

# ANGLERFISH - SKÖTUSELUR

## *Lophius piscatorius*

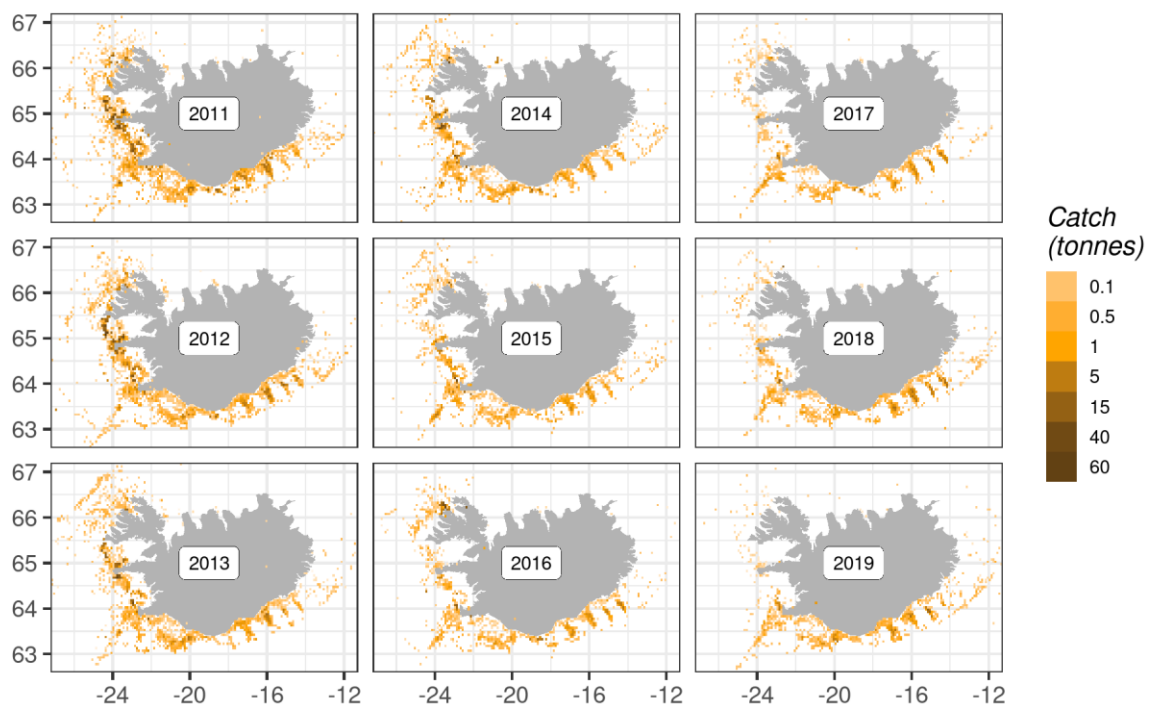
### GENERAL INFORMATION

Anglerfish (or monkfish) is a benthic "sit and wait" predator that is most abundant south and west of Iceland. It is found at depths ranging from 20 to 2800 meters, though most abundant between 50 and 250 meters.

Females grow larger than males with an average length of 72 cm compared with 60 cm for males according to measurements from Icelandic groundfish surveys. Females can reach a size of 130 cm while males larger than 80 cm are rare. Similarly, females become sexually mature around 80 cm and males around 61 cm.

The north-western edge of the anglerfish's habitable area is found in Icelandic waters, which renders it more sensitive to environmental changes than many other species in the area.

