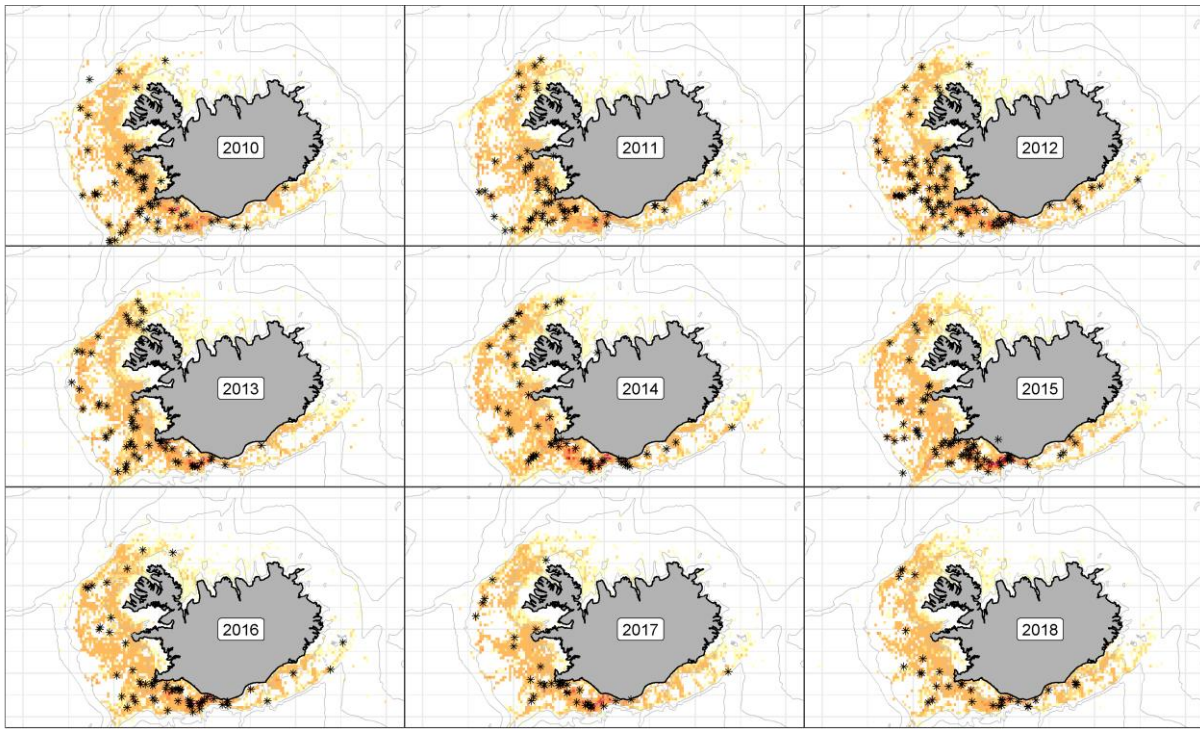


Figure 6. Ling. Spatial distribution of length samples (black dots) from commercial catches in Icelandic waters.

Mynd 6. Langa. Dreifing lengdarmælinga (svartir punktar) og afla á Íslandsmiðum.

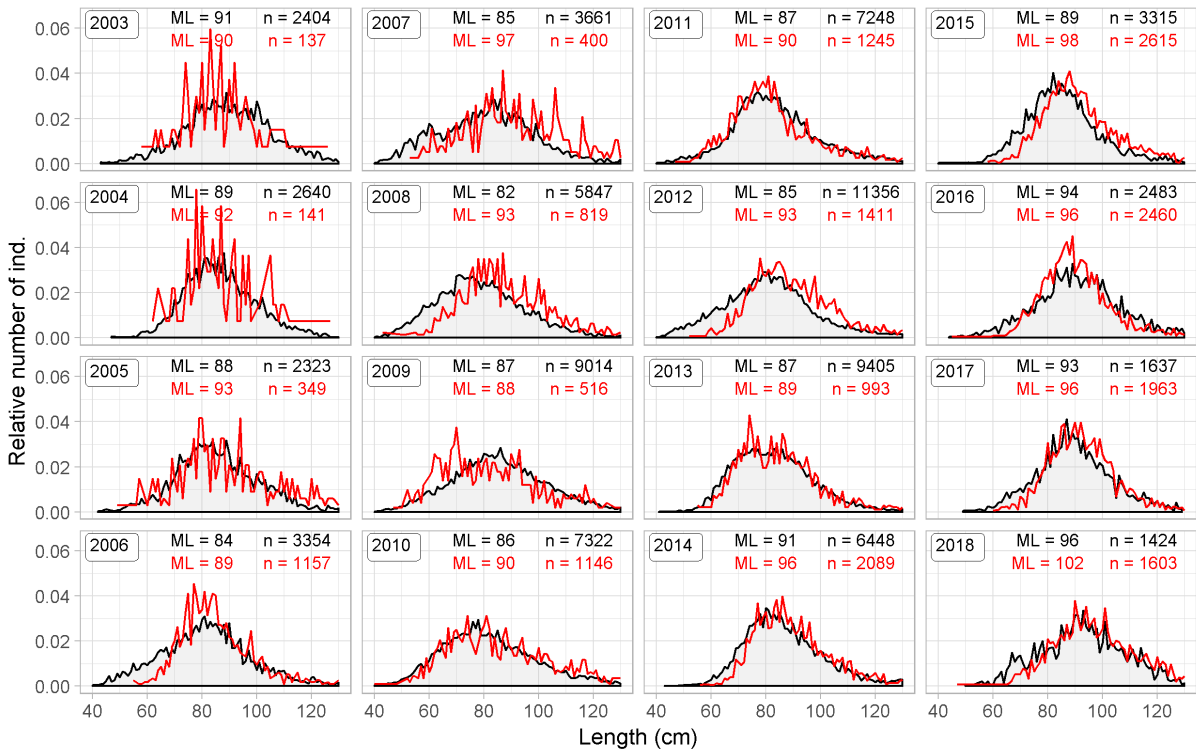


Figure 7. Ling. Length distributions from the Icelandic longline fleet (black line and grey area) and trawls (red lines) from 2003-2018.

Mynd 7. Langa. Lengdardreifing úr línuveiðum (svört lína og grátt svæði) og botnvörpu veiðum (rauðar línur) frá 2003-2018.



## AGE COMPOSITIONS

A limited number of otoliths collected in 2010 were aged and a considerable difference in growth rates was observed between the older data and the 2010 data (WGDEEP, 2011:WD07). Substantial progress has been made since 2010. Now aged otoliths are available from the 2000 onwards (Table 3). Most of the ling caught in the Icelandic spring survey is between age 5 and 8 but from longlines the age is between 6 and 9.

