

# MEGRIM – STÓRKJAFTA

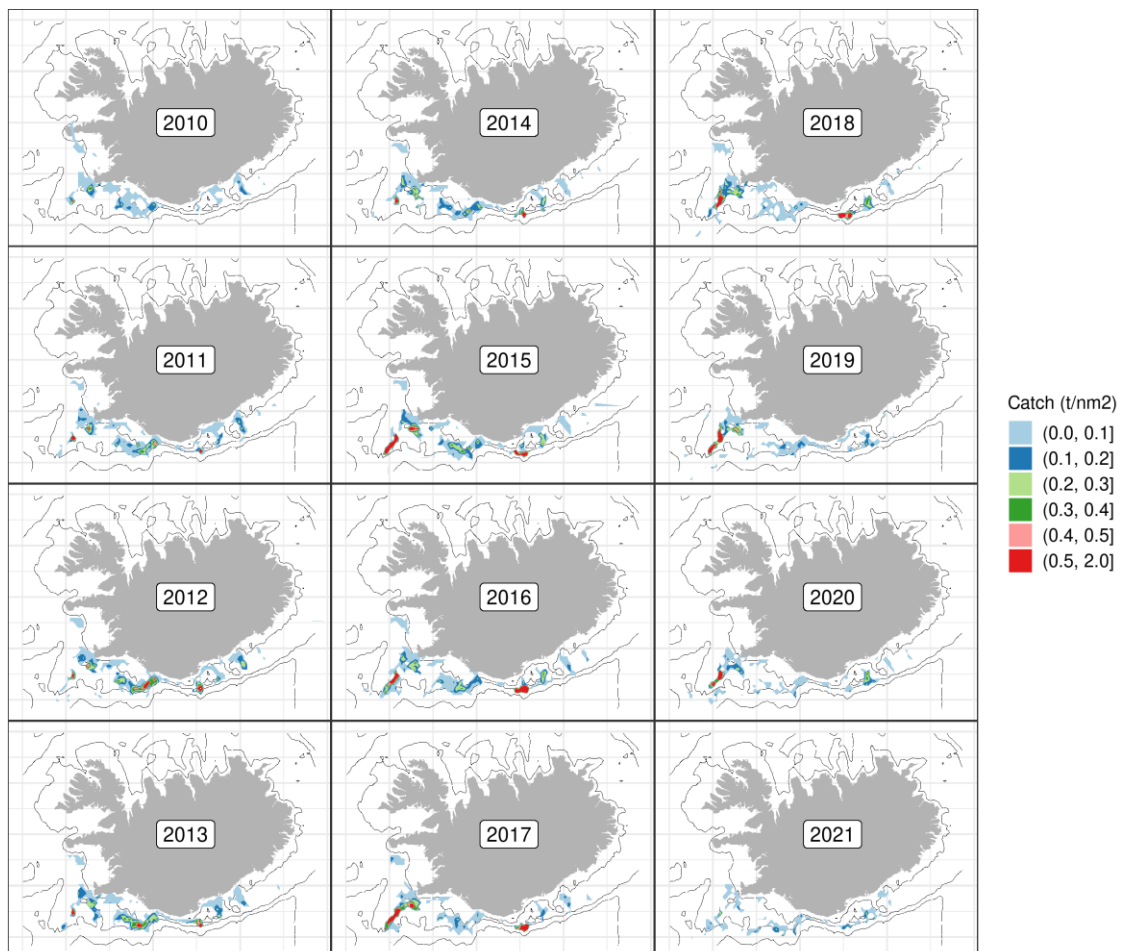
## *Lepidorhombus whiffiagonis*

### GENERAL INFORMATION

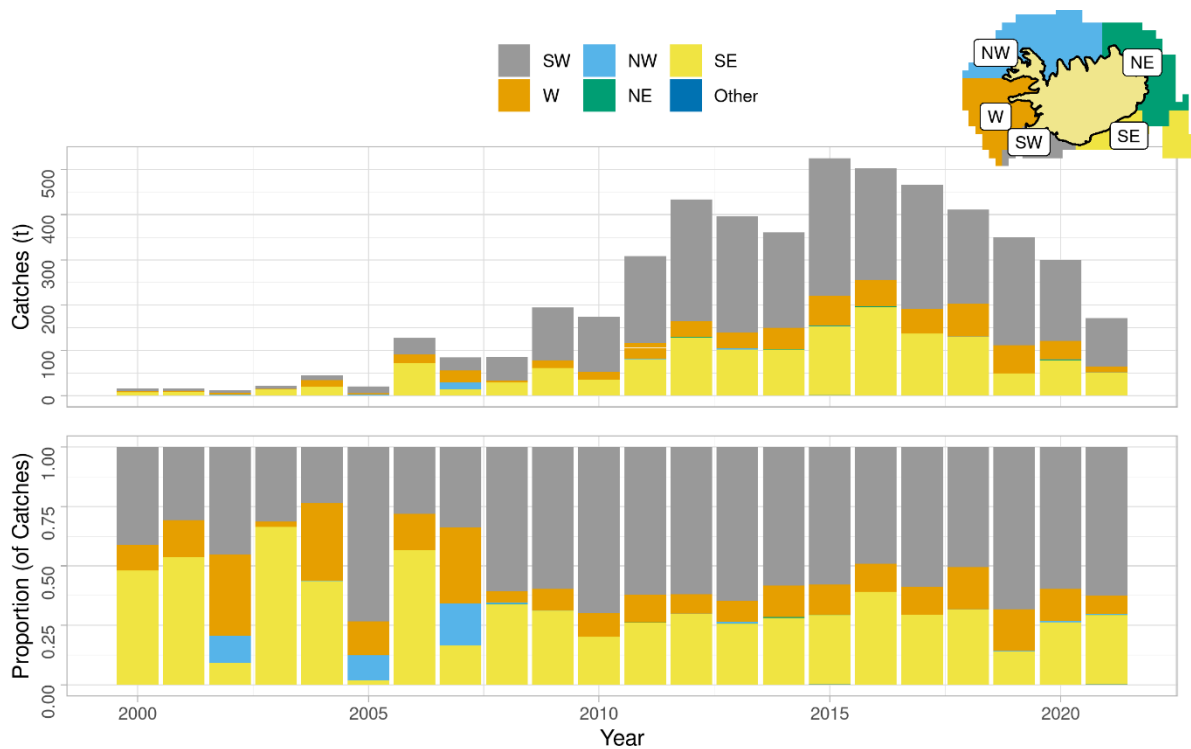
Megrím is a demersal species on a sandy or muddy substrate, occurring at depths ranging from 40-400 m, but is most common at 100-200 m. Its distribution is confined to the relatively warm waters south and west of Iceland. In Icelandic waters the females can reach 70 cm in length, but males about 60 cm. Size at sexual maturity differs between the sexes. At the length of 32 cm about half the males have reached maturity, but half the females have reached maturity at 42 cm.

### THE FISHERY

Main fishing grounds for megrím are in the southeast, south, and southwest of Iceland (Figure 1). There is no target fishery for megrím in Iceland and it is taken as bycatch in other fisheries. Spatial distribution of the Icelandic megrím fishery is relatively stable, with around 90% caught off the south coast. In recent years, reported catches have increased as megrím was inadequately reported in logbooks before 2009 (Figure 2).