### THE FISHERY



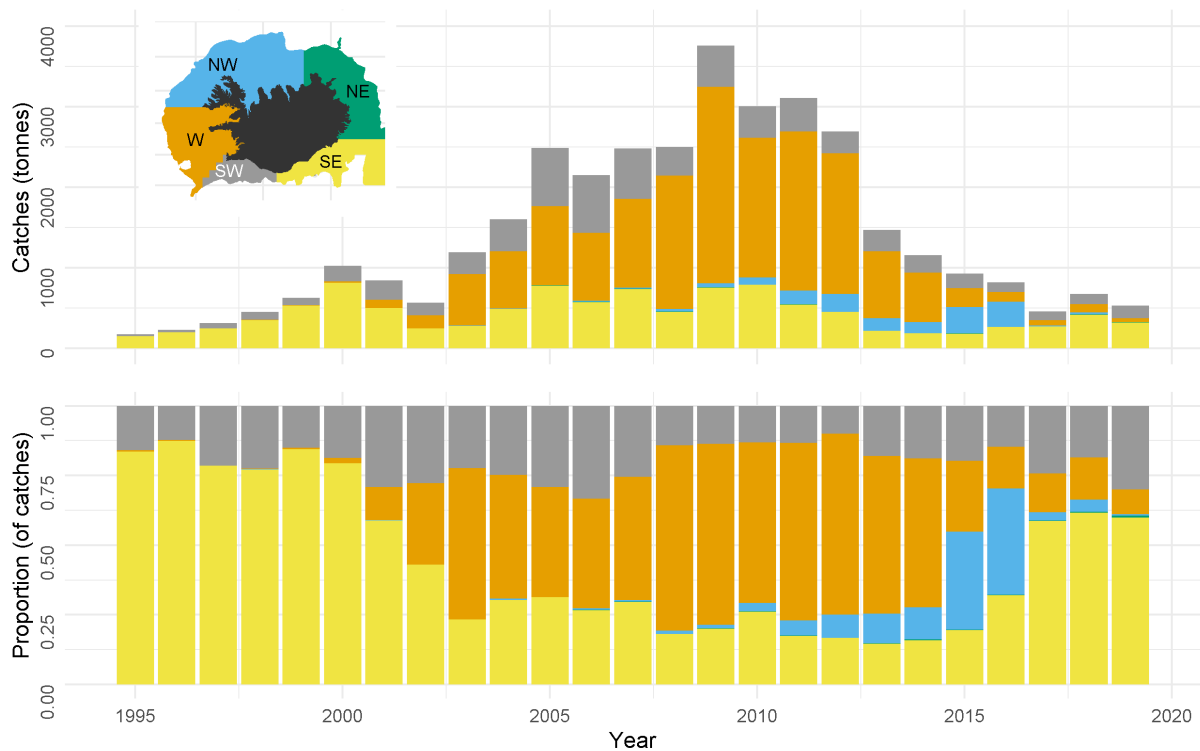
**Figure 1. Anglerfish. Geographic distribution of the Icelandic fishery 2011-2019 as reported in logbooks.**

*Mynd 1. Skötuselur. Útbreiðsla skötusels á Íslandsmiðum 2011-2019 samkvæmt aflagdagbókum.*

In 2017-2019, anglerfish was caught in the southeast, southwest, west and, to a small extent northwest of Iceland as reported in logbooks (Figure 1 and 2). From 1995-2000 captures were mostly in the southeast and southwest after which it was captured increasingly west and more recently northwest of Iceland (Figure 1-2).

On Icelandic fishing grounds, anglerfish is caught almost exclusively at depths less than 250 m (Figure 3) in anglerfish gillnets, bottom trawls and *Nephrops* trawls (Figure 4, Table 1). The number of boats reporting anglerfish catches peaked in 2007, with a total of 418 boats, but annual catch peaked in 2009 at 4069 t. Since then catches have declined annually amounting to 467 t in 2017 but increased to 643 t and 565 t in 2018 and 2019, respectively. A large reduction in catches between 2016 and 2017 can be explained by a reduction in the anglerfish gillnet fishery which accounted for 56% of the anglerfish fisheries in 2016 but only 19% in 2017, 16% in 2018 and 10% in 2019 (Table 1).

Geographic distribution has changed mostly in the form of more aggregated patches because of a large reduction in catches in the southeast, south, southwest, and west areas apart from a large increase in the northwest from 2010-2016. During the past two years, spatial distribution has started to resemble that of the period before the large increase started around 2003 (Figure 1).



**Figure 2. Anglerfish. Catch distribution and proportions by area 1995-2019 according to logbooks. All gears combined.**

*Mynd 2. Skötuselur. Afli eftir svæðum ásamt hlutfalli innan hvers svæðis 1995-2019 samkvæmt afladagbókum. Öll veiðarfæri samanlögð.*