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

*Tafla 3. Langa. Fjöldi aldursgreindra kvarna úr afla.*

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

## CATCH AND EFFORT

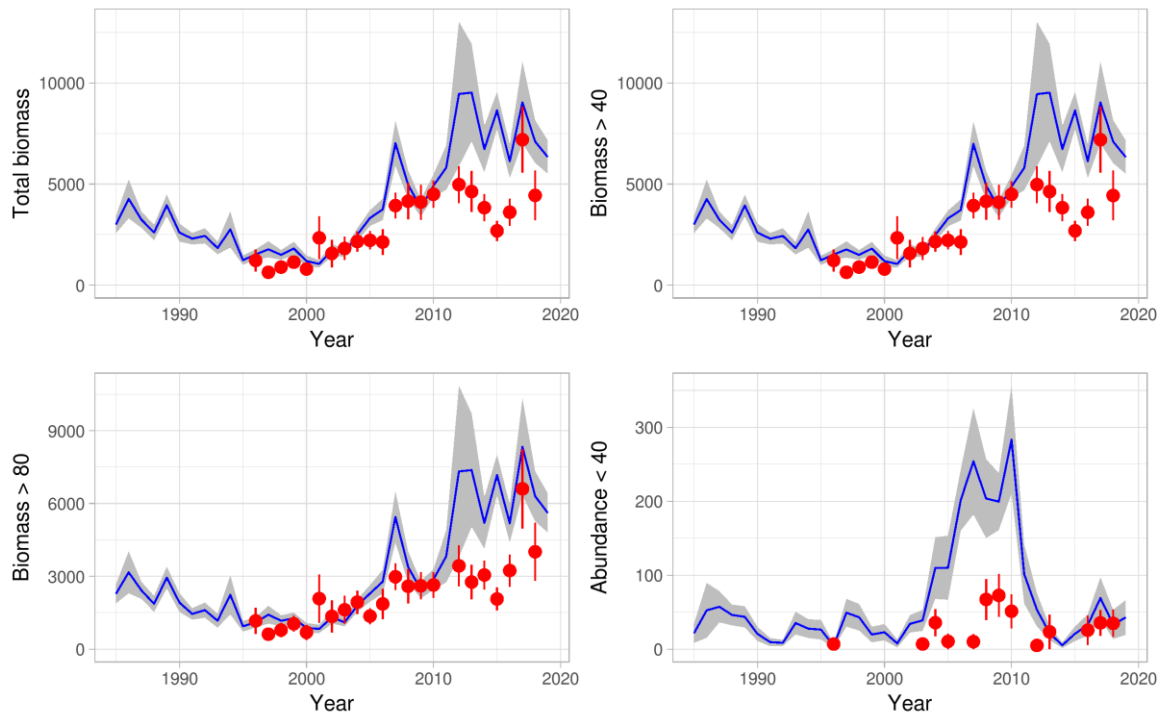
The CPUE estimates of ling in Icelandic waters have not been considered representative of stock abundance.

## SURVEY DATA

Indices: 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. A detailed description of the Icelandic spring and autumn groundfish surveys is given in the stock annex.

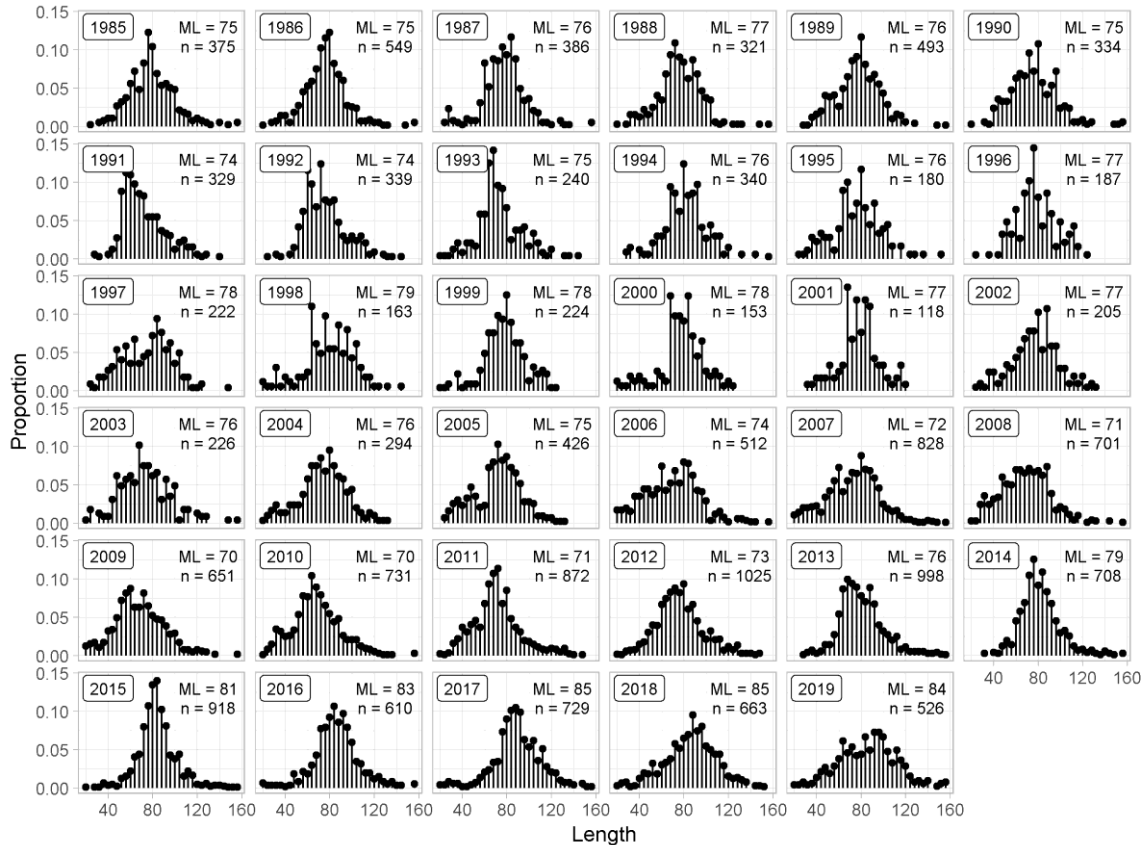
Figure 8 shows both a recruitment index and the trends in biomass from both surveys. Length distributions from the spring survey are shown in Figure 9 (abundance) and changes in spatial distribution in the spring survey are presented in Figure 10.