**Figure 1. Megrím. Geographical distribution of the Icelandic fishery 2013-2021. Reported catch from logbooks.**



**Figure 2. Megrim. Spatial distribution of the Icelandic fishery by fishing area since 2000 according to logbooks. All gears combined.**

Megrim is caught in relatively deep water for a flatfish species, with most of the catch (50-80%) taken at depths of 100-250 meters (Figure 3).

Megrim in Icelandic fishing grounds is mainly caught as bycatch in demersal seine, *Nephrops* trawls, and bottom trawls (Figure 4, Table 1). Catches in demersal seine have been decreasing in the past decade. Catches in *Nephrops* trawl and bottom trawl increased in 2009-2016 but have decreased again since then. In 2021, approximately 70% of landed megrim was fished in bottom trawl and 25% in *Nephrops* trawl. In recent years numbers of seiners landing over 1000 kg of megrim has decreased significantly with only two seiners in 2021 landing one tonne or more annually. This decrease also applies to *Nephrops* trawlers with area closures on certain *Nephrops* fishing grounds, numbers have decreased to four *Nephrops* trawlers landing one tonne or more in 2021. However, there is an increase in number of trawlers landing over one tonne of megrim (Table 1).

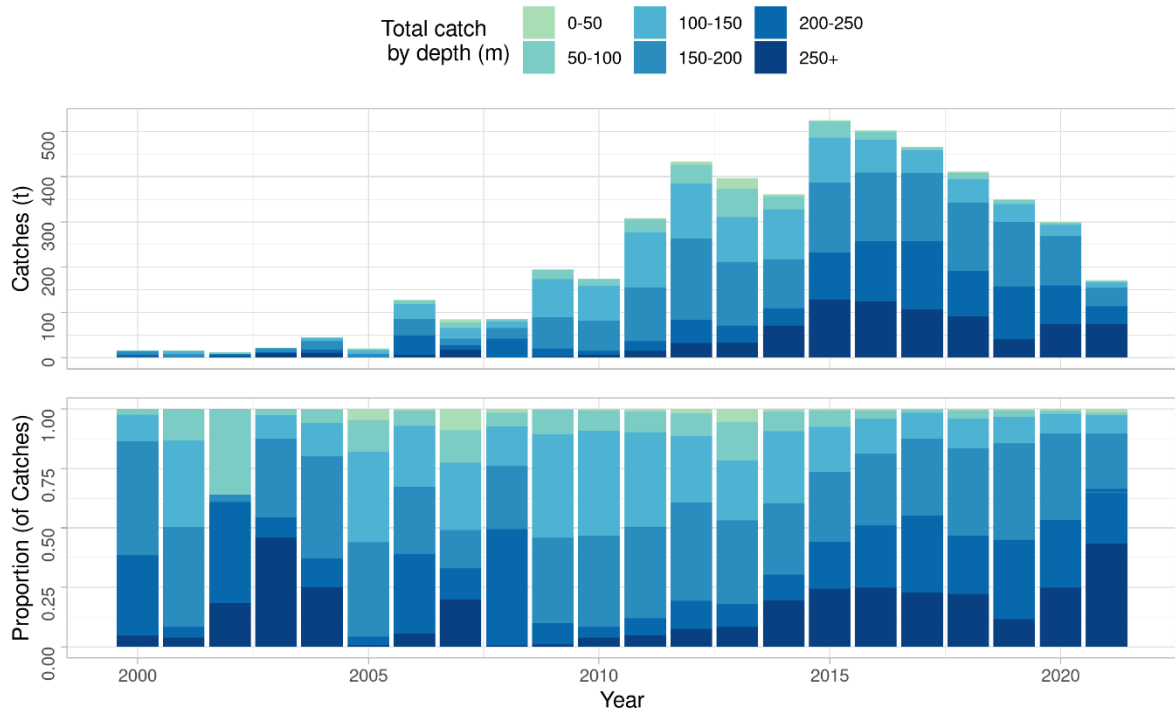
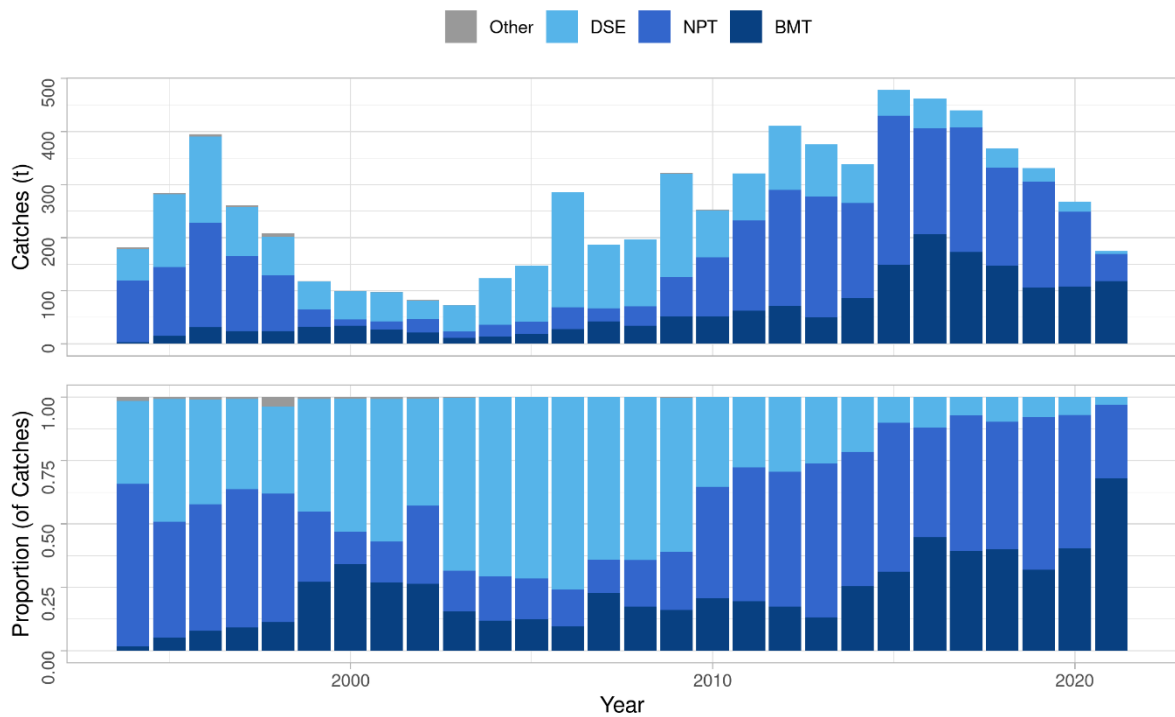


Figure 3. Megrim. Depth distribution catches according to logbooks since 2000.