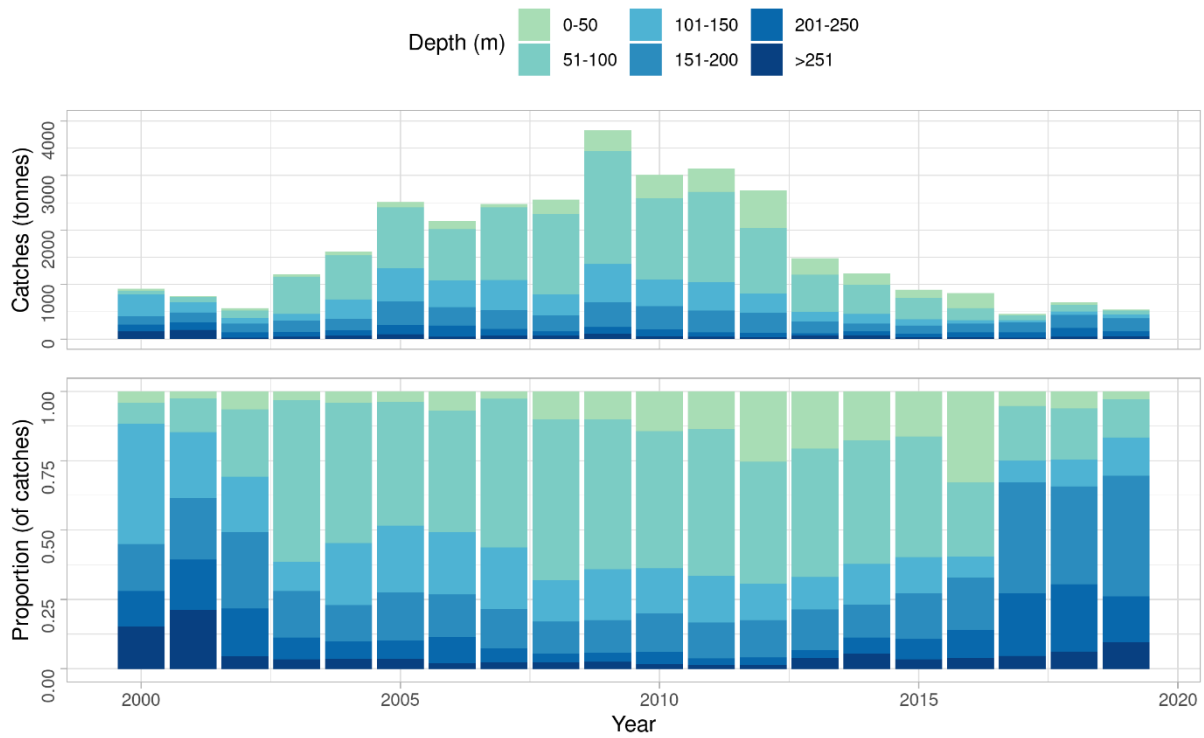


Figure 3. Anglerfish. Depth distribution of catches 2000-2019 according to logbooks.

Mynd 3. Skötuselur. Afli eftir dýpi 2000-2019 samkvæmt afladagbókum.