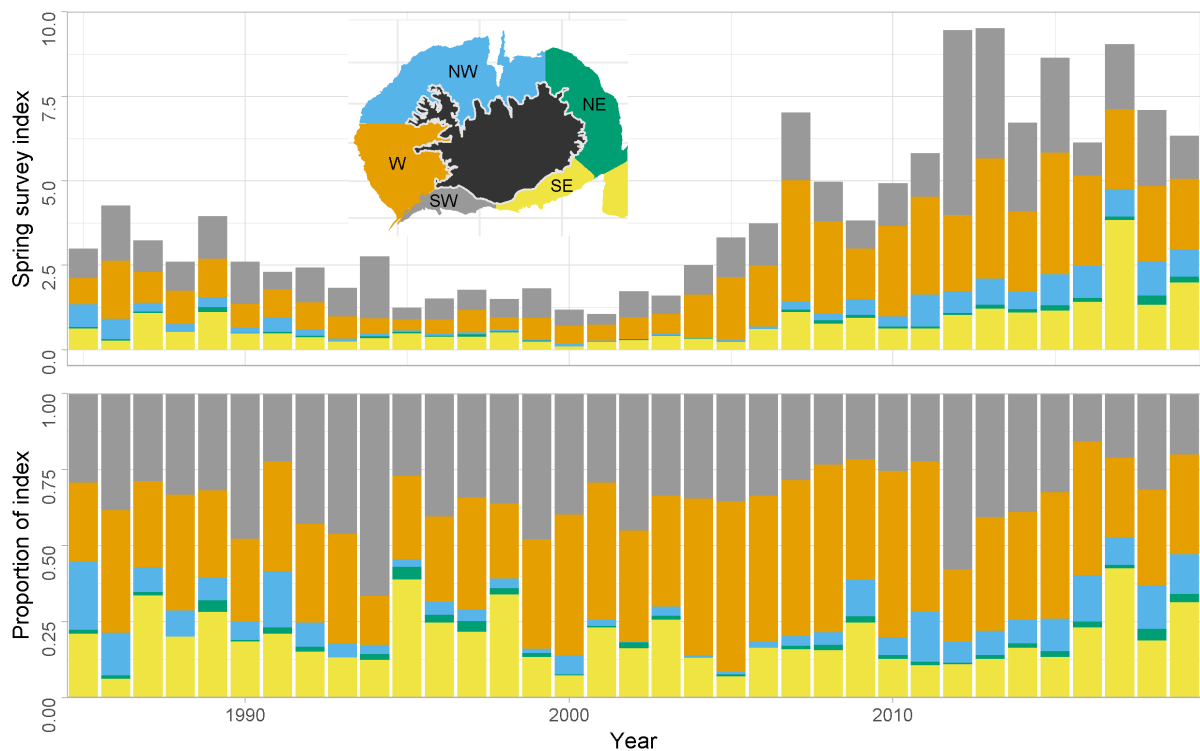
**Figure 8.** Ling. a) Total biomass indices, b) biomass indices larger than 40 cm, c) biomass indices larger than 80 cm and d) abundance indices < 40 cm. The lines with shaded area show the spring survey index from 1985 and the points with the vertical lines show the autumn survey from 1997. The shaded areas and vertical lines indicate +/- standard error.

*Mynd 8. a) Langa. Heildarlífsmassi, b) lífmassi >40 cm, c) lífmassi >80 cm og d) nýliðun (fjöldi <40 cm). Línur sýna niðurstöður úr stofnmælingu botnfiska að vori og punktar niðurstöður úr stofnmælingu að hausti. Skyggð svæði og lóðréttar línur sýna staðalskekku.*



**Figure 9.** Ling. Length distributions (3 cm grouping) from the spring survey.

*Mynd 9. Langa. Lengdardreifing úr stofnmælingu botnfiska að vori (3 cm lengdarhópar).*



**Figure 10.** 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).

*Mynd 10. Langa. Áætluð vísitala úr stofnmælingu botnfiska að vori eftir árum og svæðum landgrunnins (efri mynd) og hlutfall milli hluta (neðri mynd).*

Ling in both in 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) in the March survey gradually decreased until 1995 (Figure 6). In the years 1995 to 2003 these indices were half of the mean from 1985–1989. In 2003 to 2007, the indices increased and have been for the last five years the highest in the time-series. The index of the large ling (80 cm and larger) shows similar trend as the total biomass index (Figure 6). The recruitment index of ling, defined here as ling smaller than 40 cm, also showed a similar increase in 2003 to 2007 and but then decreased by around 25% and remained at that level until 2010. Then the juvenile index fell to a very low level in 2014 but has since then started showing signs of an upward trend (Figure 8). However, the increase in the juvenile index is very uncertain as it is simply some variation in the length distribution of the survey but not a distinct peak (Figure 8).

The shorter autumn survey shows that biomass indices were low from 1996 to 2000 but have increased since then (Figure 8). There is a consistency between the two survey series; the autumn survey biomass indices are however derived from substantially fewer ling caught. Also, there is an inconsistency in the recruitment indices (<40 cm), where the autumn survey shows much lower recruitment, in absolute terms compared with the spring survey (Figure 8). 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 in recent years in ling abundance is in the western area, but an increase can be 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. A similar pattern is observed in the autumn survey.

## 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 (WKICEMSE 2017). Several changes were made to the model setup and settings which are described in the Stock Annex.