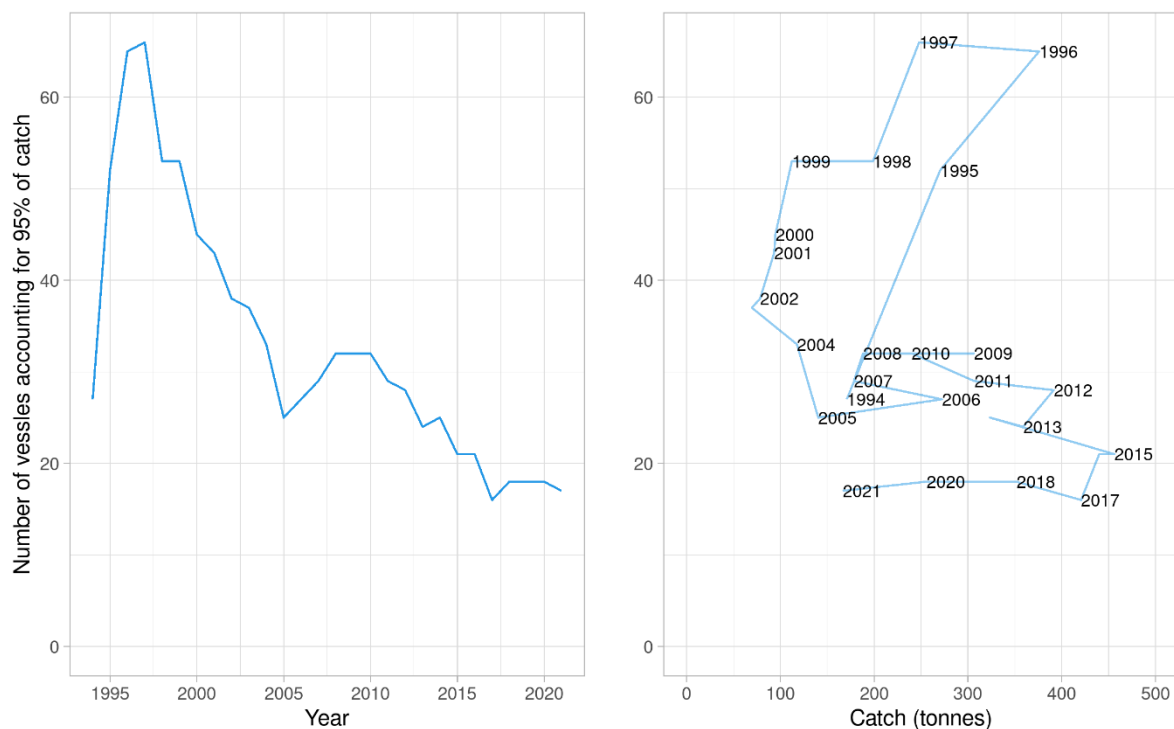
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Figure 4. Megrim. Total catch (landings) by fishing gear since 1994, according to statistics from the Directorate of Fisheries. DSE = demersal seine, NPT = *Nephrops* trawl, BMT = Bottom trawl.

**Table 1. Megrim. Number of Icelandic vessels landing catch of 1000 kg or more of megrim, and all landed catch divided by gear type.**

YEAR	NUMBER OF VESSELS			CATCHES (TONNES)			
	<i>Seiners</i>	<i>Nephrops Trawlers</i>	<i>Other</i>	<i>Demersal seine</i>	<i>Nephrops trawl</i>	<i>Other</i>	<i>Sum</i>
2000	8	4	7	53	12	31	96
2001	12	6	7	56	15	26	97
2002	7	9	6	33	23	20	76
2003	10	4	3	50	7	11	68
2004	13	4	4	85	21	14	120
2005	15	5	8	106	22	18	146
2006	17	9	7	216	40	28	284
2007	13	5	9	119	23	45	187
2008	19	7	8	126	36	34	196
2009	23	7	10	191	72	53	316
2010	17	11	12	89	110	52	251
2011	12	14	10	89	169	62	320
2012	17	14	9	134	171	104	409
2013	12	13	8	98	228	50	376
2014	9	14	10	74	171	82	327
2015	8	12	14	48	279	152	479
2016	11	10	17	55	190	215	460
2017	15	8	7	32	235	173	440
2018	8	9	13	36	185	147	368
2019	8	7	13	26	199	106	331
2020	5	7	14	19	141	108	268
2021	2	4	17	5	51	119	175

The number of vessels accounting for 95% of the annual catches of megrim in Icelandic waters increased with increased catches in 1992-1996 from about 9 to 65 vessels (Figure 5). From 1996-2003, a drop in the number of vessels coincided with reduced catches. Since 2016, less than 20 vessels have accounted for 95% of annual catches (Figure 5).



**Figure 5. Megrim. Number of vessels (all gear types) accounting for 95% of the total catch annually since 1994. Left: Plotted against year. Right: Plotted against total catch. Data from the Directorate of Fisheries.**

## CATCH PER UNIT OF EFFORT (CPUE) AND EFFORT

CPUE estimates of megrim in Icelandic waters are not considered representative of stock abundance as changes in fleet composition, technical improvements, and differences in gear setup among other things have not been accounted for when estimating CPUE.

CPUE of demersal trawl and *Nephrops* trawl (kg/hour), in hauls where megrim is caught, has increased since 2009 and was around 60 kg/hour last year.

CPUE in demersal seine (kg/set) is calculated as the total weight in sets in which megrim was caught. CPUE gradually decreased from 200 kg/set in 2014 to about 60 kg/set in 2021 (Figure 6). CPUE of all gears was at similar levels last year.

Effort in the demersal trawl fishery (number of tows where megrim was caught) has gradually increased from 2004. Effort in the *Nephrops* trawl fishery (number of tows where megrim was caught) increased in years 2009-2014, where 2014 was the highest peak seen. However, in most recent years the effort has decreased to similar levels as in 2004. Fishing effort for megrim in the demersal seine fishery is estimated as the number of sets where megrim was caught. Fishing effort by seiners reached the lowest level in 2021.