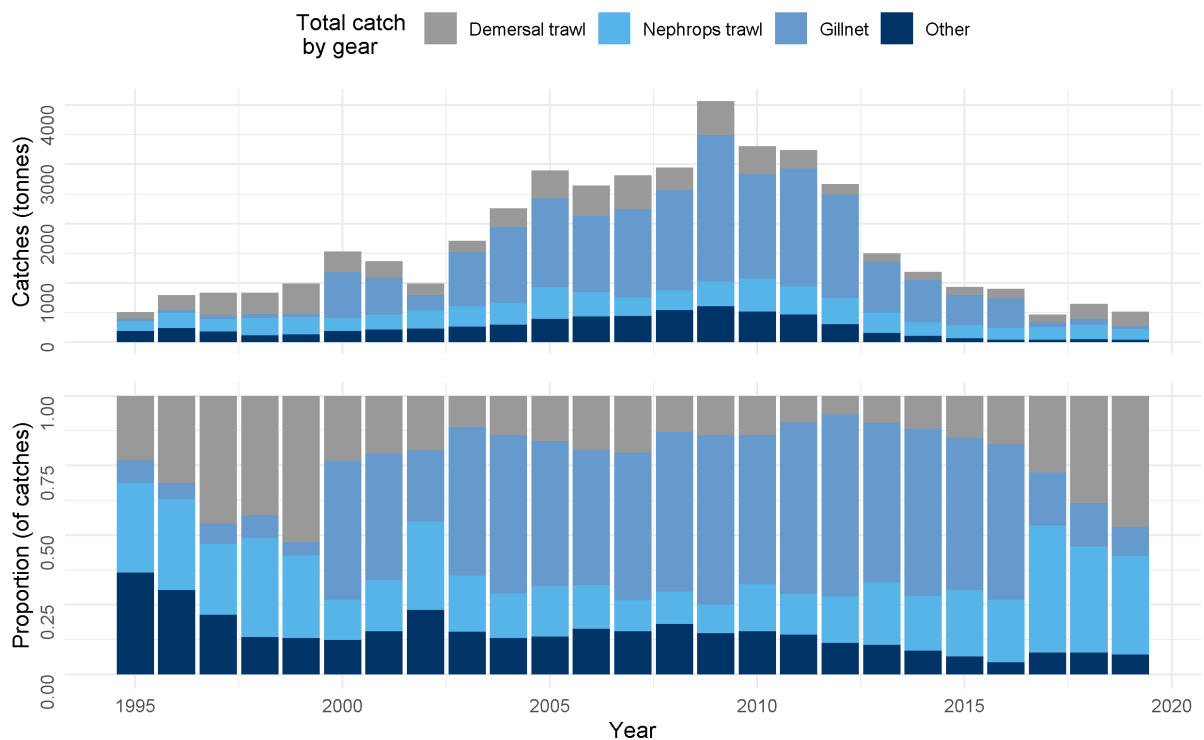


Figure 4. Anglerfish. Total catches (landings) by fishing gear 1995-2019 according to statistics from the Directorate of Fisheries.

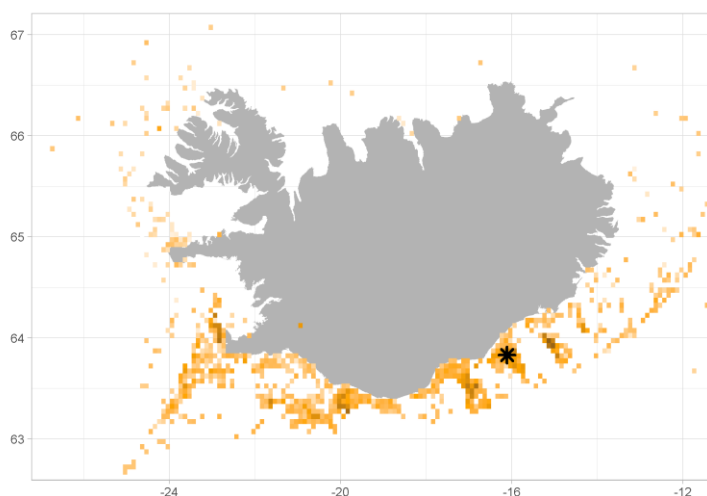
Mynd 4. Skötuselur. Landaður afli eftir veiðarfærum 1995-2019 samkvæmt aflaskráningarkerfi fiskistofu.

**Table 1. Anglerfish. Number of Icelandic vessels reporting captures of anglerfish, and landed catch divided by gear type.***Tafla 1. Skötuselur. Fjöldi íslenskra skipa sem landað hafa skötusel ásamt heildarafla og afla eftir veiðarfærum.*

YEAR	NUMBER OF VESSELS				CATCHES (TONNES)				
	Bottom trawl	Gillnets	Nephrops trawl	Other	Bottom trawl	Gillnets	Nephrops trawl	Other	Sum
2000	94	149	34	139	355	834	220	164	1573
2001	74	215	36	161	279	613	251	208	1351
2002	73	188	36	154	185	248	309	233	975
2003	74	167	37	180	184	875	341	279	1679
2004	76	158	29	181	307	1211	353	352	2223
2005	79	117	31	204	451	1488	514	390	2843
2006	72	95	28	222	488	1266	405	431	2590
2007	72	92	22	232	560	1484	310	437	2791
2008	63	80	22	226	381	1669	341	555	2946
2009	62	91	17	222	574	2397	419	679	4069
2010	62	132	18	207	452	1762	556	512	3282
2011	54	136	17	199	299	1989	475	465	3228
2012	54	124	18	184	175	1744	444	304	2667
2013	58	75	16	169	142	859	339	156	1496
2014	50	70	16	149	140	707	234	105	1186
2015	45	51	14	133	141	511	223	60	935
2016	50	40	12	120	156	501	200	37	894
2017	44	29	9	121	129	87	213	38	467
2018	47	31	9	96	248	100	244	51	643
2019	49	26	8	92	240	53	181	37	511