### DATA USED AND MODEL SETTINGS

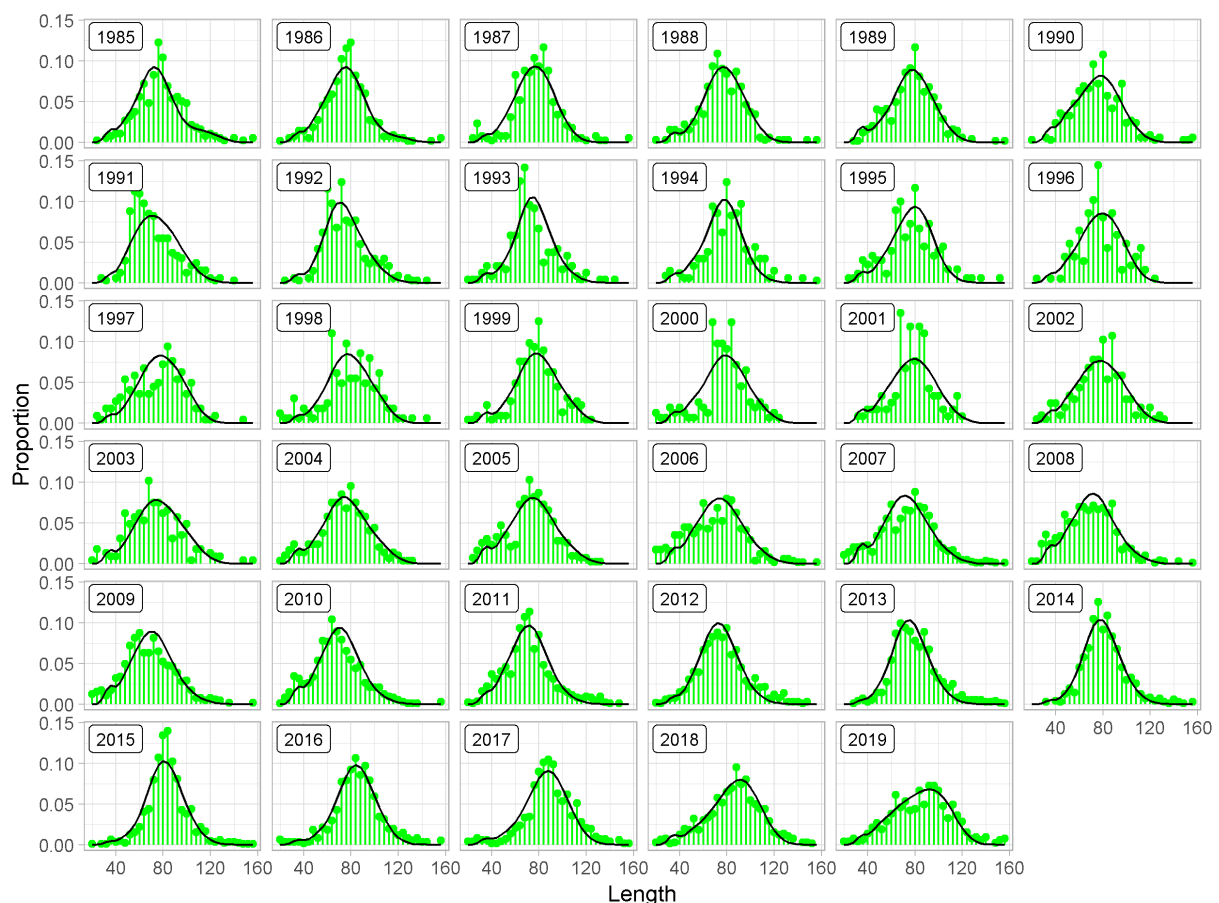
Data used for tuning are given in the stock annex.

Model settings used in the Gadget model are described in more detail in the stock annex.

### DIAGNOSTICS

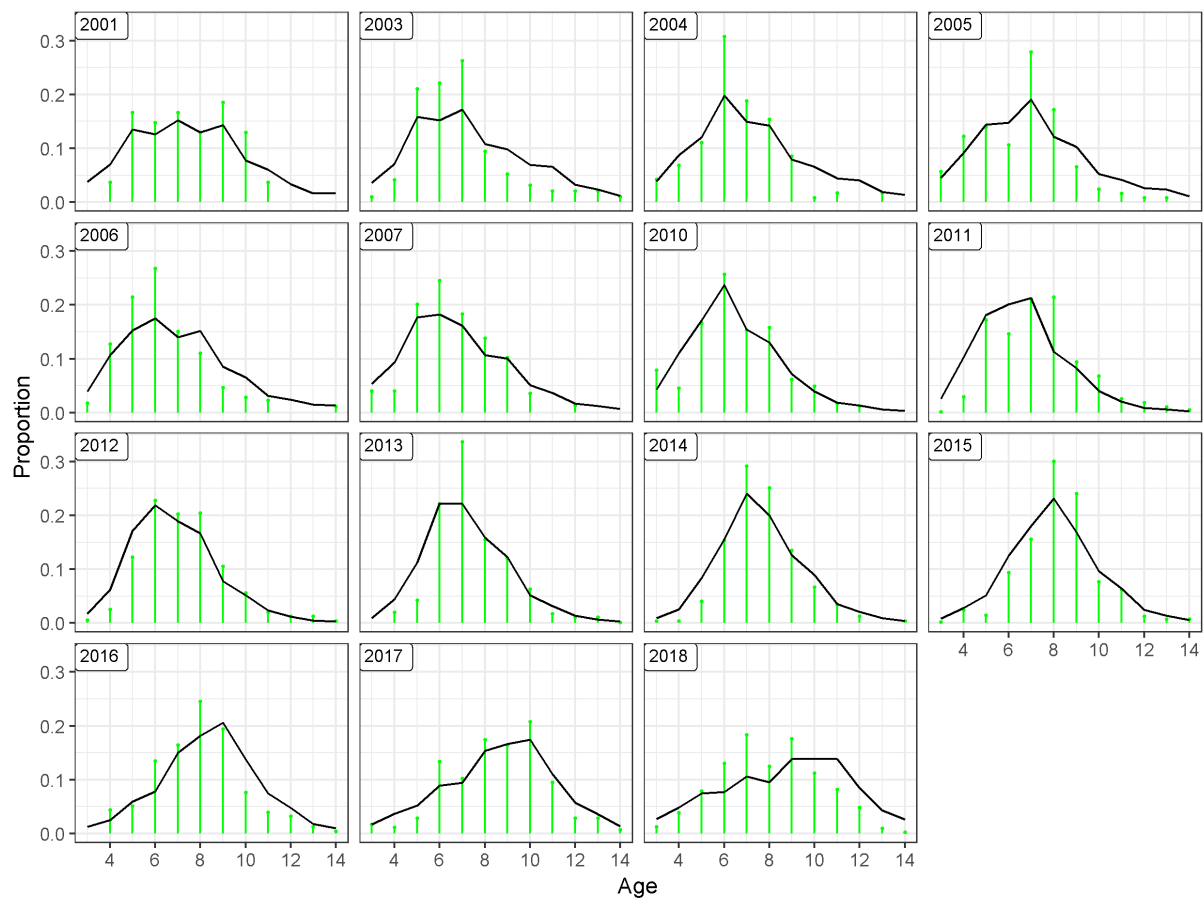
#### OBSERVED AND PREDICTED PROPORTIONS BY FLEET

Overall fit to the predicted proportional length and age-length distributions is close to the observed distributions. (Figures 10-13). 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.