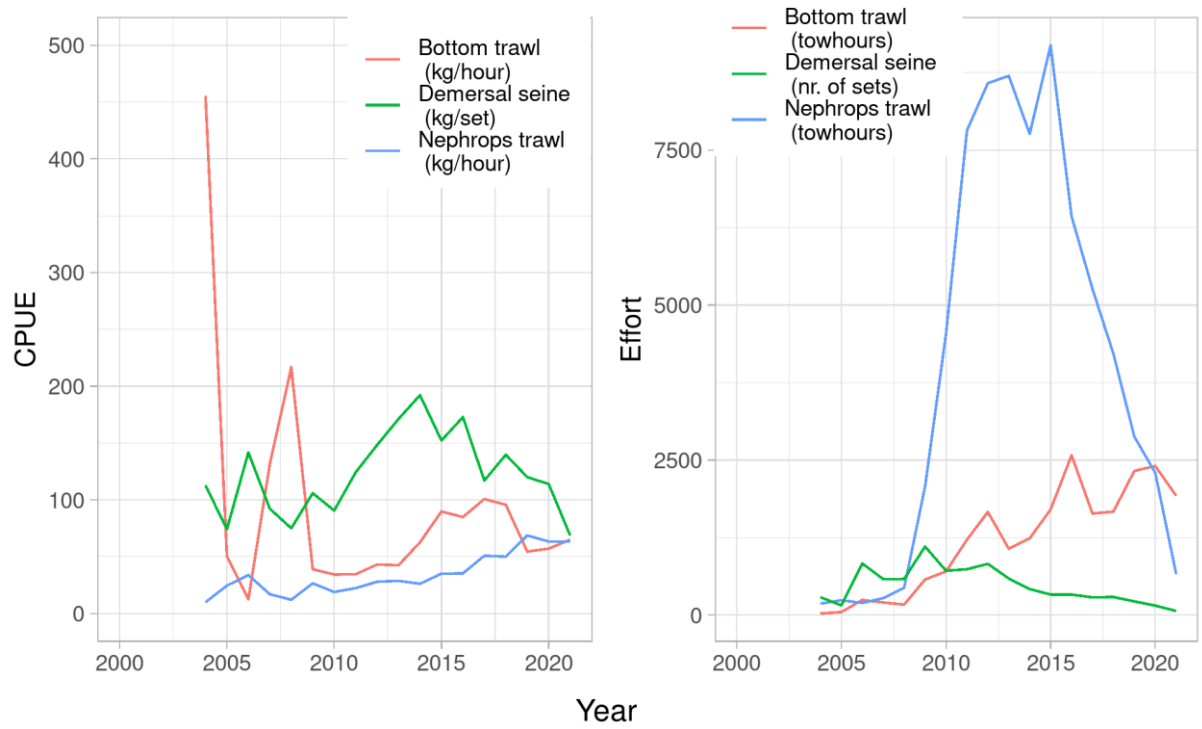
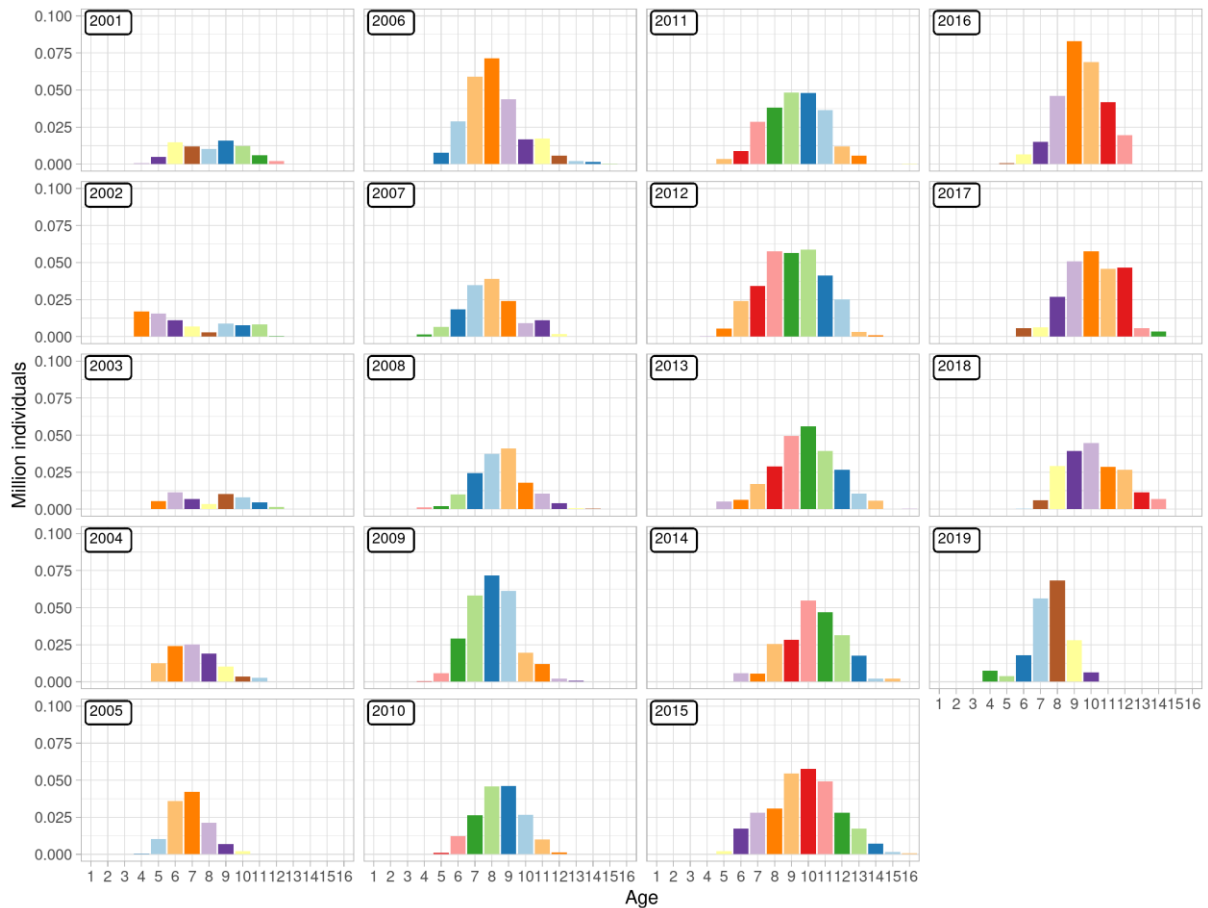


Figure 6. Megrim. Non-standardized of CPUE (left) and fishing effort (right) from bottom trawl (kg/hour or towhours, red), *Nephrops* trawl (kg/hour or towhours, blue) and demersal seine (kg/set or nr. of sets, green).

### AGE DISTRIBUTION OF LANDED MEGRIM

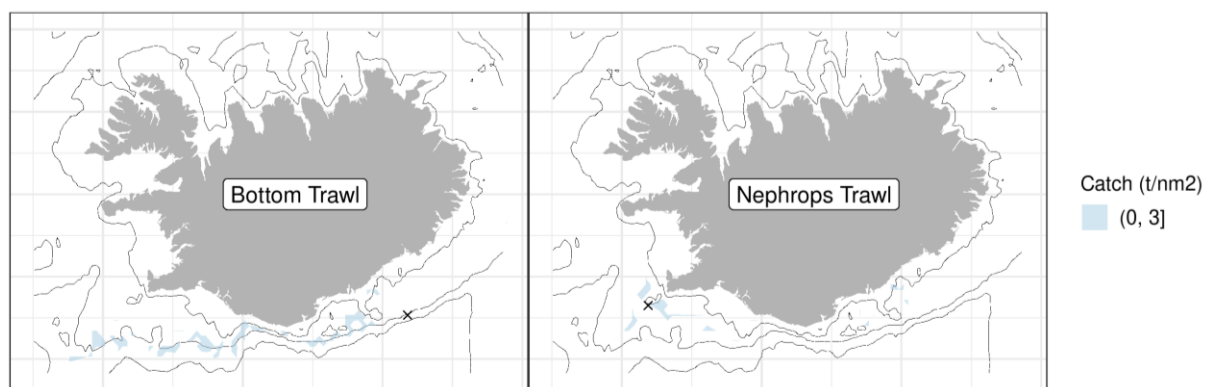
Systematic age reading from the commercial catch started in 1996. Table 1 shows number of otoliths sampled from the commercial catch. Usually, 90-97% of the otoliths sampled are age read. During this period, total numbers of otoliths sampled has decreased considerably and in the last two years only 50 otoliths were collected from landed catch. The sampling coverage in 2021 is shown in Figure 8. The landings are mostly 6-12 years old fish, with 7-11 years olds amounting to over 70% of the numbers in most recent years (Figure 7).



**Figure 7. Megrin. Estimated age distribution of landed catch based on otoliths collected from landed catch. Data from 2020 and 2021 was not available when this report was created.**

**Table 2. Megrin. Number of samples and extracted otoliths from landed catch.**

<i>Year</i>	<i>Demersal seine</i>		<i>Nephrops trawl</i>		<i>Bottom trawl</i>	
	Samples	Otoliths	Samples	Otoliths	Samples	Otoliths
2010	9	225	8	200	0	0
2011	8	200	15	401	0	0
2012	12	299	19	475	2	50
2013	11	275	12	300	4	100
2014	4	100	4	95	0	0
2015	5	124	9	225	1	25
2016	3	75	5	125	1	25
2017	2	50	7	175	0	0
2018	2	50	3	75	1	25
2019	2	50	5	125	0	0
2020	0	0	1	25	1	25
2021	0	0	1	25	1	25

**Figure 8. Megrin. Fishing grounds in 2021 as reported in logbooks (colours) and positions of samples taken from landings (asterisks).**



LENGTH DISTRIBUTION OF LANDED MEGRIM

Length distribution of landed megrim was relatively stable in 2001-2009, with average length ranging between 47 and 49 cm in most years with exception of 2002 (Figure 8). Since 2010, landings of larger megrim (50 cm and larger) have increased.

