

Assessment of Ling in 5a - WGDEEP

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Overview of the ling fishery in Va: Number of boats with >100 kg landings

Year	Gillnetters	Longliners	Nephrops boats	Trawlers
2006	50	181	21	80
2007	54	171	16	79
2008	39	156	16	74
2009	44	155	13	70
2010	30	152	18	65
2011	29	151	15	65
2012	26	153	15	61
2013	22	160	15	59
2014	23	170	14	59
2015	22	160	13	54
2016	24	149	8	59
2017	26	139	9	56



Overview of the ling fishery in Va: Landings by gear

gear	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
L.line	59.4	61.2	64.7	64.8	66.2	63.6	69.8	66.6	74.5	70.9	66.2	68.1
Trawl	19.9	21.2	19.5	16.0	15.6	19.1	13.6	15.7	12.1	14.7	18.5	17.5
G.net	10.0	9.6	6.2	7.5	3.7	2.5	2.2	3.4	4.7	5.0	6.9	6.3
Lobst.tr	7.0	3.7	5.4	6.8	9.9	10.8	10.1	11.6	7.1	6.8	6.1	6.1
D.seine	3.4	3.6	3.7	4.5	4.1	3.5	3.9	2.3	1.4	2.4	2.2	1.8
Jiggers	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
P.trawl	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0

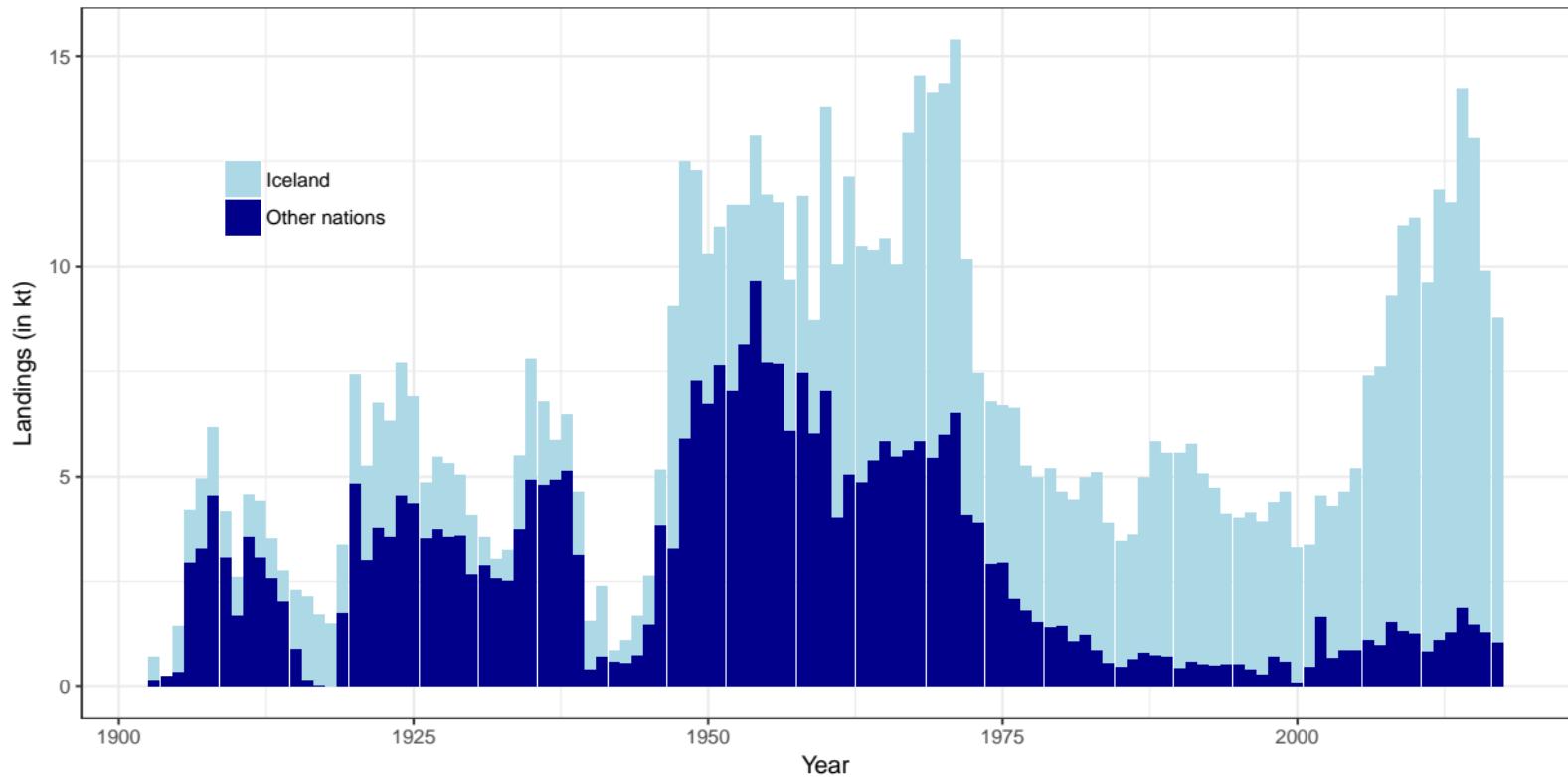


Overview of the ling fishery in Va: Landings by country

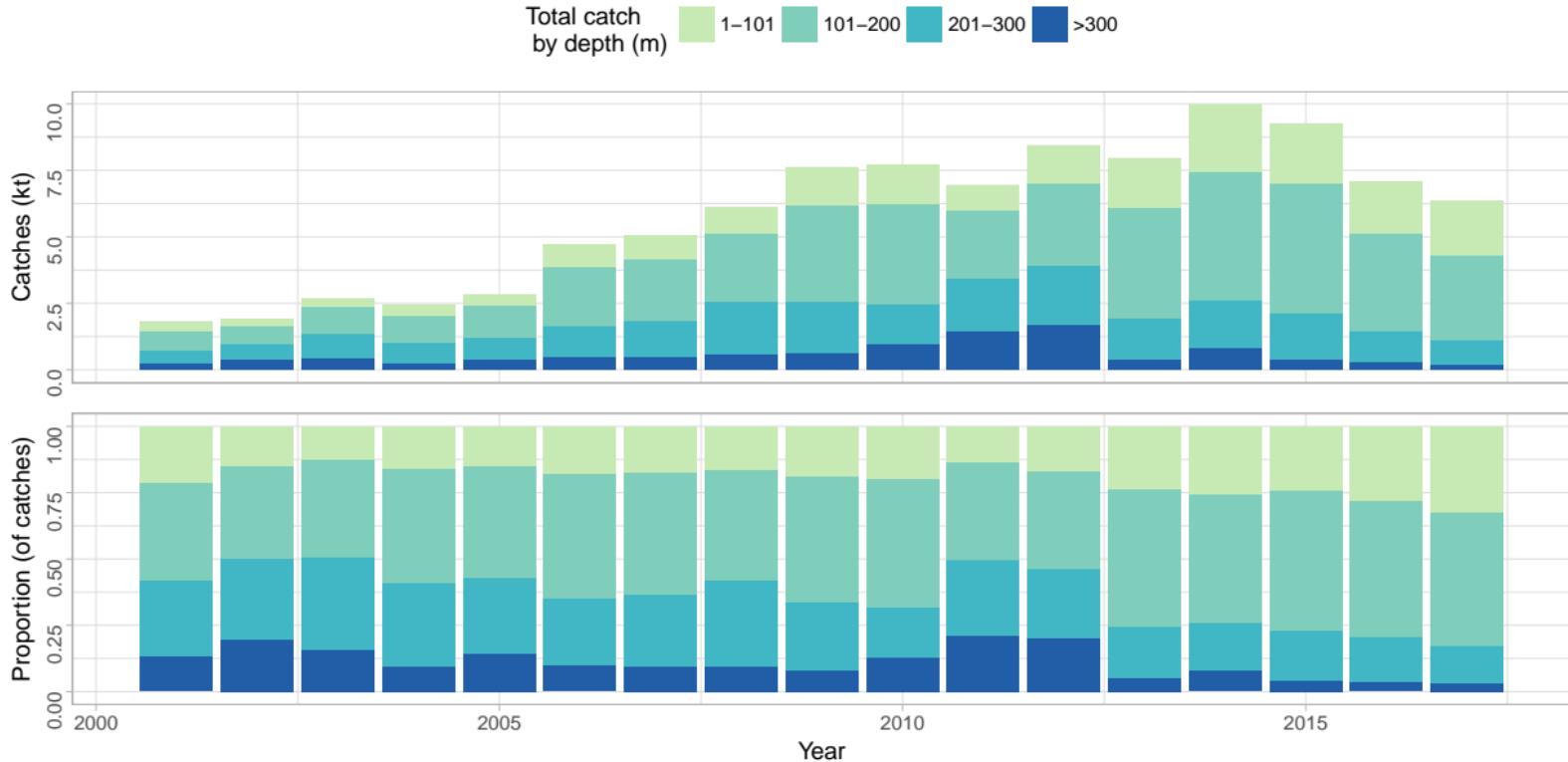
year	Faroe Islands	Germany	Iceland	Norway	UK
2000	3	1	3209	67	5
2001	370	2	2872	116	1
2002	1631		2843	45	
2003	570	2	3585	108	5
2004	739	1	3727	139	
2005	682	3	4313	180	20
2006	962	1	6283	158	0
2007	807		6599	185	0
2008	1366		7738	179	
2009	1157		9616	172	
2010	1095	1	9868	168	
2011	588		8789	249	
2012	875		10695	248	
2013	1030		10198	294	
2014	1738		12350	158	
2015	1233		11552	250	
2016	1072		8583	230	
2017	829		7692	244	