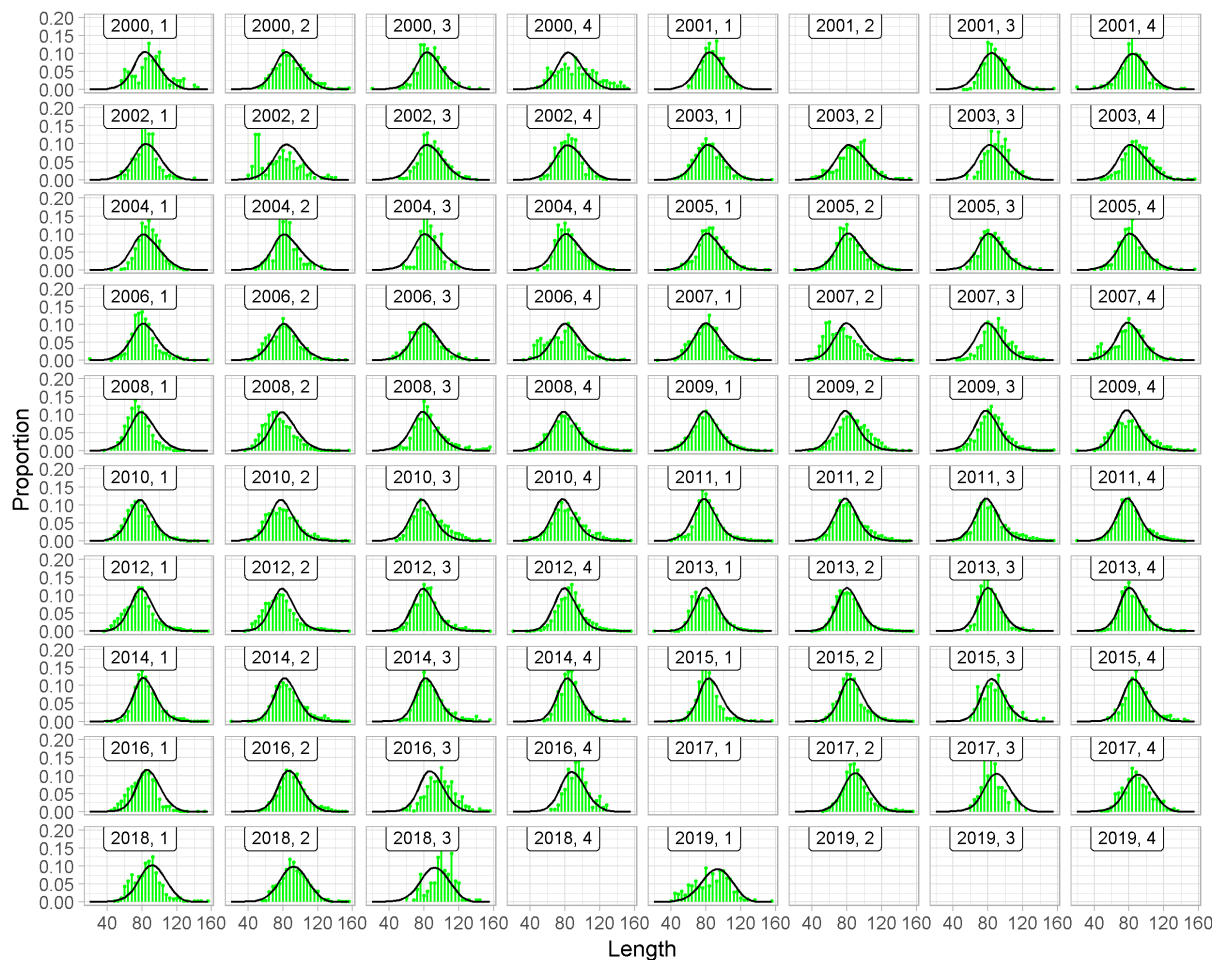
**Figure 11. Ling. Fitted proportions-at-length from the Gadget model (black lines) compared to observed proportions in the spring survey (green lines and points).**

**Mynd 11. Langa. Hlutfall eftir lengdarflokkum úr Gadget líkani (svartar línur) samanborið við fengin hlutföll í vorralli (grænar línur og punktar).**



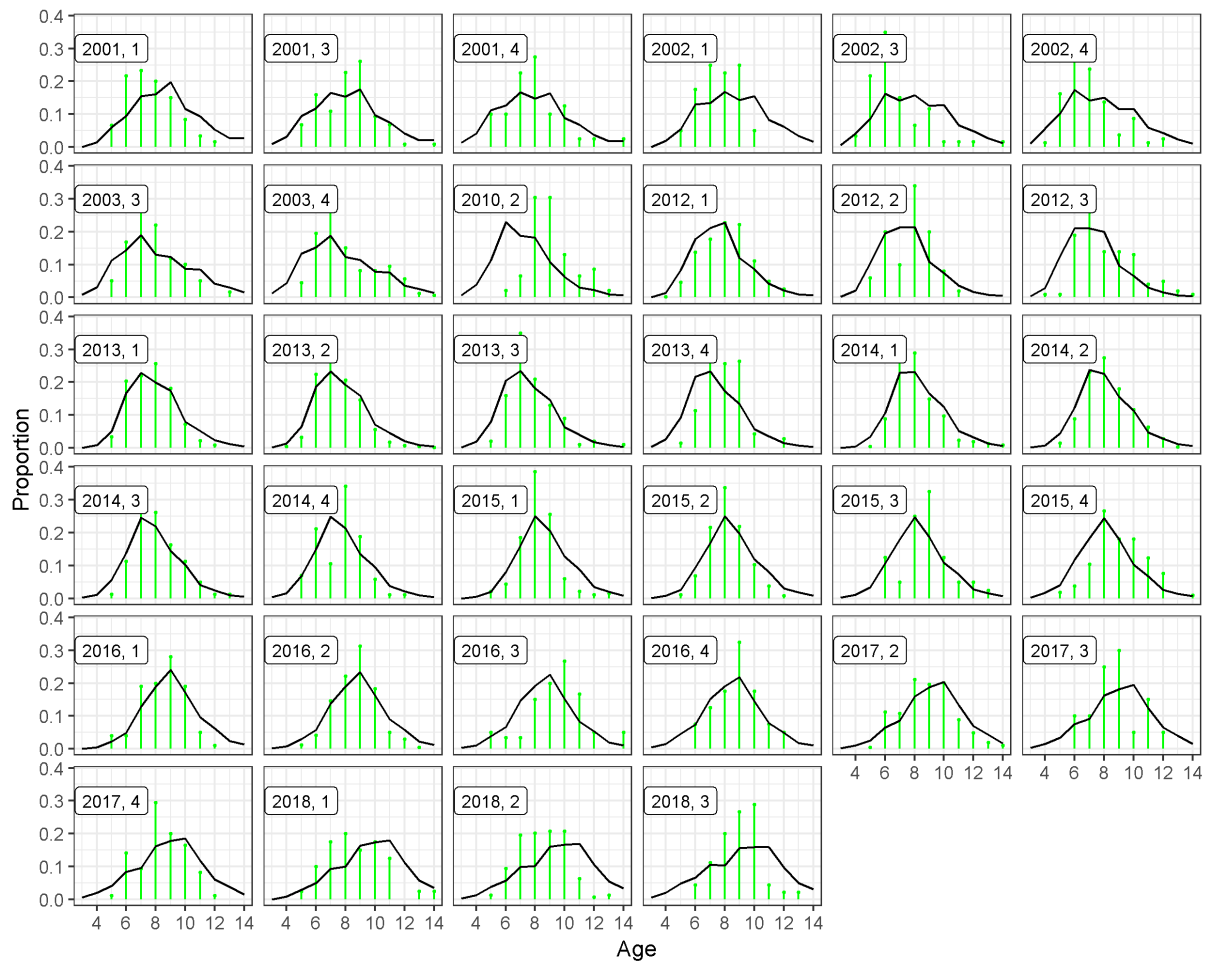
**Figure 12.** Ling. Fitted proportions-at-age from the Gadget model (black lines) compared to observed proportions in the spring survey catches (green lines and points).