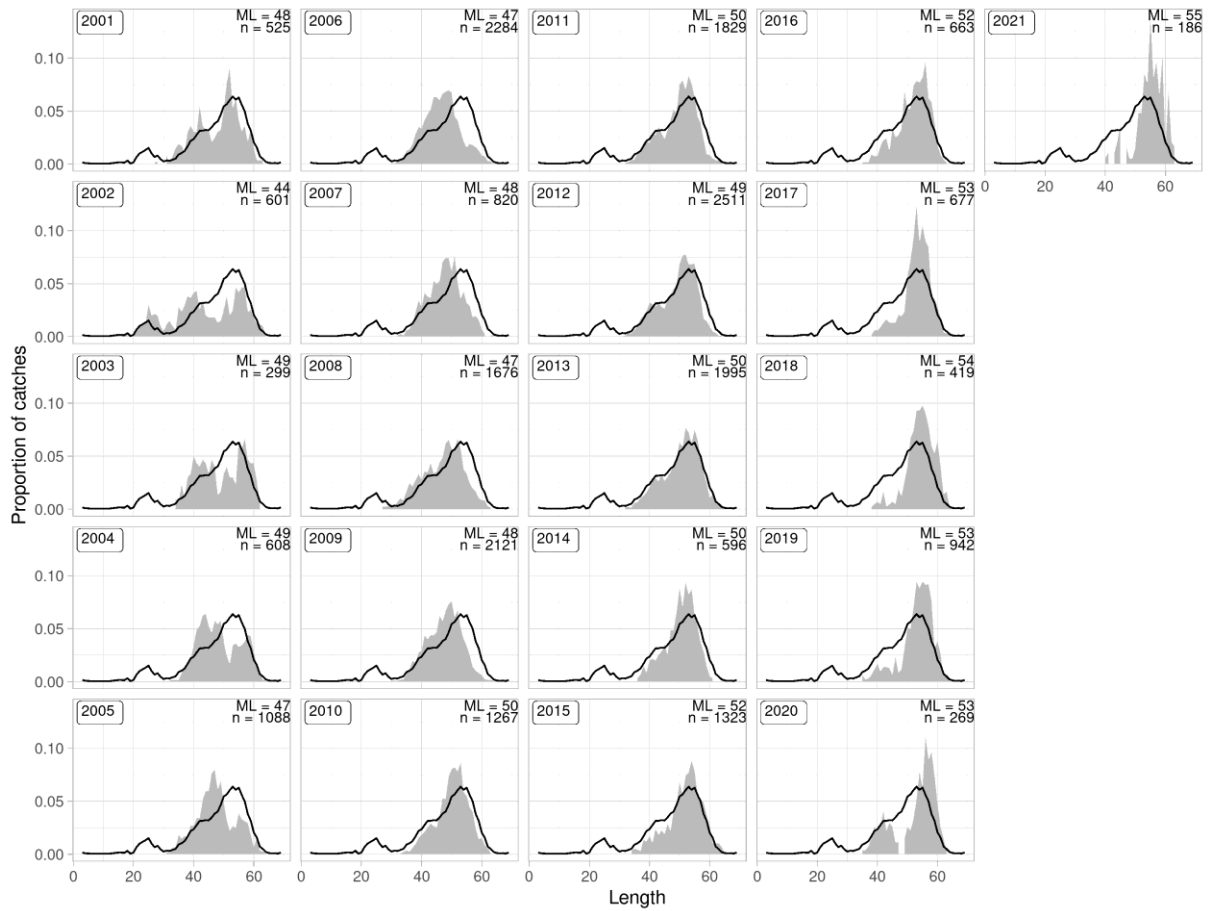


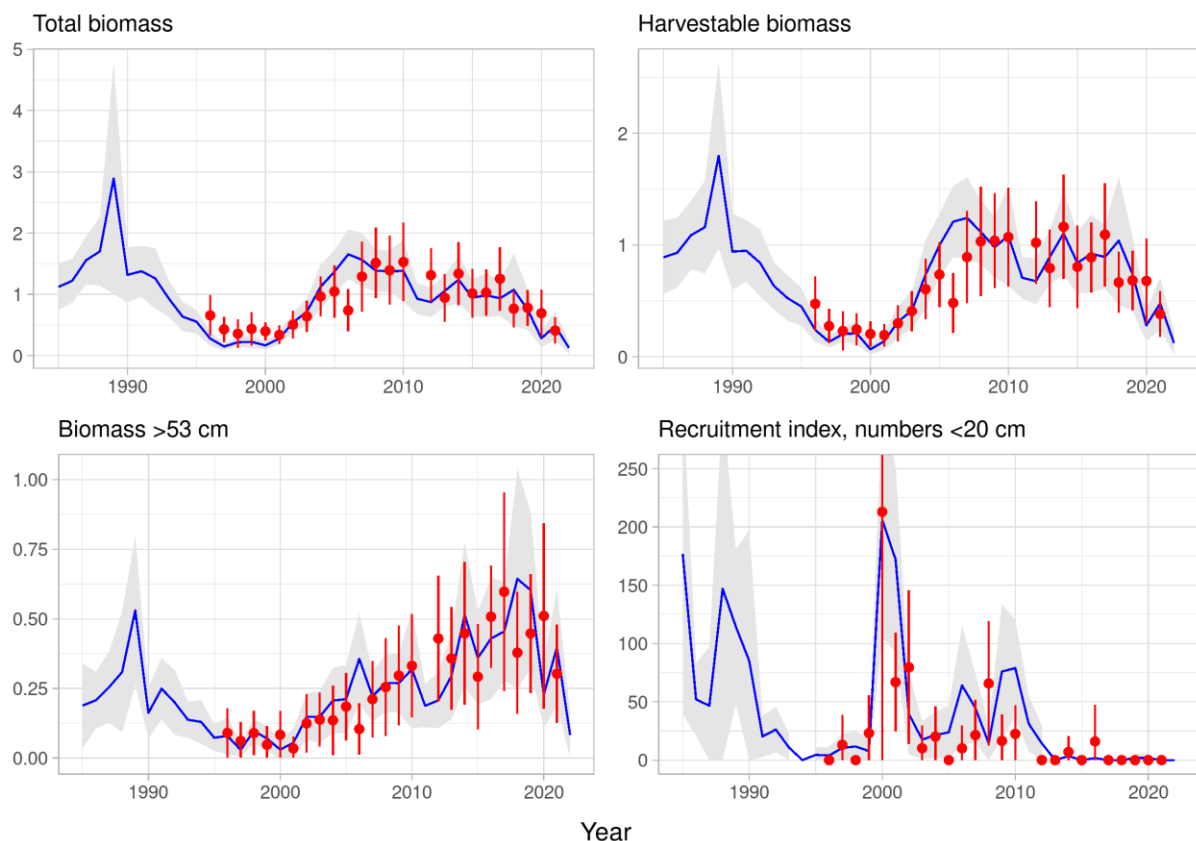
Figure 9. Megrim. Relative length distribution from landed catch. The black line represents the mean length distribution for all years.