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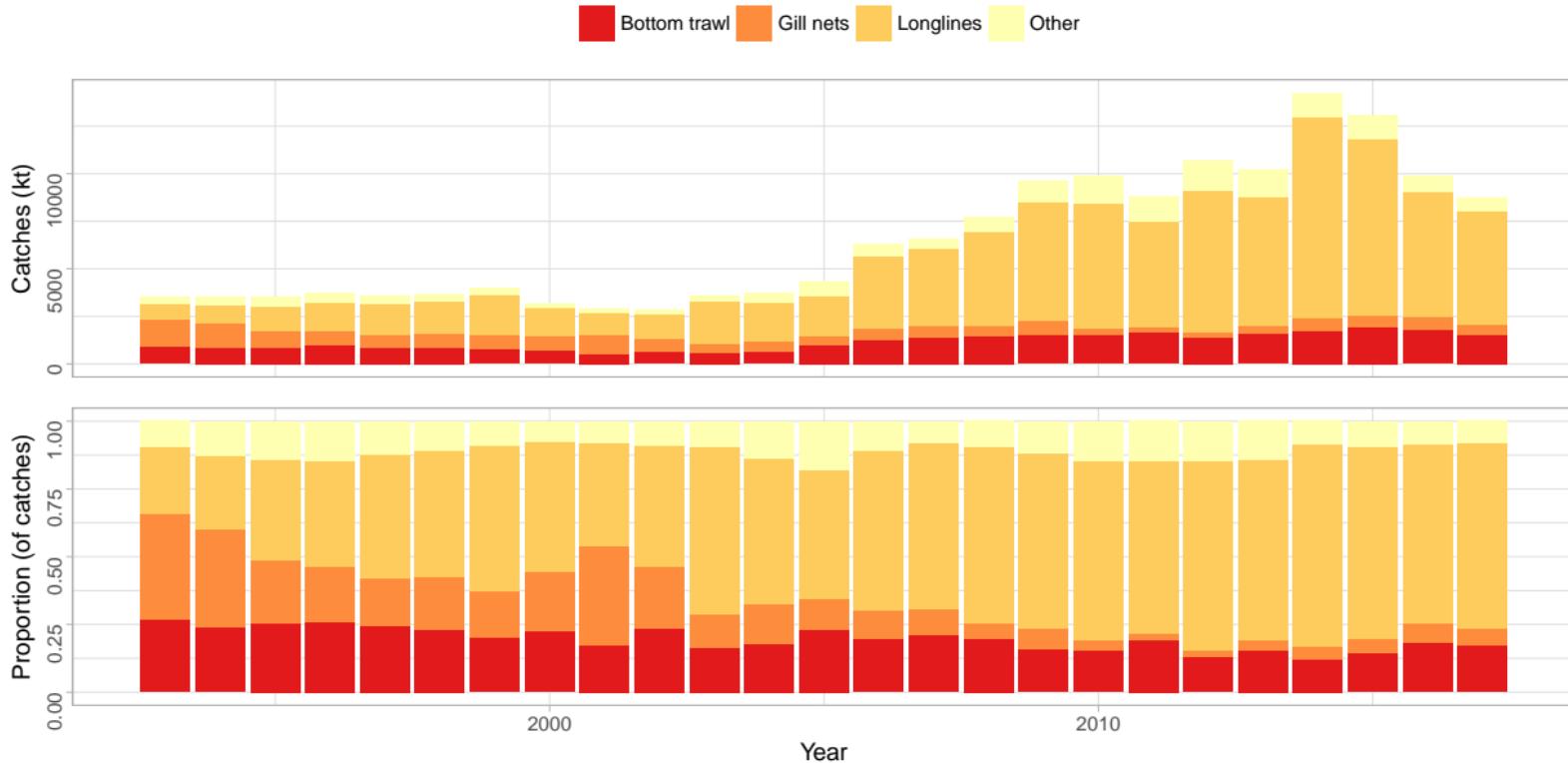
Ling landings