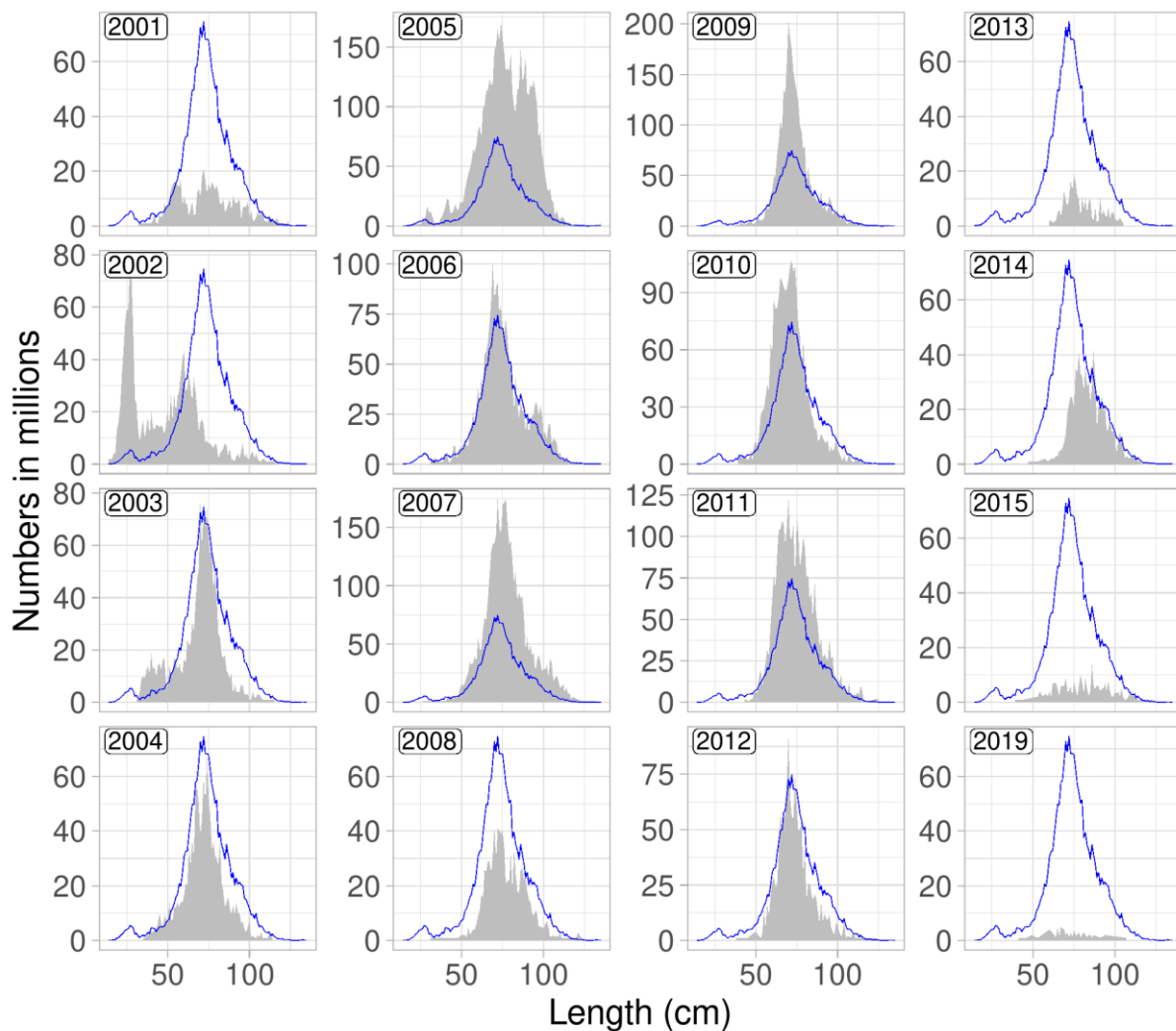
## LENGTH DISTRIBUTIONS FROM COMMERCIAL CATCHES

Recruitment can be observed from length distributions from 2001-2007 after which little recruitment was observed resulting in larger mean length (Figure 6).