## SURVEY DATA

The Icelandic spring groundfish survey (hereafter spring survey, IS-SMB), which has been conducted annually in March since 1985, covers the most important distribution area of the megrim fishery. In addition, survey data on megrim is available from the Icelandic autumn groundfish survey (hereafter autumn survey, IS-SMH) since 1996. The autumn survey was not conducted in 2011. The spring survey is considered to measure changes in abundance/biomass better than the autumn survey.

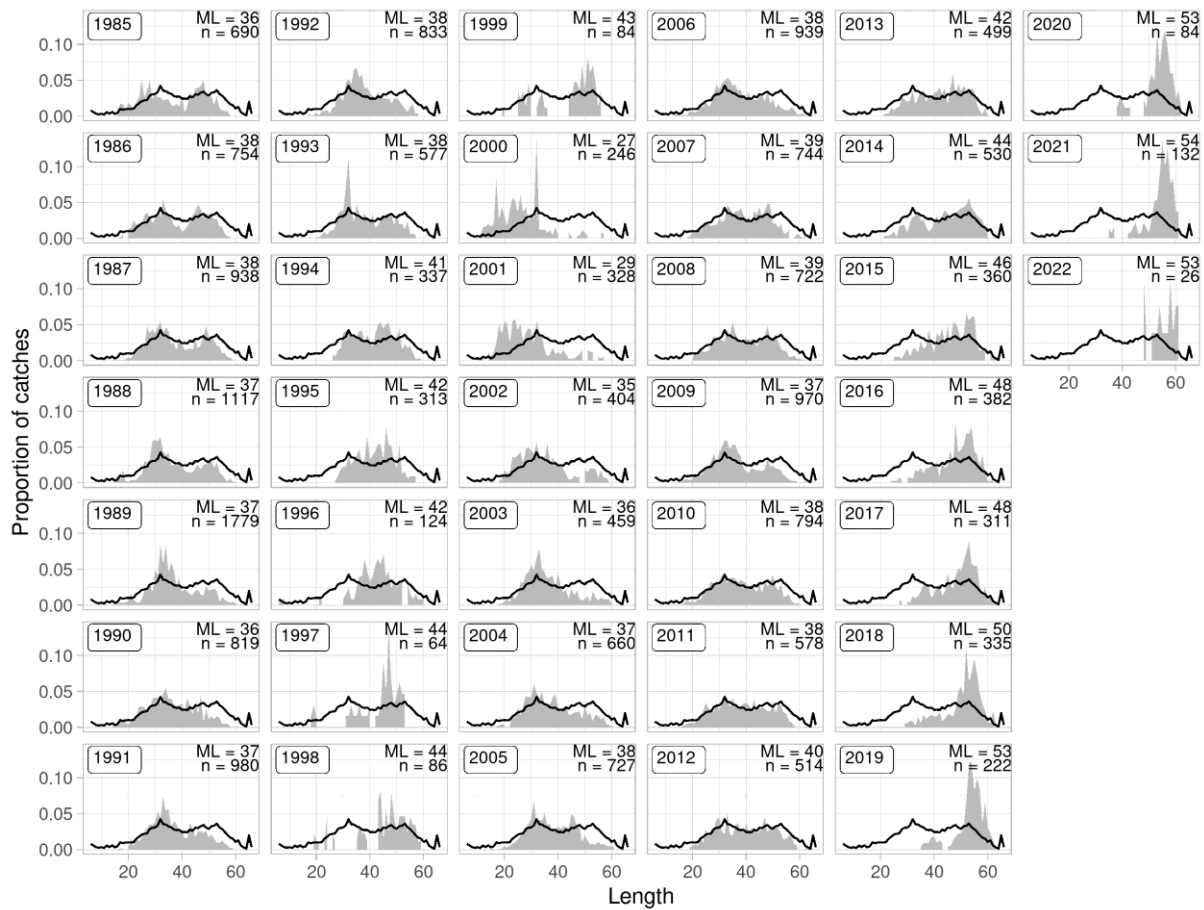
Figure 10 shows trends in various biomass indices and a recruitment index based on abundance of megrim smaller than 20 cm. Survey length disaggregated abundance indices are shown in Figures 11-12, and abundance and changes in spatial distribution in Figures 13-16.

Total biomass index and the biomass index for megrim larger than 40 cm (harvestable part of the stock) increased steadily between 2000 and 2007 and stayed relatively stable until 2018 when the indices decreased and are approaching the lowest levels. The index of megrim larger than 53 cm gradually increased 2000-2018 but has decreased since then. The index of juvenile abundance (<20 cm) has been low for the last eight years. Since 2018, all indices except the juvenile index decreased significantly (Figure 10).