Ling landings by depth



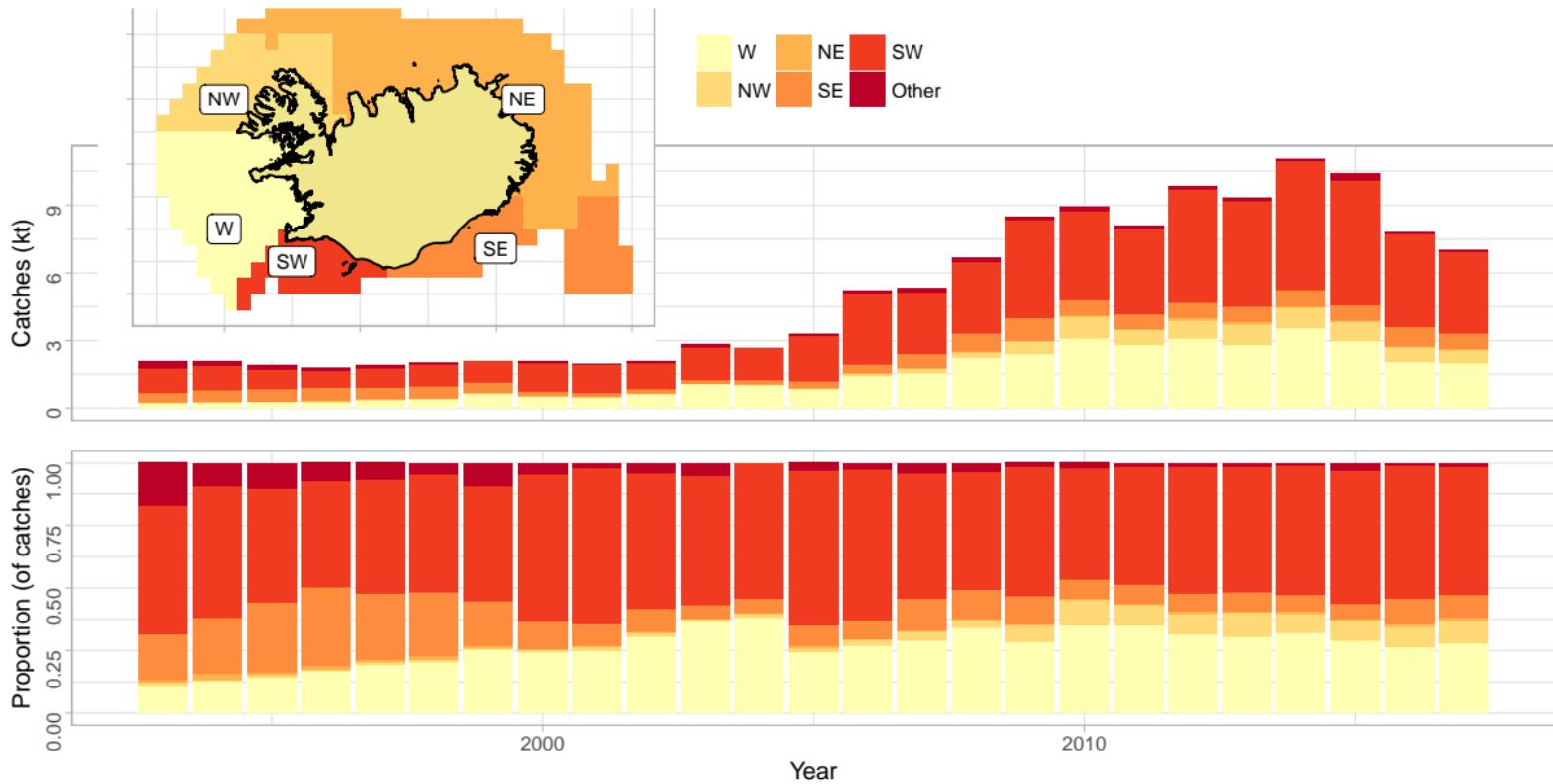
Ling landings by gear



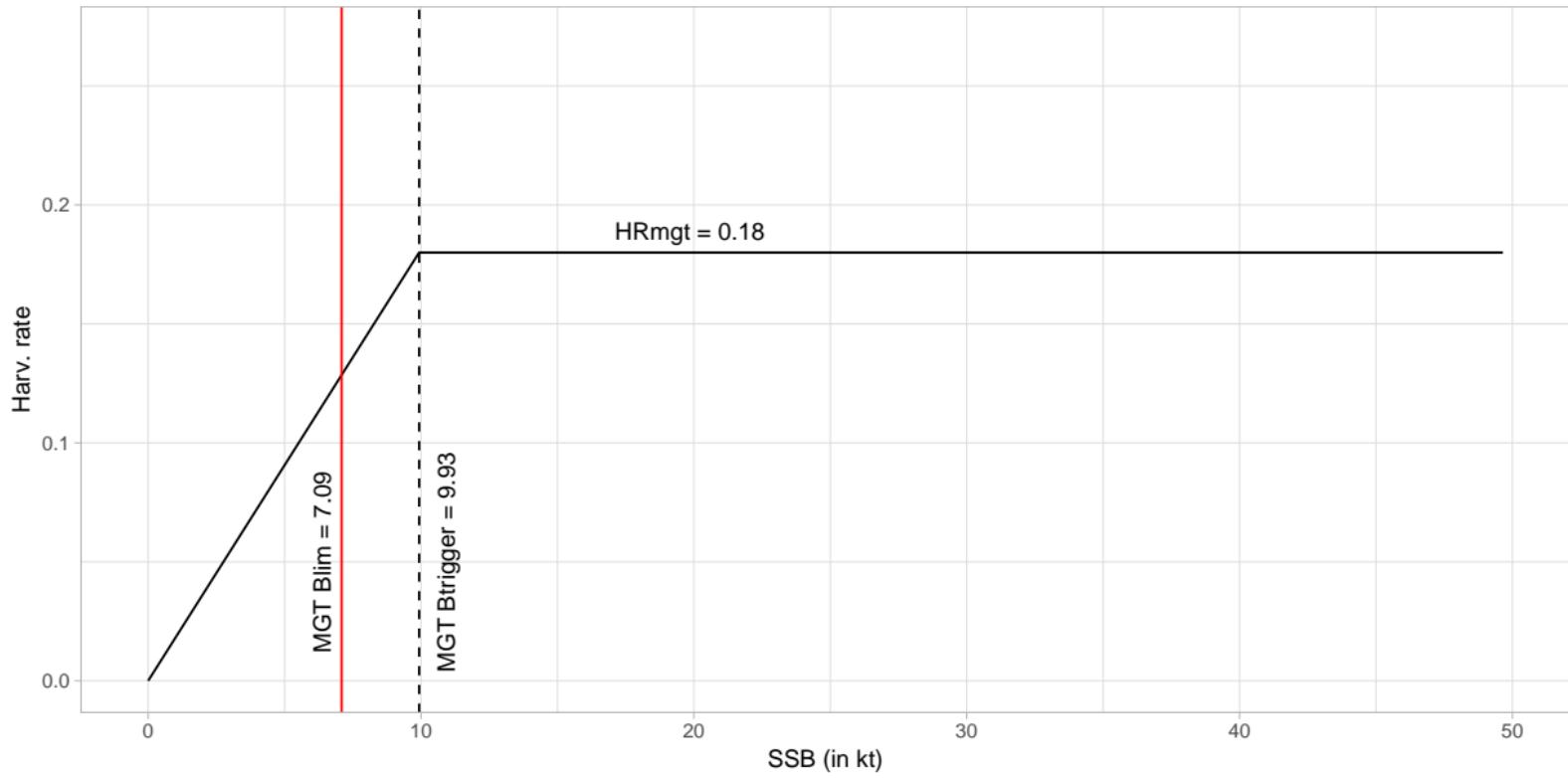
Ling landings spatial distribution



Ling landings by region



Accepted management plan



The latest Advice from ICES in May 2017 states:

ICES advised that when the management plan is applied, catches in the 2017/2018 fishing year should be no more than 8 598 tonnes. All catches are assumed to be landed.



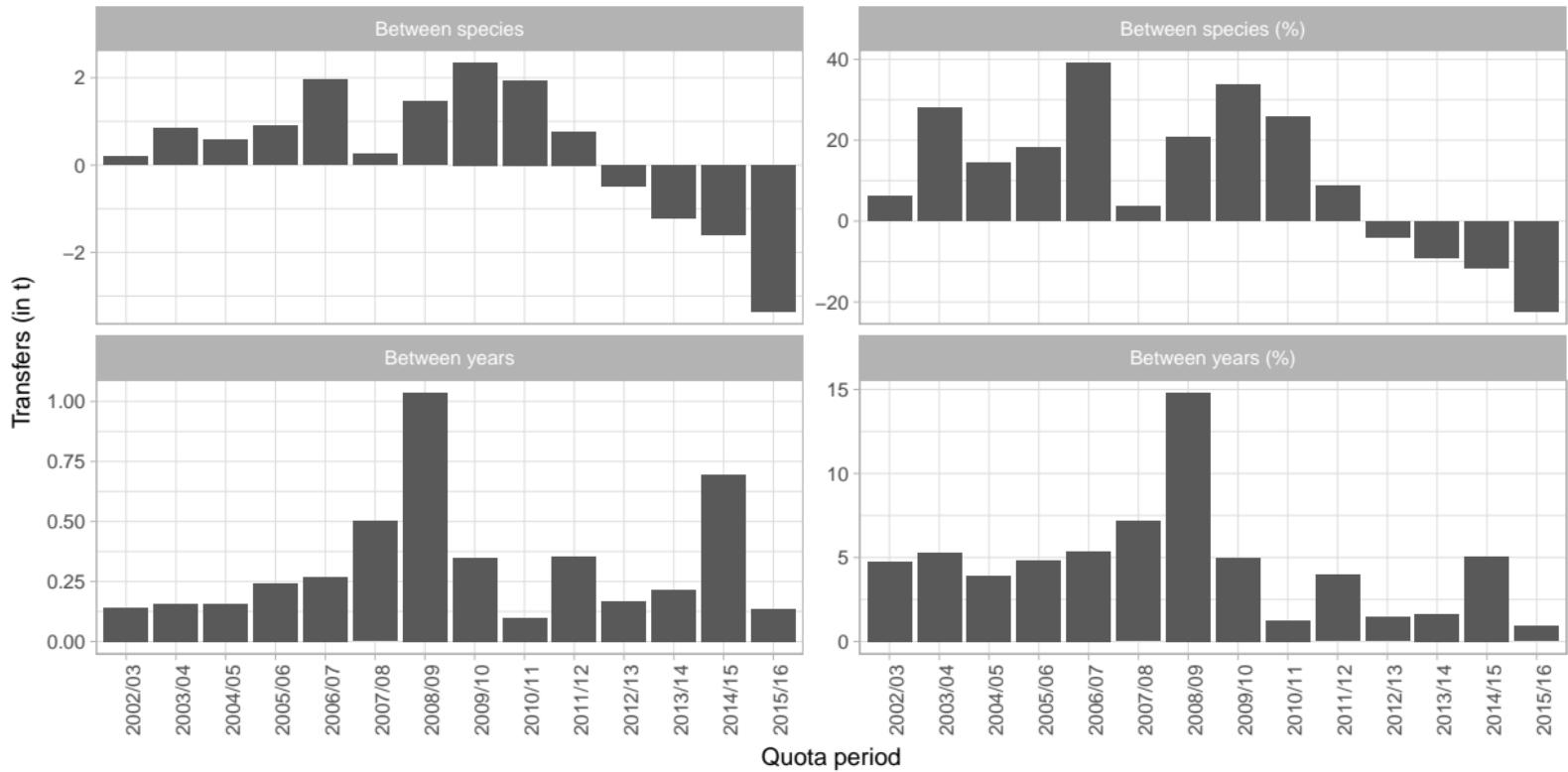
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Management of ling in Iceland (Va)

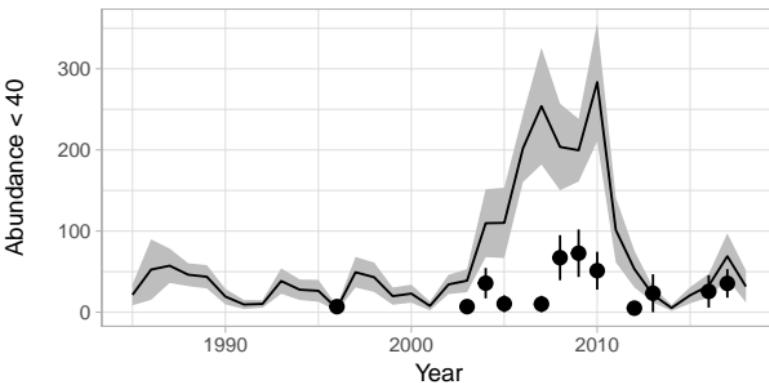
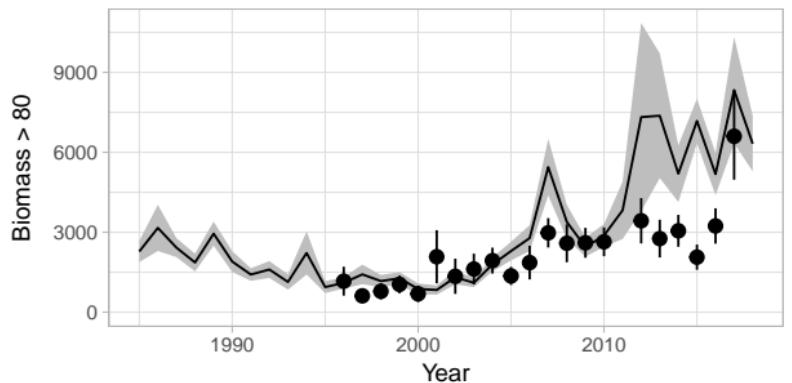
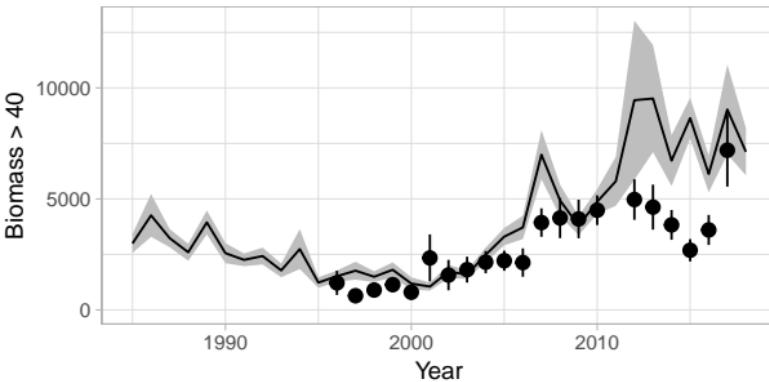
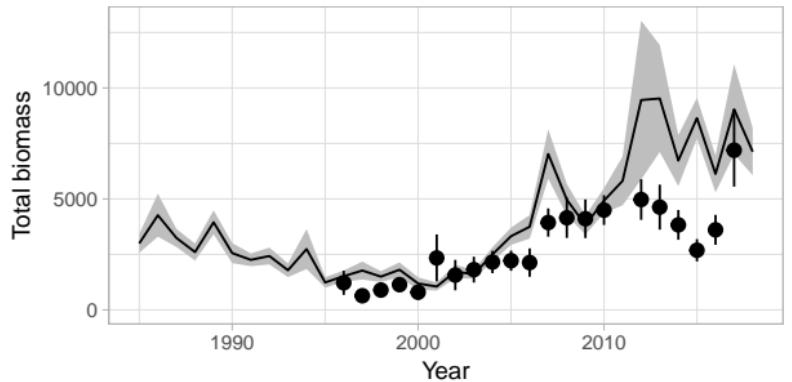
Fishing Year	MFRI Advice	National TAC	Landings
1999/00			3961
2000/01			3451
2001/02	3000	3000	2968
2002/03	3000	3000	3715
2003/04	3000	3000	4608
2004/05	4000	4000	5238
2005/06	4500	5000	6961
2006/07	5000	5000	7617
2007/08	6000	7000	8560
2008/09	6000	7000	10489
2009/10	6000	7000	10713
2010/11	7500	7500	10095
2011/12	8800	9000	11133
2012/13	12000	11500	12445
2013/14	14000	13500	13470
2014/15	14300	13800	13166
2015/16	16200	15000	9769
2016/17	9343	8143	8336
2017/18	8598	8598	