**Mynd 12.** Langa. Hlutfall eftir aldursflokkum úr Gadget líkani (svartar línur) samanborið við fengin hlutföll í vorralli (grænar línur og punktar).



**Figure 13.** Ling. Fitted proportions-at-length from the Gadget model (black lines) compared to observed proportions from longline catches (green lines and points).

*Mynd 13.* Langa. Hlutföll eftir lengdarflokkum úr Gadget líkani (svartar línur) samanborið við fengin hlutföll úr línuveiðum (grænar línur og punktar).

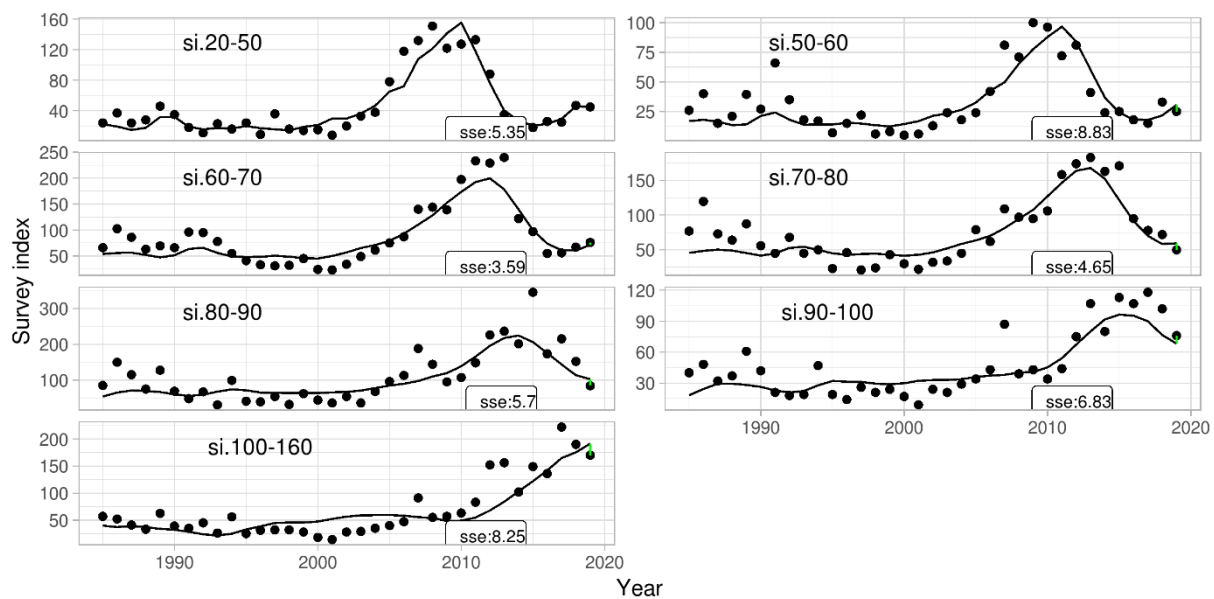


**Figure 14.** Ling. Fitted proportions-at-age from the Gadget model (black lines) compared to observed proportions in longline catches (green lines and points).

*Mynd 14.* Langa. Hlutfall eftir aldursflokkum úr Gadget líkani (svartar línur) samanborið við fengin hlutföll úr línuveiðum (grænar línur og punktar).

## MODEL FIT

Figure 15 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 15.** 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.

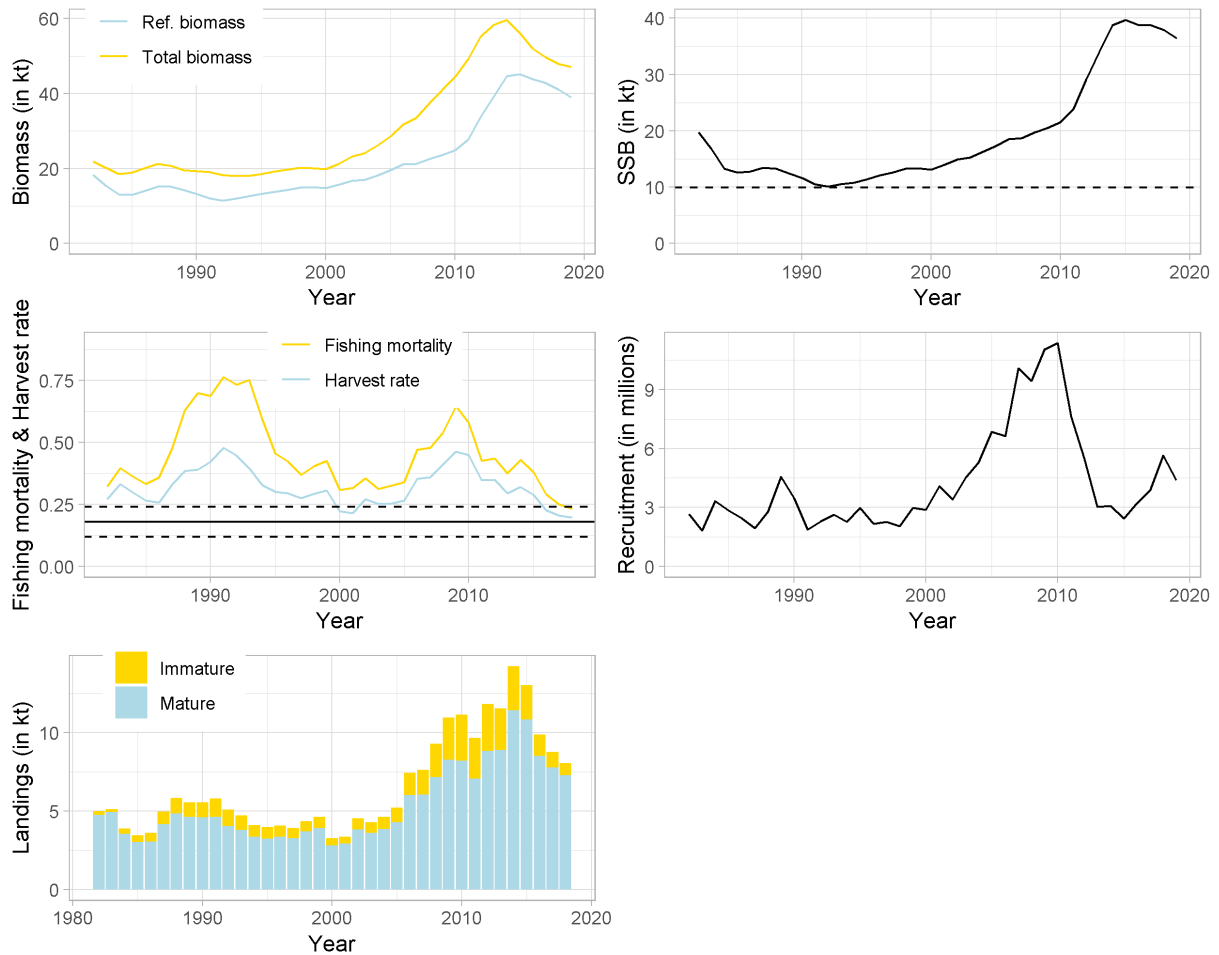
*Mynd 15. Langa. Lífmassavísitala úr Gadget líkani (svartar línur) eftir stærðarflokkum borin saman við fenginn fjölda langa í vorralli (punktar). Grænar línur sýna muninn á samsvörun gagna og líkans við lok tímabilsins.*