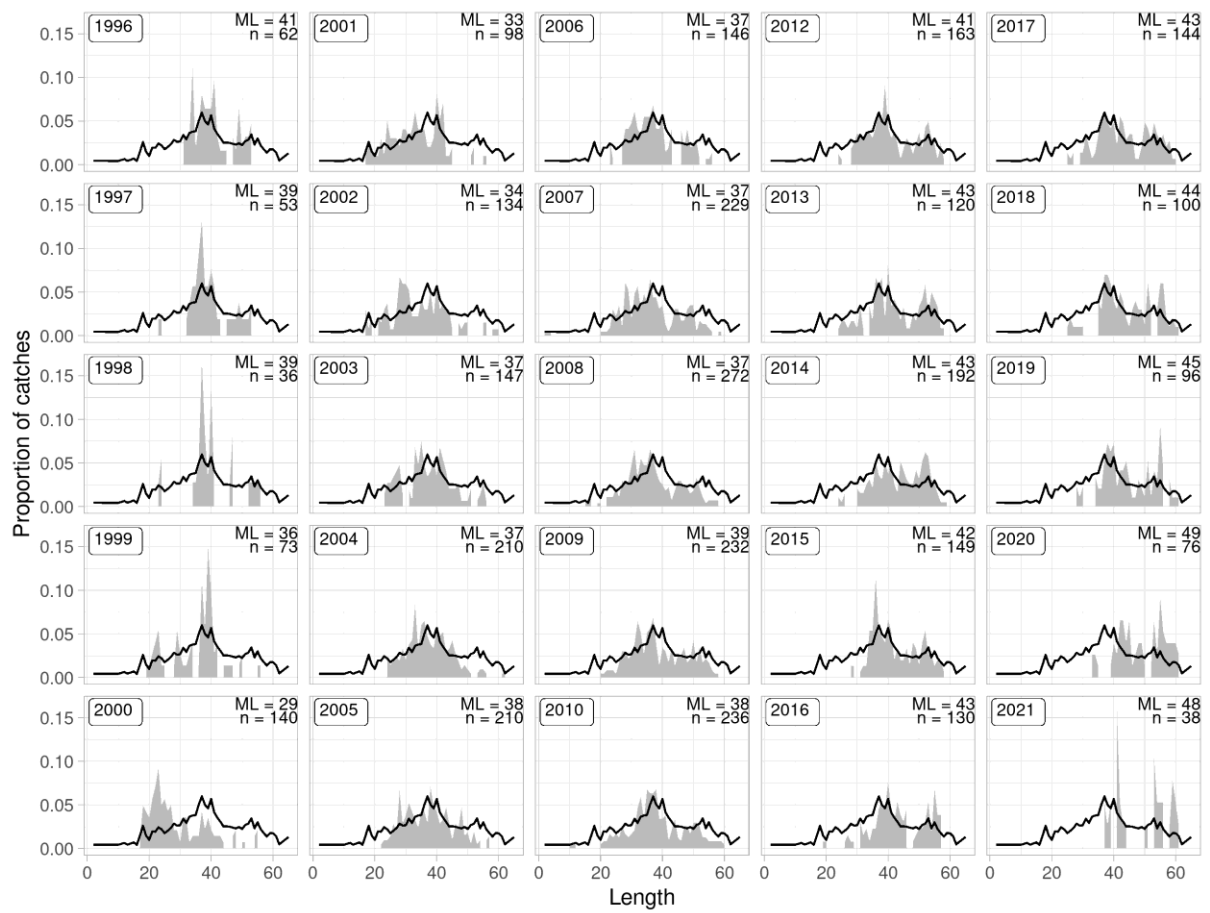


**Figure 10. Megrim. Total biomass indices (upper left) and harvestable biomass indices ( $\geq 40$  cm) (upper, right), biomass indices of larger ind. ( $\geq 53$  cm) (lower left) and juvenile abundance indices ( $\leq 20$  cm) (lower right) from the spring survey (blue) from 1985 and autumn survey (red) from 1996, along with the standard deviation.**

From the onset of the spring survey in 1985 until 1993 there were little changes in the general length distribution of megrim and the average length ranged between 36 and 38 cm (Figure 11). In 1994-1999 there was relatively more larger fish, increasing the average length to 44 cm in 1998. In the survey of 2000, there was a sudden change in the length distribution of megrim with relatively high number of small individuals and the average length decreased to 26.5 cm. This is seen as a sudden increase in recruitment in 2000 (Figure 10). Although recruitment continued to be high in the following years, the length distribution gradually shifted towards larger fish with average length reaching over 50 cm in 2018. Comparable changes in length distribution of megrim are also seen in the autumn survey (Figure 12).



**Figure 11. Megrim. Relative length-disaggregated abundance indices from the spring survey. The black line shows the mean for all years.**



**Figure 12. Megrim. Relative length-disaggregated abundance indices from the autumn survey. The black line shows the mean for all years.**

Megrim was caught in the southern part of the shelf in the spring survey in 2022, particularly in the SW area around 300 m depth (Figure 13). Spatial distribution of the biomass index of megrim in the spring survey has been relatively stable since 2007, with highest proportion of megrim caught in the SW area, with the exception of this year's survey (Figure 14).

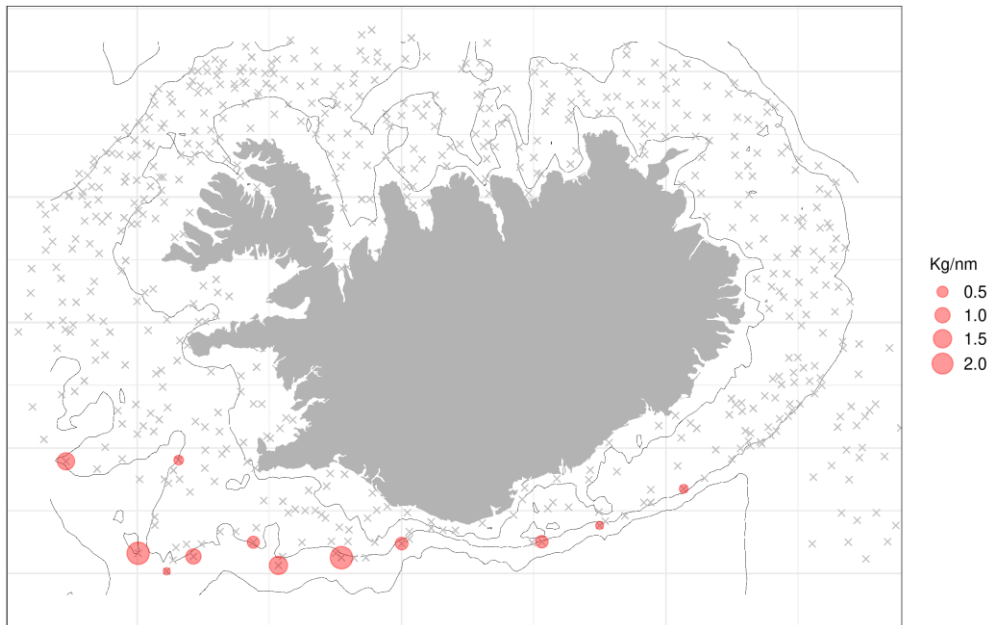
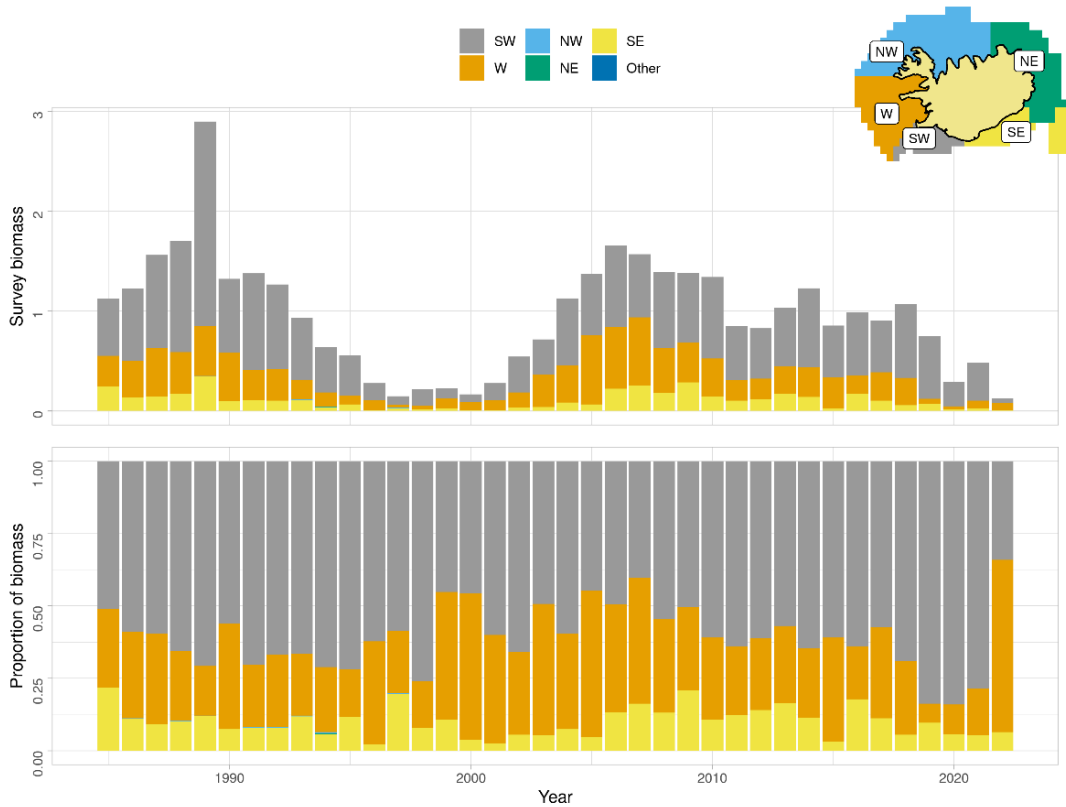
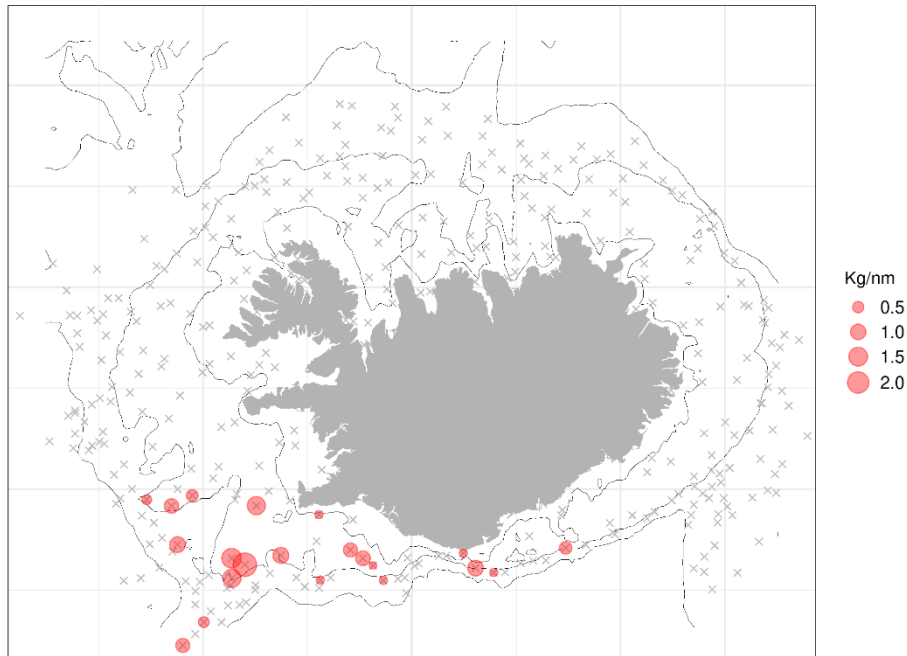