Transfers in the Icelandic ITQ-system



Trends in biomass and juvenile abundance



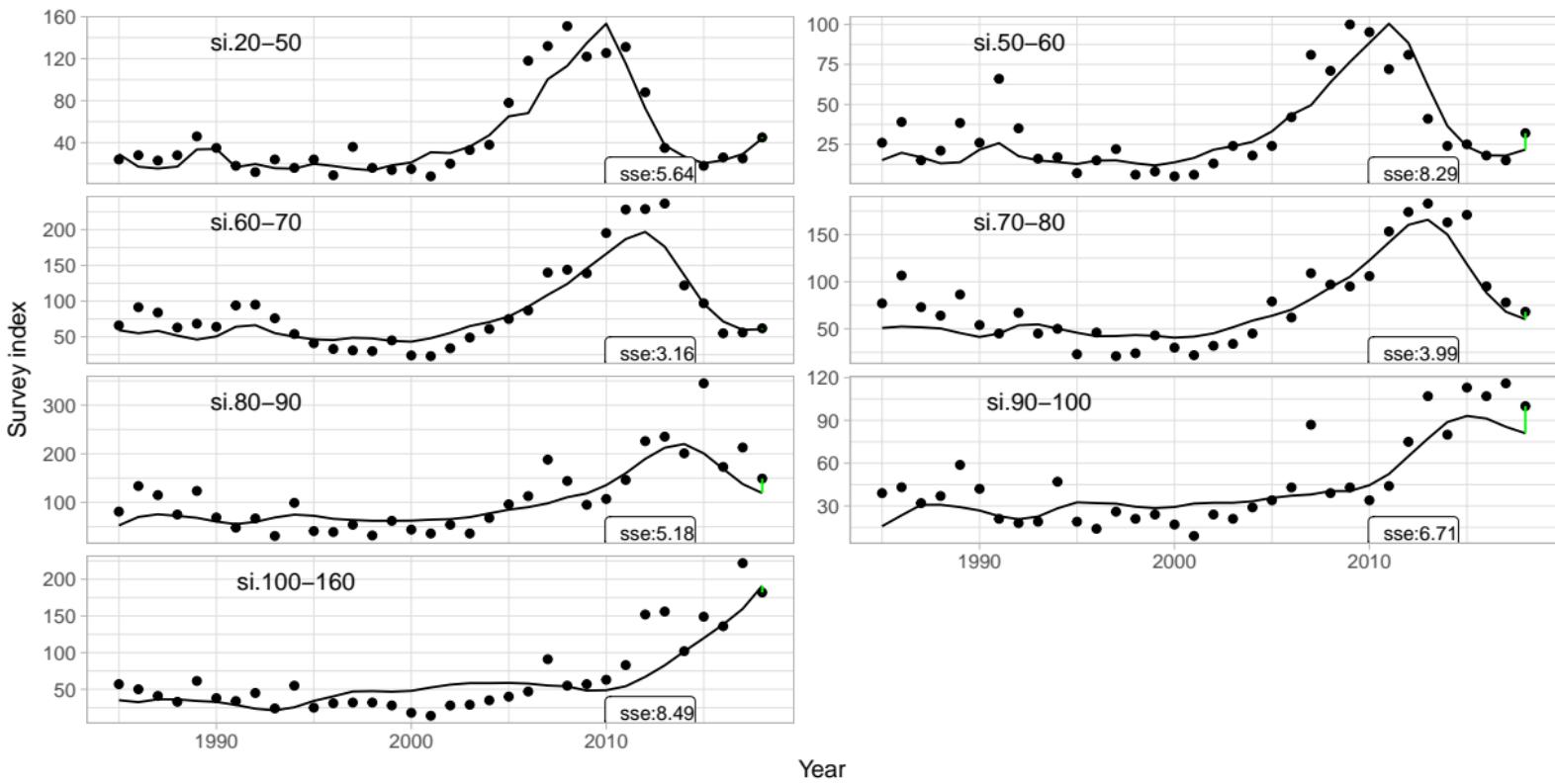
Observational data for Gadget length- and age-based model

- Survey indices from the Icelandic groundfish survey from 1985, split into 7 slices in 10 cm intervals.
 - lengths 20–160 cm in 4 cm bins
 - ages 3–15
- Survey samples from 1985 (as available):
 - proportion at length
 - proportion at length and age
 - proportion mature at length
- Commercial samples from 1982 (as available - longlines, gillnets, bottom trawl fleets)
 - proportion at length by gear
 - proportion at length and age by gear
- Commercial catches by gear since 1982