## RESULTS

The results are presented in Table 6 and Figure 16. Recruitment peaked in 2009 to 2010 but has decreased and is estimated in 2013 to 2015 to be at low level. Spawning–stock biomass has increased since 2000 and is now estimated the highest SSB estimate in the time-series. Similarly, harvestable biomass is estimated at its highest level in the time-series. Fishing mortality for fully selected ling (age 14–19) has decreased from 0.66 in 2009 to 0.25 in 2018.

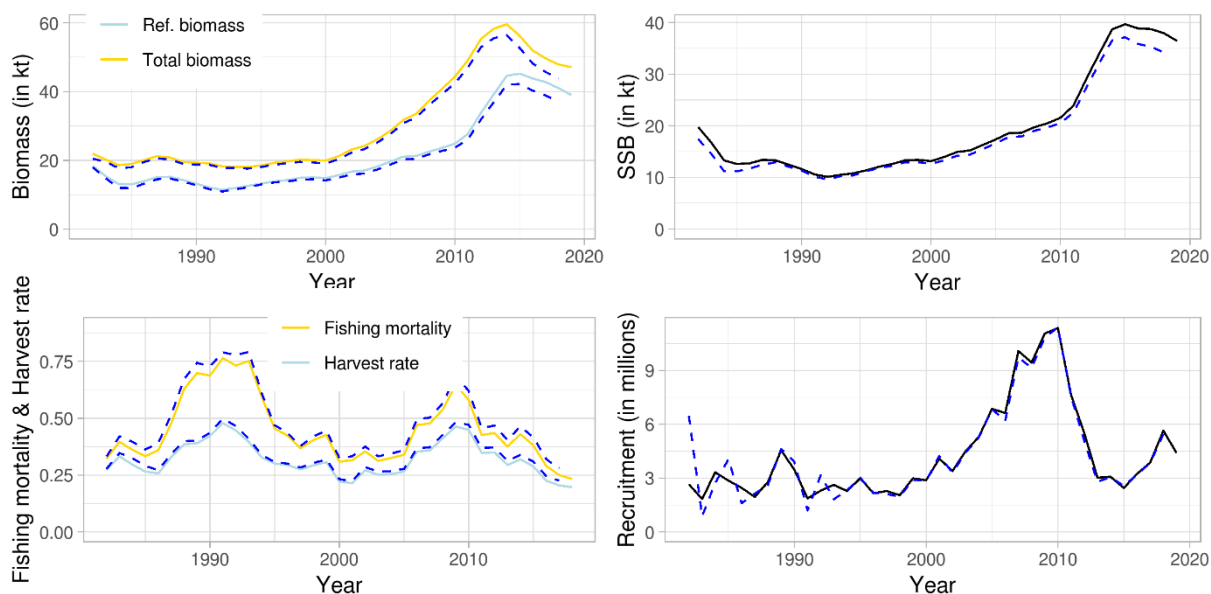
This year's assessment shows an upward revision of SSB and an upward revision of fishing mortality compared to last year's assessment (Figure 17). The reason for this revision is the 'one-way trip' in the data and as the model is now getting closer to the terminal total survey index there is an upward revision of biomass. Figure 18





**Figure 16.** 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.

*Mynd 16. Langa. Áætlaður heildarlífmassi, lífmassi hrygningarstofns, dánartala og veiðidánartala, nýliðun og heildarafli. Brotin lína við lífmassa hrygningarstofns sýnir gátmörk ( $B_{pa}$ ). Heil lína við veiðihlutfall sýnir það gildi sem stefnt er að með aflareglu, en brotnar línur sýna þau mörk sem búast má við vegna óvissu í stofnmati.*



**Figure 17. 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.

*Mynd 17. Langa. Stofnmat ársins í ár (blá og gul lína) borið saman við stofnmatið fyrir ári síðan (punktalína). Áætlaður heildarlífmassi, lífmassi hrygningarstofns, dánartala og veiðidánartala, og nýliðun.*

REFERENCE POINTS

At the WKDEEP-2014 benchmark meeting for ling in 5.a the following reference points were adopted.