Figure 13. Megrim. Spatial distribution in the spring survey in 2022

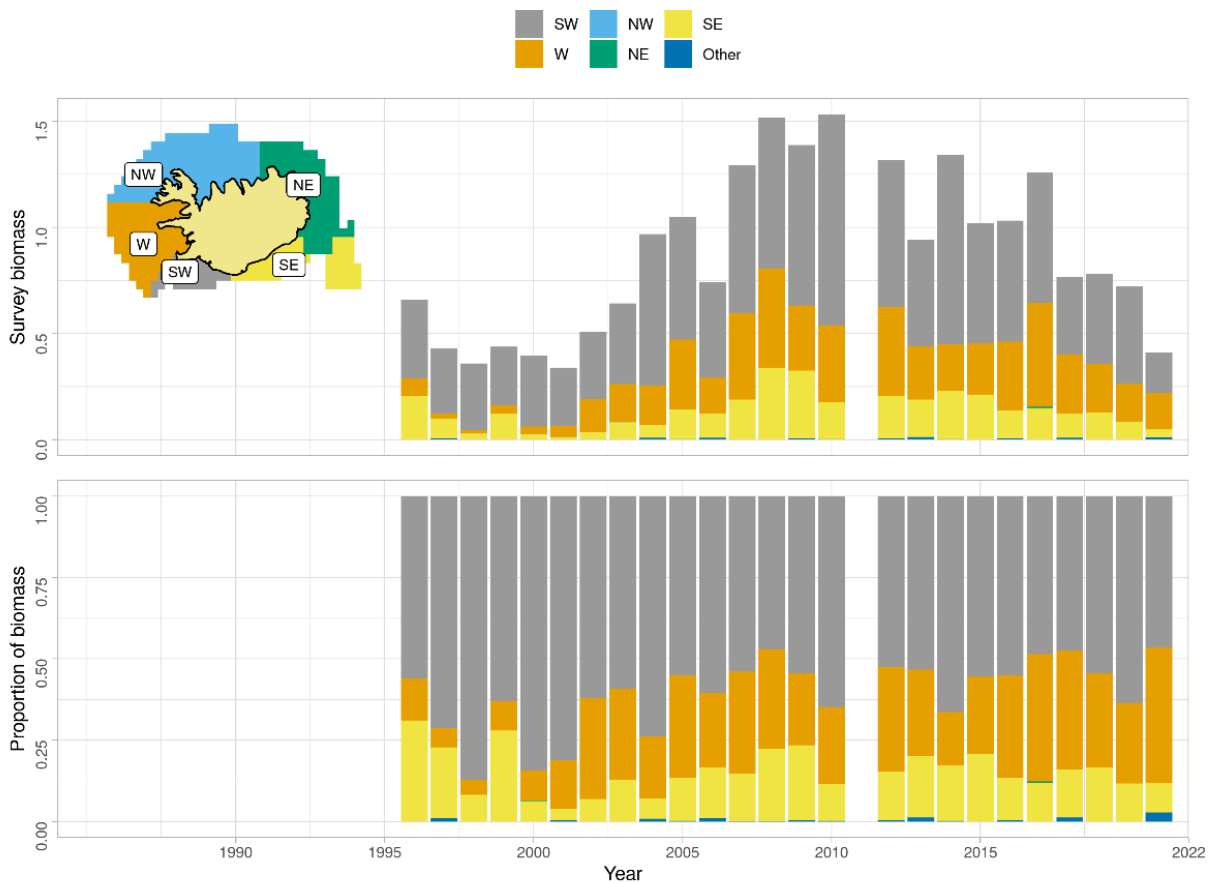


**Figure 14. Megrim. Spatial distribution of biomass indices from the spring survey.**

In the autumn survey of 2021, the general distribution was similar to the distribution in the spring survey (Figure 15). The same is true for the spatial distribution of megrim in the autumn survey since 1996 (Figure 16), where most of the biomass has been observed in the SW area, followed by the W and SE areas.



**Figure 15. Megrim. Spatial distribution of megrim in the autumn survey in 2021.**



**Figure 16. Megrim. Spatial distribution of biomass indices from the autumn survey.**

## MANAGEMENT

Megrim is caught as a bycatch and usually in small quantities. However, due to low recruitment for a prolonged time and substantial decline in survey biomass indices, the Marine and Freshwater Research Institute made a recommendation on TAC for megrim for the 2021/2022 fishing year.

**Table 3. Megrim. Recommended TAC, national TAC set by the Ministry, and landings (tonnes).**

<b><i>FISHING YEAR</i></b>	<b>REC. TAC</b>	<b>NATIONAL TAC</b>	<b>CATCH</b>
<b><i>2010/11</i></b>	-	-	270
<b><i>2011/12</i></b>	-	-	429
<b><i>2012/13</i></b>	-	-	380
<b><i>2013/14</i></b>	-	-	369
<b><i>2014/15</i></b>	-	-	429
<b><i>2015/16</i></b>	-	-	498
<b><i>2016/17</i></b>	-	-	467
<b><i>2017/18</i></b>	-	-	387
<b><i>2018/19</i></b>	-	-	341
<b><i>2019/20</i></b>	-	-	289
<b><i>2020/21</i></b>	-	-	194
<b><i>2021/22</i></b>	206	-	