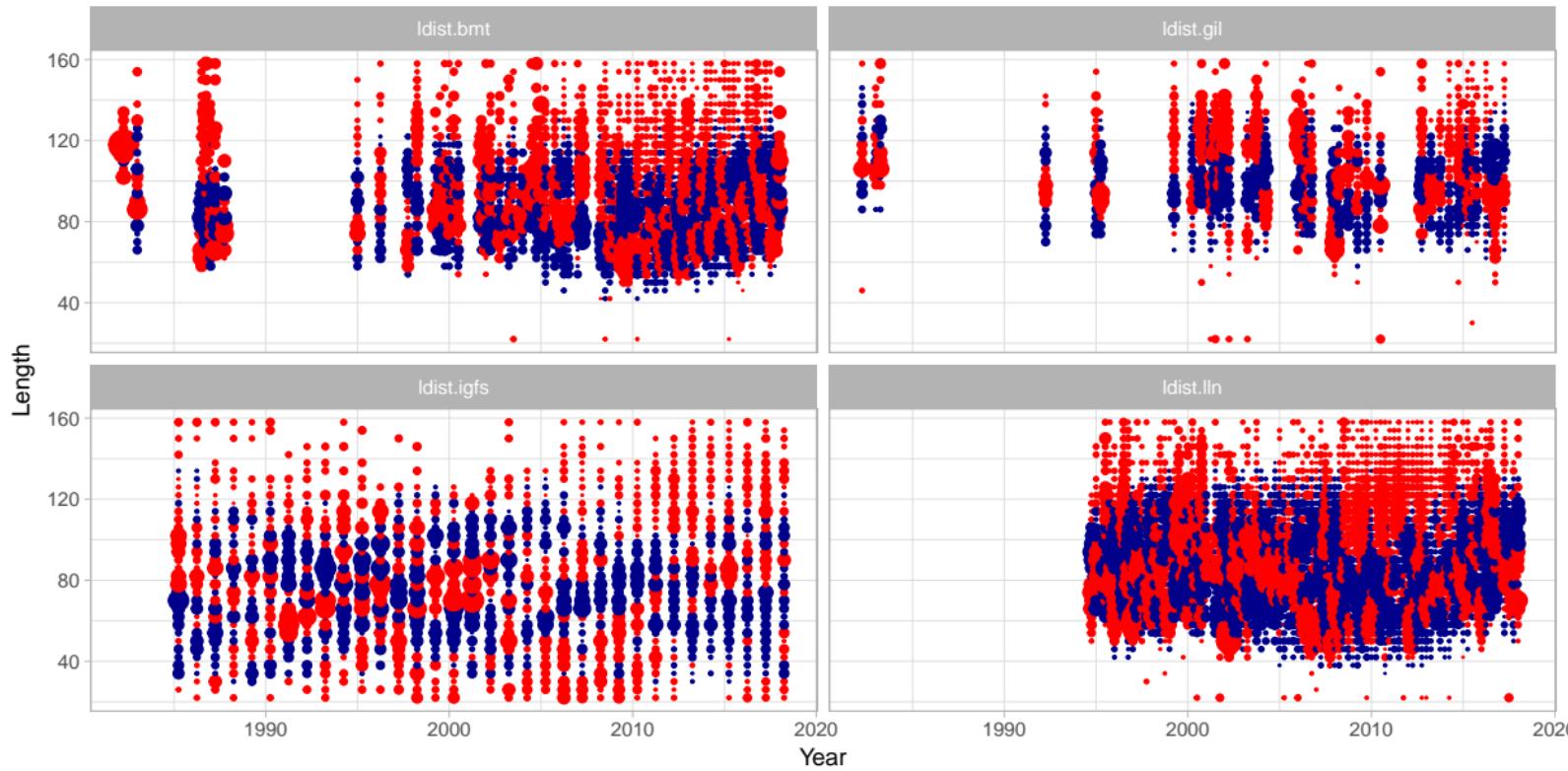


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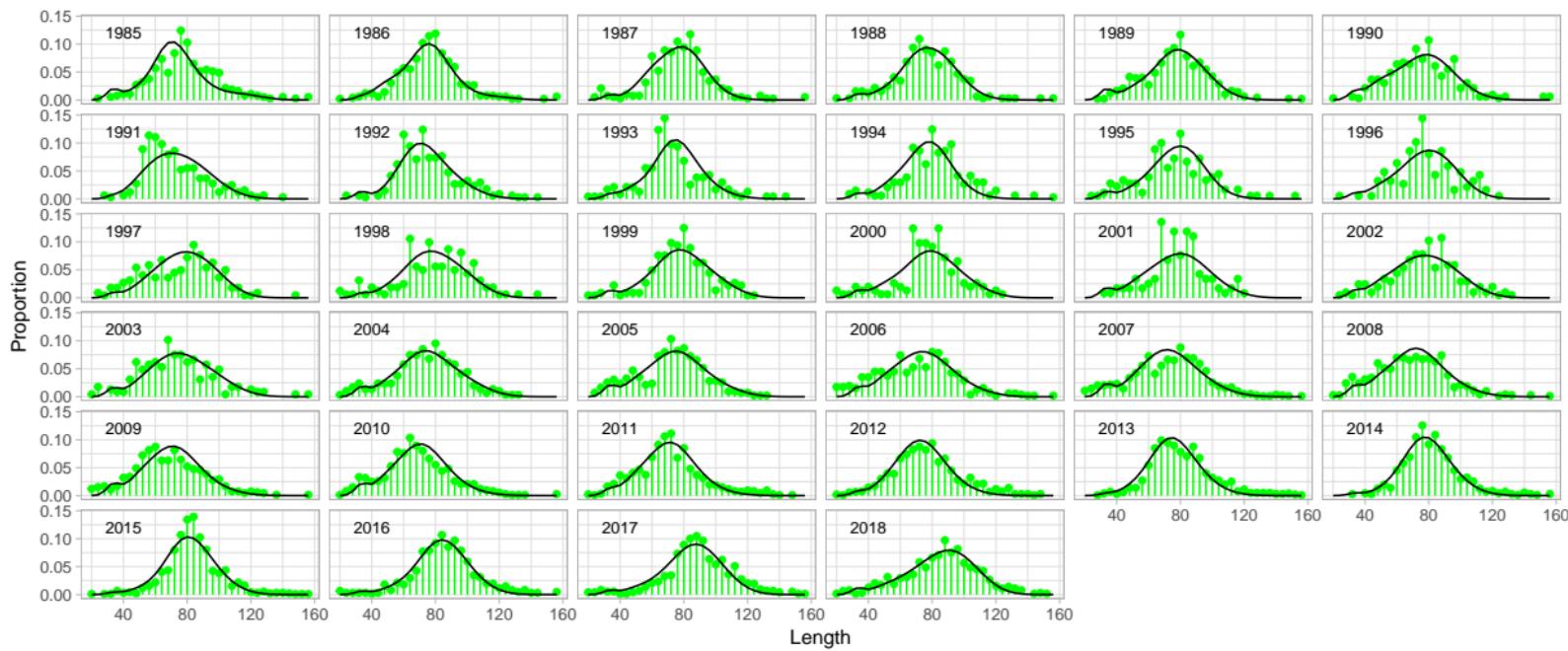
Fit to data – Indices



Fit to length distributions

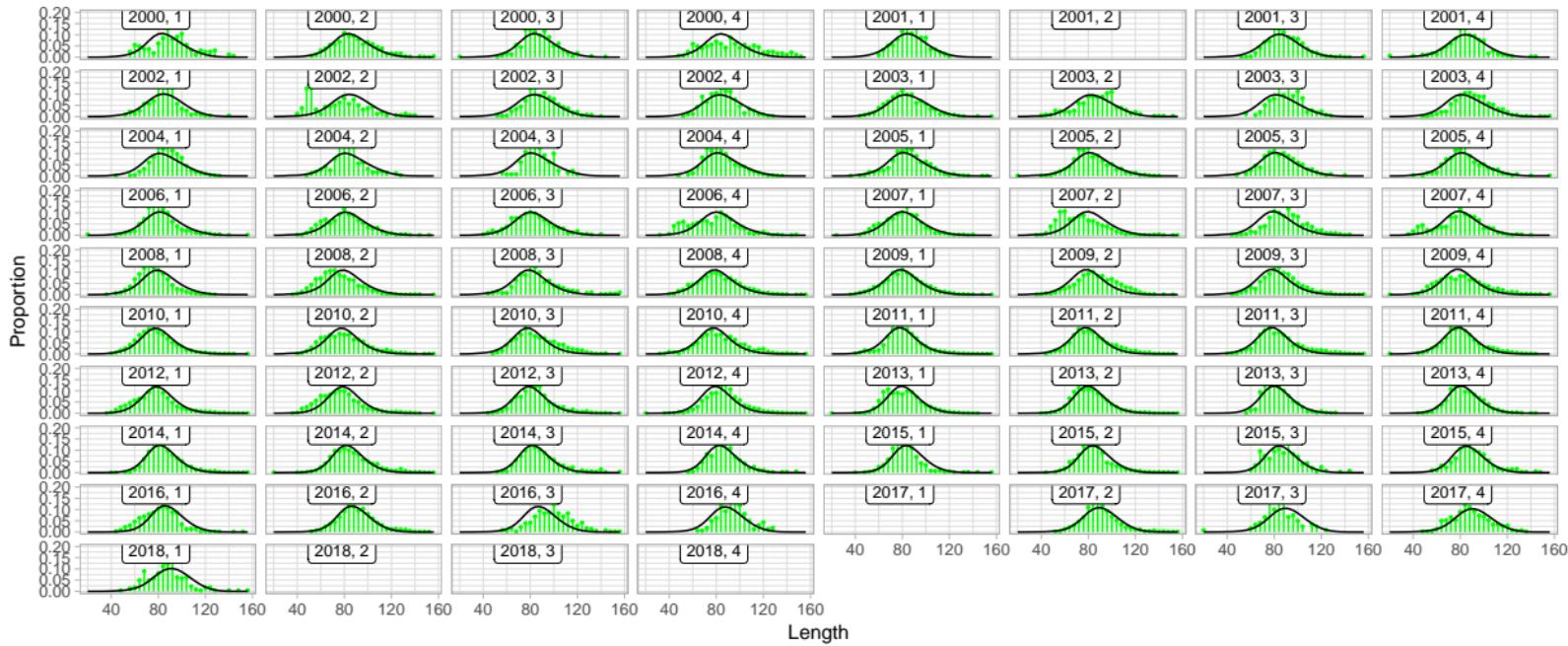


Fit to data – survey length distributions



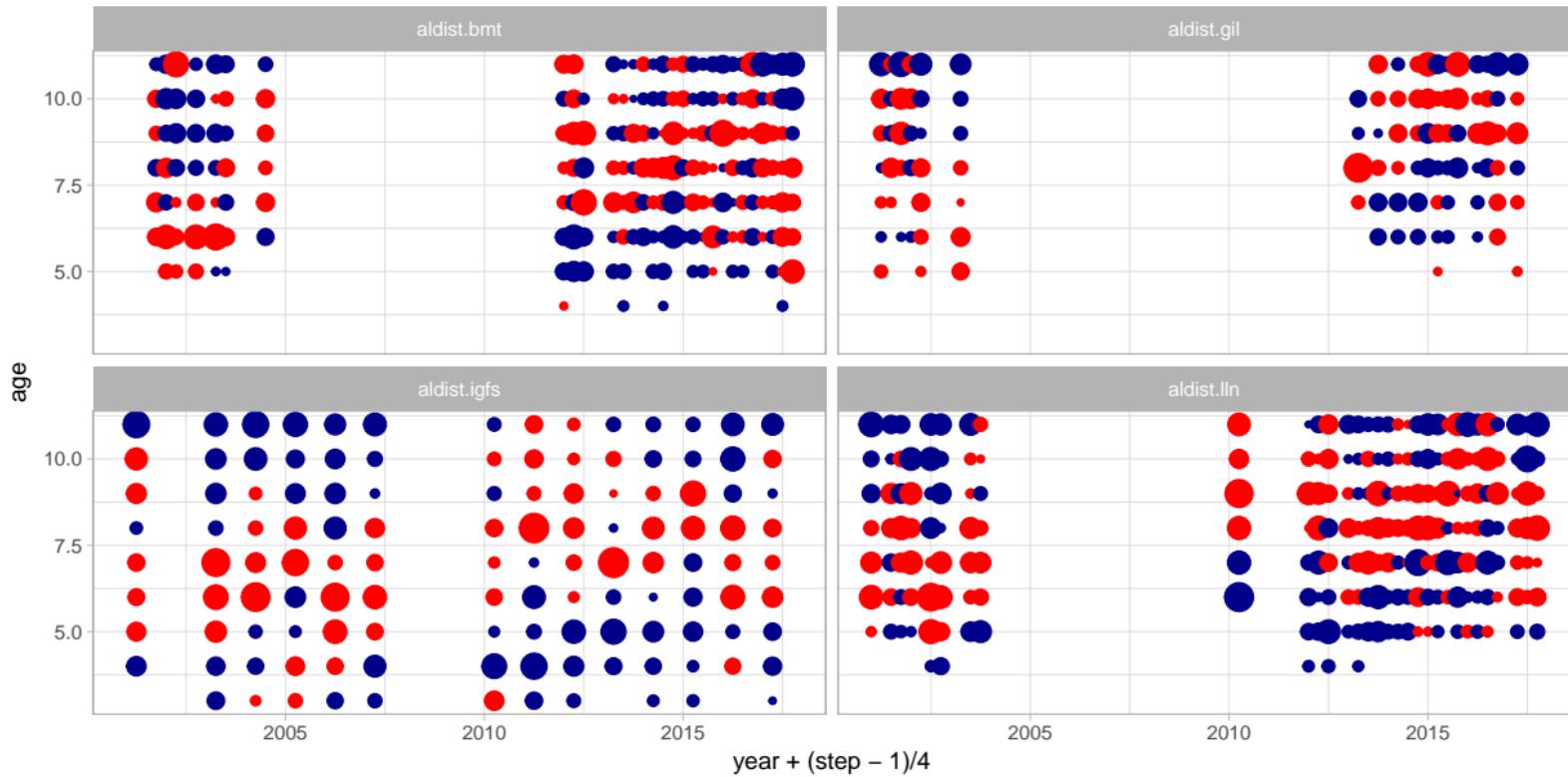
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Fit to data – longline length distributions