REFERENCE POINT	VALUE	TECHNICAL BASIS
MSY $B_{trigger}$	9.5 kt	Based on $B_{pa}$
$F_{MSY}$	0.24 $y^{-1}$	Based on stochastic simulations
$B_{lim}$	8.6 kt	Median of the lowest SSB
$B_{pa}$	9.5 kt	Based on the 97.5% quantile of the lowest SSB

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

Framework	Reference point	Value	Technical basis
MSY approach	MSY $B_{trigger}$	9.93 kt	$B_{pa}$ The harvest rate that maximises the median long-term catch in stochastic simulations with recruitment drawn from a block bootstrap of historical recruitment scaled according to a hockey stick recruitment function with $B_{loss}$ as defined below.
	$H_{msy}$	0.24	
Precautionary approach	$F_{msy}$	0.284	The median fishing mortality when an harvest rate of $H_{msy}$ is applied.
	$B_{lim}$	7.09 kt	$B_{pa}/e^{1.645\sigma}$ where $\sigma = 0.2$
	$B_{pa}$	9.93 kt	SSB(1992), corresponding to $B_{loss}$
	$H_{lim}$	0.56	H corresponding to 50% long-term probability of $SSB > B_{lim}$
	$F_{lim}$	0.70	F corresponding to $H_{lim}$
	$F_{pa}$	0.41	$F_{lim}/e^{1.645\sigma}$ where $\sigma = 0.33$
Management plan	$H_{pa}$	0.35	H corresponding to $F_{pa}$
	$H_{mp}$	0.18	H such that $P(SSB < B_{pa}   \text{for any given year}) < 0.05$ .

The management plan proposed by Iceland is:

The spawning–stock biomass trigger (MGT  $B_{trigger}$ ) is defined as 9.93000 tonnes, the reference biomass is defined as the biomass of ling 70+ cm and the target harvest rate ( $HR_{MGT}$ ) is set to 0.18. In the assessment year (Y) the TAC for the next fishing year (September 1 of year Y to August 31 of year Y+1) is calculated as follows:

When  $SSB_Y$  is equal or above MGT  $B_{trigger}$ :

$$TAC_{Y/Y+1} = HR_{MGT} * B_{Ref,y}$$

When  $SSB_Y$  is below MGT  $B_{trigger}$ :

$$TAC_{Y/Y+1} = HR_{MGT} * (SSB_Y / MGT B_{trigger}) * B_{Ref,y}$$

WKICEMSE 2017 concluded that the HCR was precautionary and in conformity with the ICES MSY approach.

## COMMENTS ON THE ASSESSMENT

At WKICEMSE 2017 the assessment was benchmarked. Various settings were changed from the previous assessment. Therefore, the assessment in 2017-2019 is not directly comparable to previous assessments of this stock.

## 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.

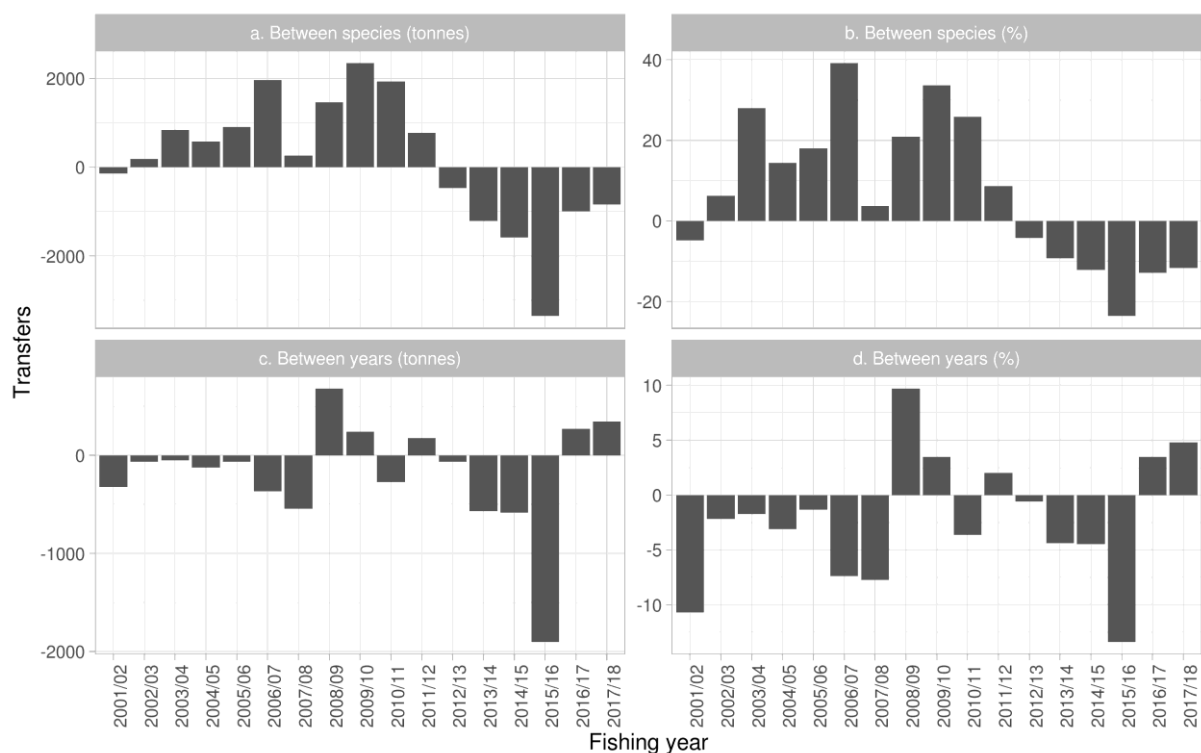
Landings have exceeded both the advice given by MFRI and the set TAC from 2002/2003 to 2013/2014 but amounted to less than two thirds in 2015/2016 (Table 4). Overshoot in landings in relation to advice/TAC has been decreasing steadily since the 2009/2010 fishing year, with an overshoot of 53% to 35% 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 set by the Ministry, and landings (tonnes) by fishing year (1 September to 31 August).**

*Tafla 4. Langa. Ráðgjöf Hafrannsóknastofnunar um hámarksafli, ákvörðun stjórnvalda og landaður afli (tonn) eftir fiskveiðiárum.*

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	14983
2014/2015	14300	13800	13166
2015/2016	16200	15000	11229
2016/2017	9343	8143	8426
2017/2018	8598	7598	8573
2018/2019	6255	5200	
2019/2020	6599		



**Figure 18. 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.**

*Mynd 18. Langa. Nettó tilfærsla á kvóta eftir fiskveiðiárum. Tilfærsla á milli tegunda (efri mynd): jákvæð gildi tákna tilfærslu á kvóta annarra tegunda yfir á löngu en neikvæð gildi tilfærslu löngukvóta á aðrar tegundir. Tilfærsla milli ára (neðri mynd): Tilfærsla kvóta frá viðkomandi fiskveiðiári yfir á næsta fiskveiðiár.*

## 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 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 by country (Source STATLANT).

Tafla 5. Langa. Afli á Íslandsmiðum flokkað eftir þjóðum.

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

\*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.**

*Tafla 6. Langa. Niðurstöður úr Gadget stofnmati. Áætlaður heildarlífmassi, lífmassi 40 cm og stærri, hrygningarstofns (SSB) í þúsundum tonna og nýliðun (milljónir), veiðidánartala og dánartala.*

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			