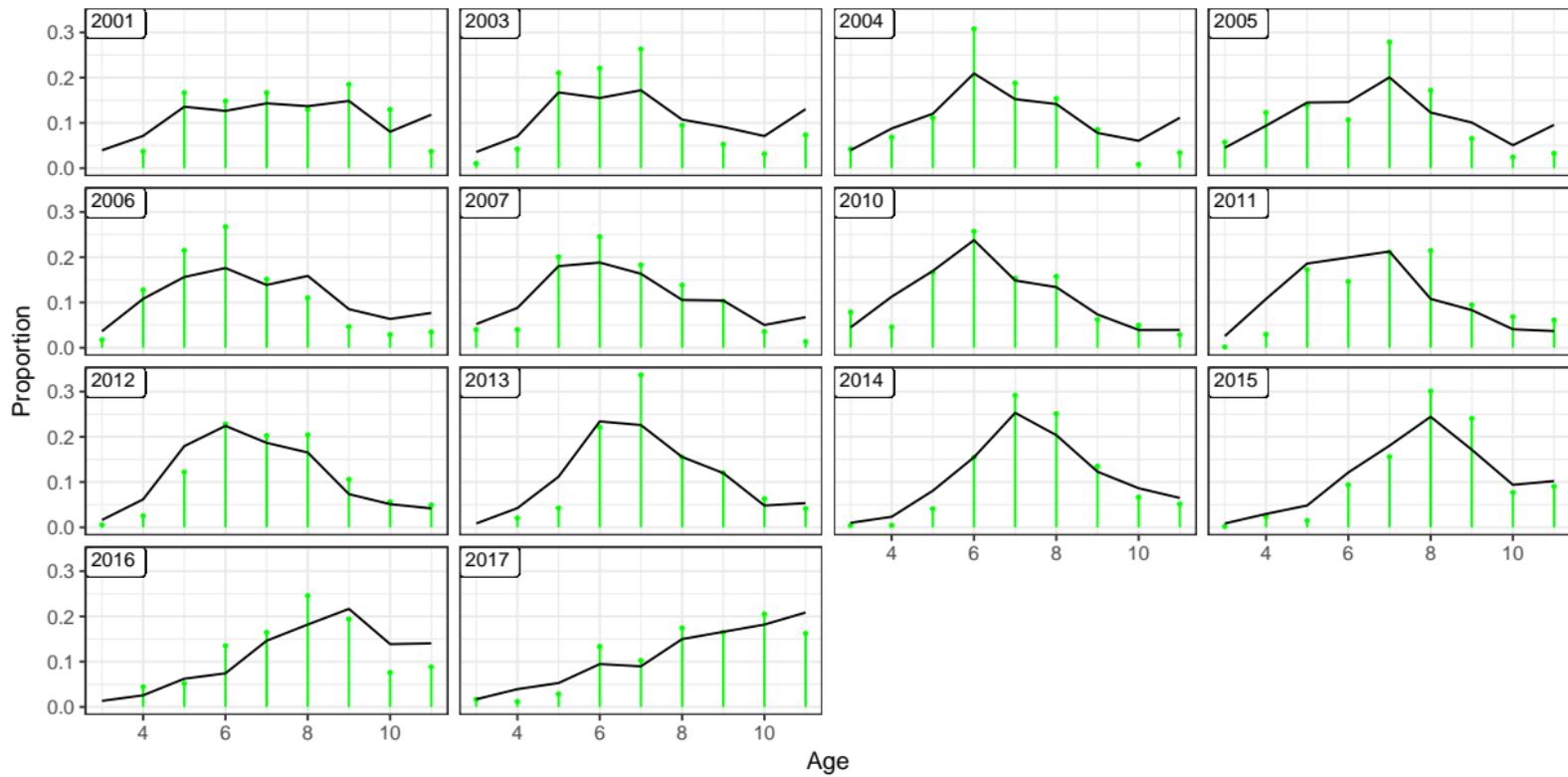


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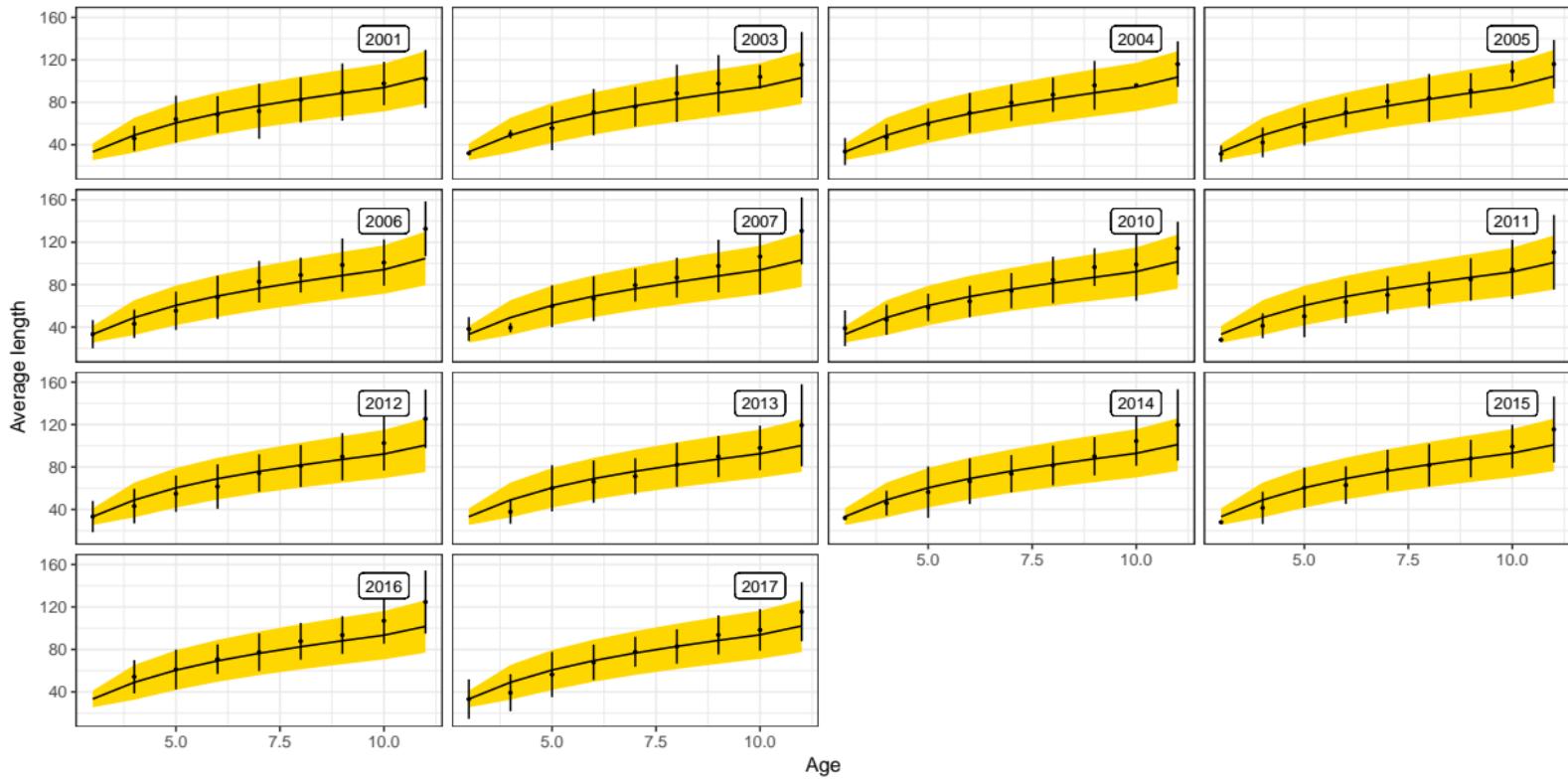
Fit to age distributions



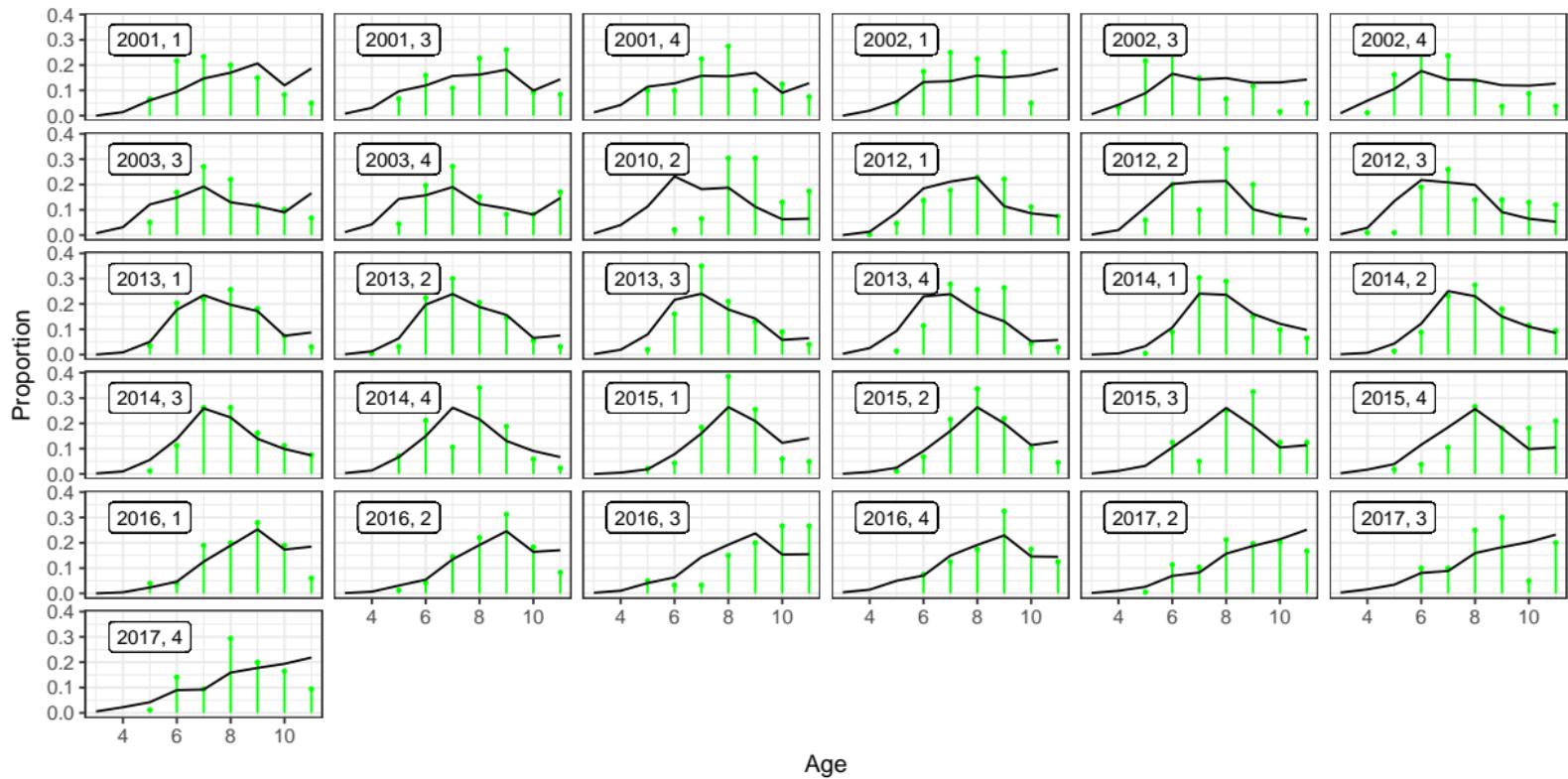
Fit to data – survey age distributions



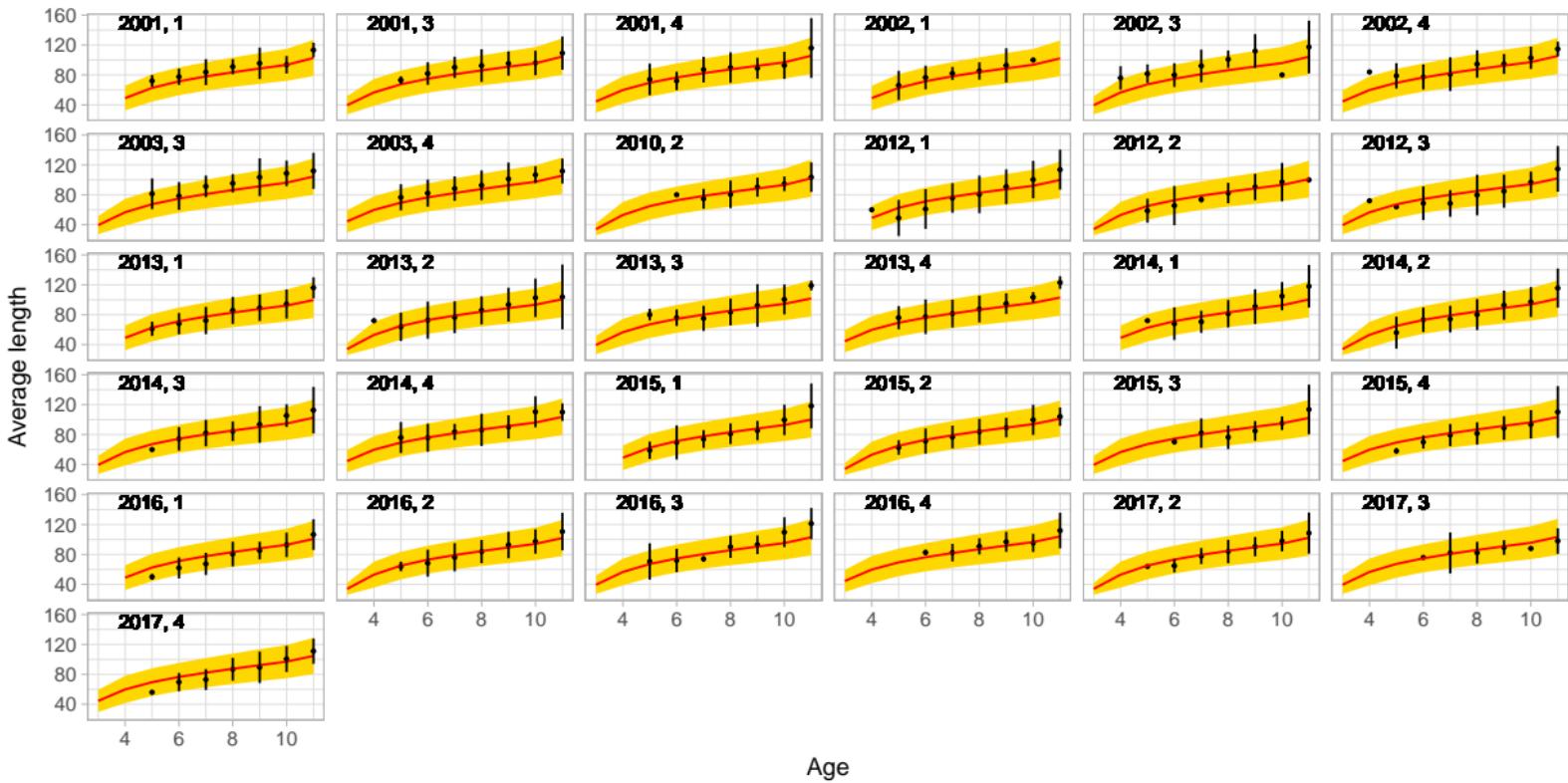
Fit to data – survey growth data



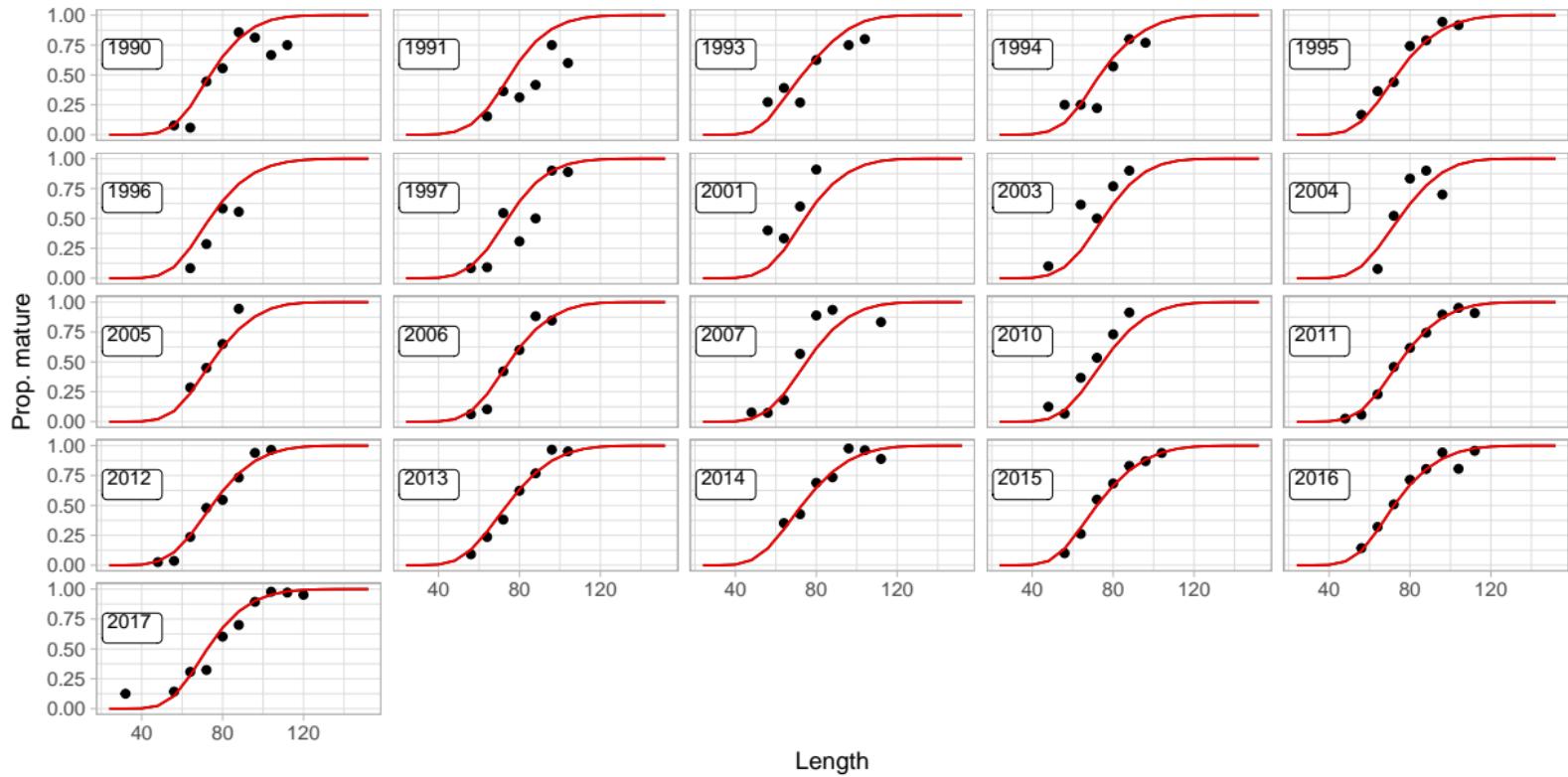
Fit to data – longline age distributions



Fit to data – longline growth data



Fit to data – survey maturity

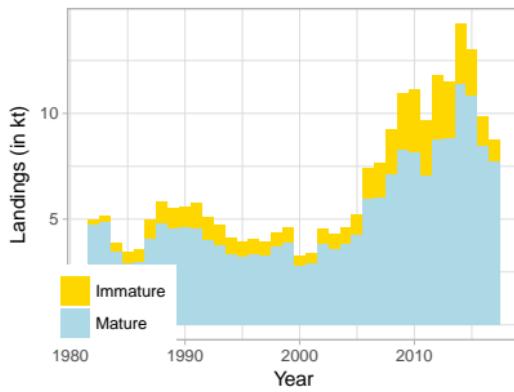
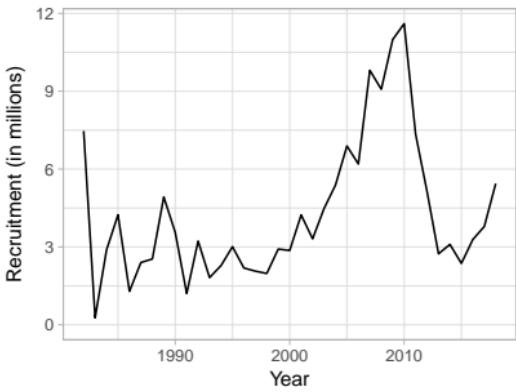
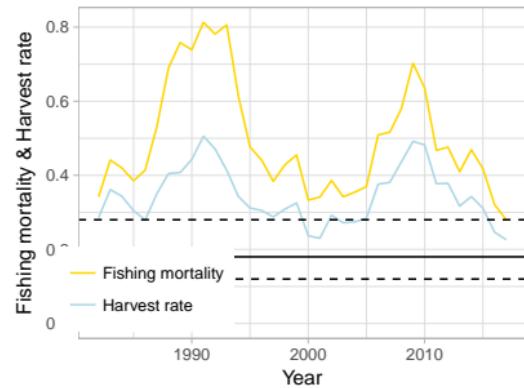
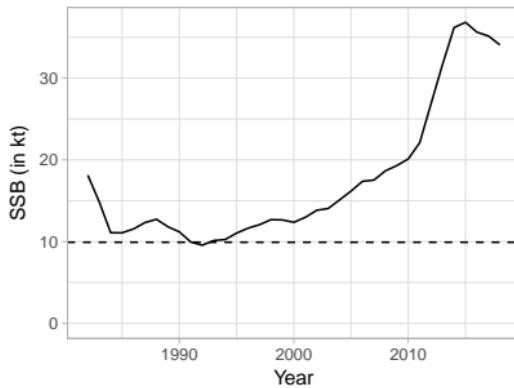
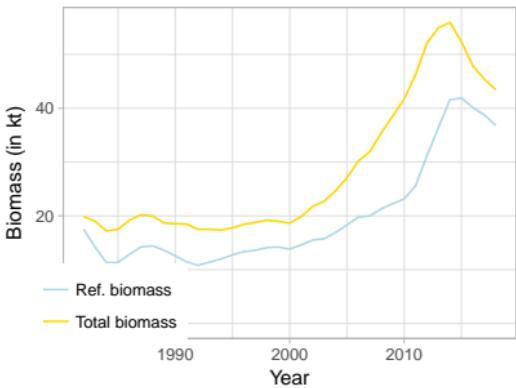


Tafla: Ling in 5a. Summary of reference points for ling in 5a.

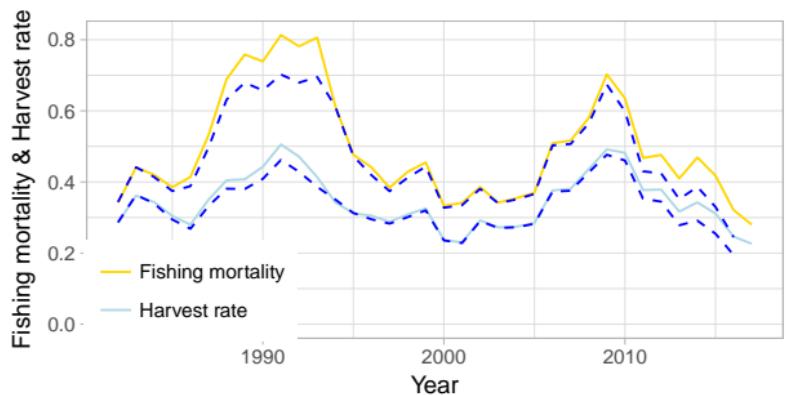
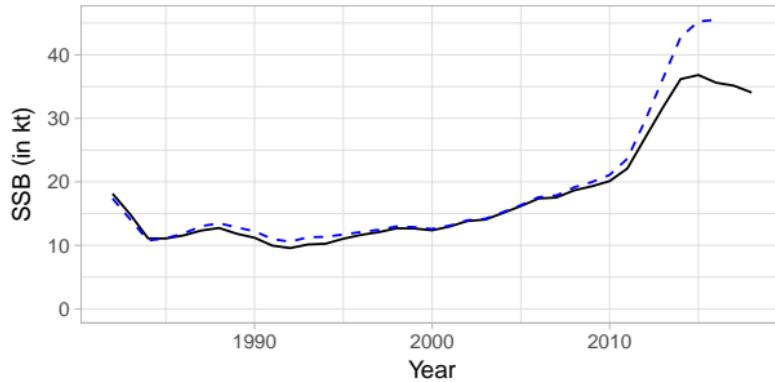
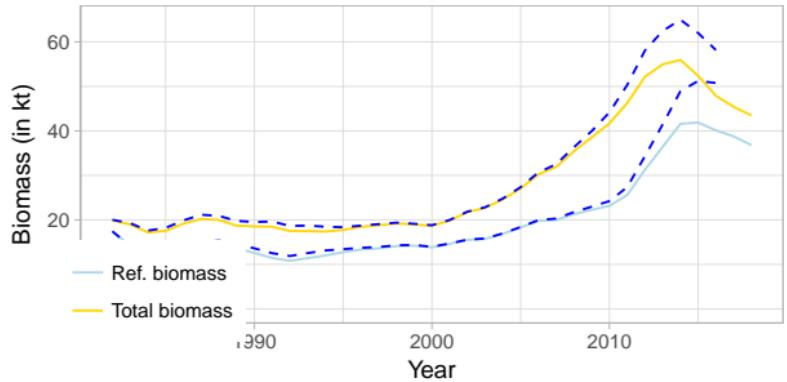
Framework		Reference point	Value	Technical basis
MSY approach		$MSY \ B_{trigger}$ H_{msy}	9.93 kt 0.24	B_{pa} The harvest rate that maximises the median long-term catch in stochastic simulations with recruitment drawn from a block bootstrap of historical recruitment scaled according to a hockey stick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



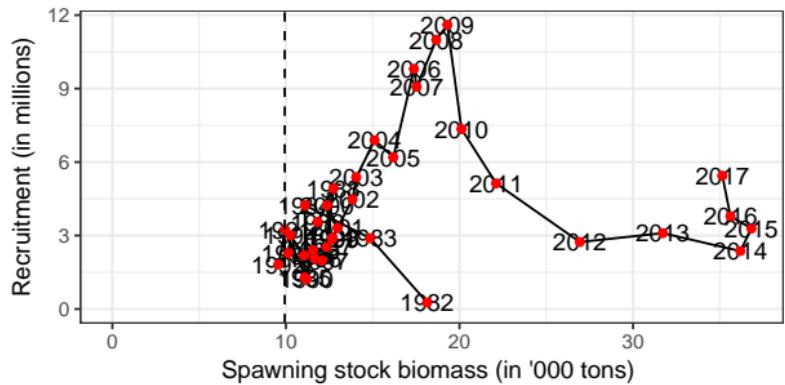
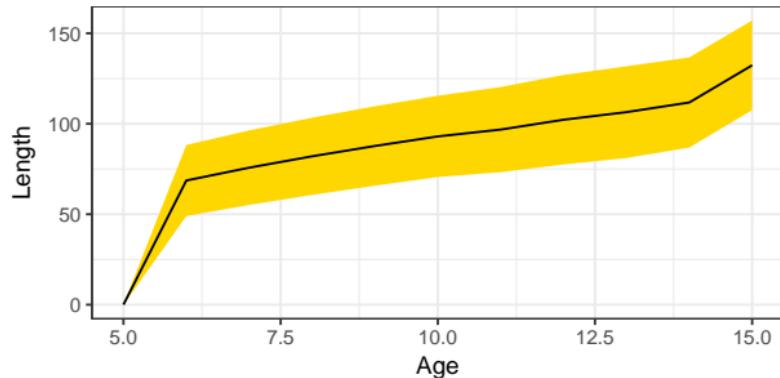
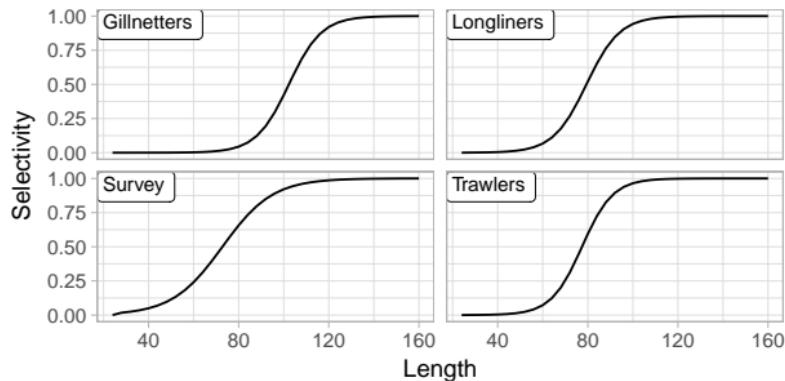
Assessment results



Comparison with previous assessment



Other derived quantities



Prognosis

When the management plan is applied, it is advised that no more than 6 074 tonnes ling are caught for the 2018/2019 fishing year.

- By calendar year

Year	HR	Catch	RefB	SSB
2016	0.268	9.88	37.30	35.85
2017	0.242	8.77	36.76	35.29
2018	0.257	8.79	34.75	34.20
2019	0.185	6.02	32.56	31.93
2020	0.179	5.86	32.58	31.91
2021	0.176	5.94	33.48	32.69

- By fishing year

Year	HR	Catch	RefB	SSB
2015/2016	0.299	11.08	37.30	35.85
2016/2017	0.230	8.34	36.76	35.29
2017/2018	0.248	8.60	34.75	34.20
2018/2019	0.186	6.07	32.56	31.93
2019/2020	0.180	5.85	32.58	31.91
2020/2021	0.177	5.89	33.48	32.69