**Figure 5. Anglerfish. Distribution of commercial catches 2019 and sampling location.**

*Mynd 5. Skötuselur. Veiðisvæði árið 2019 ásamt staðsetningu sýnatöku.*



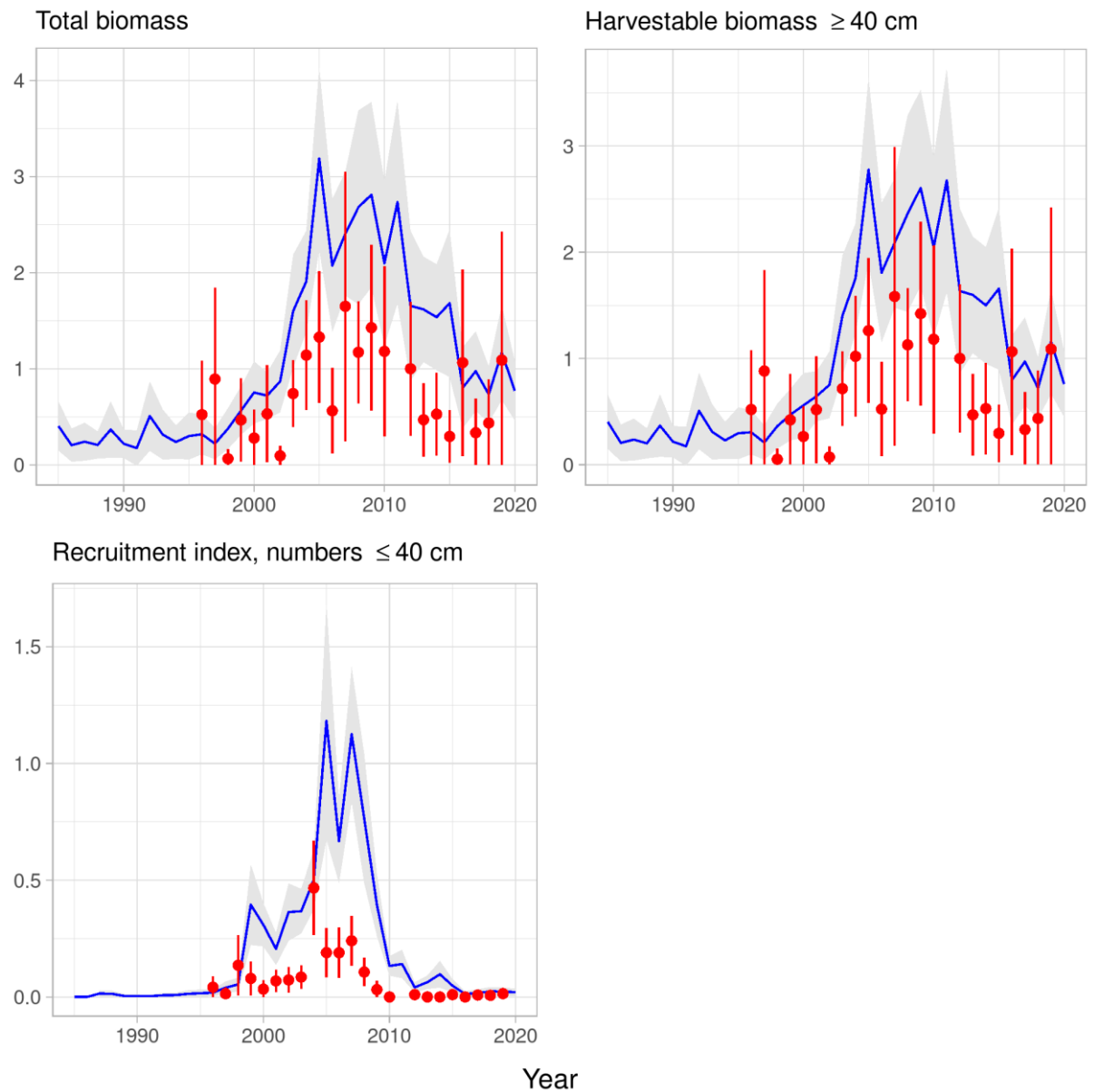
**Figure 6. Anglerfish. Relative length distribution from commercial catches 2001-2019 excluding 2016-2018 due to lack of data.**

*Mynd 6. Skötuselur. Hlutfallsleg lengdardreifing úr afla árin 2001-2019 fyrir utan 2016-2018 vegna skorts á gögnum.*

## SURVEY DATA

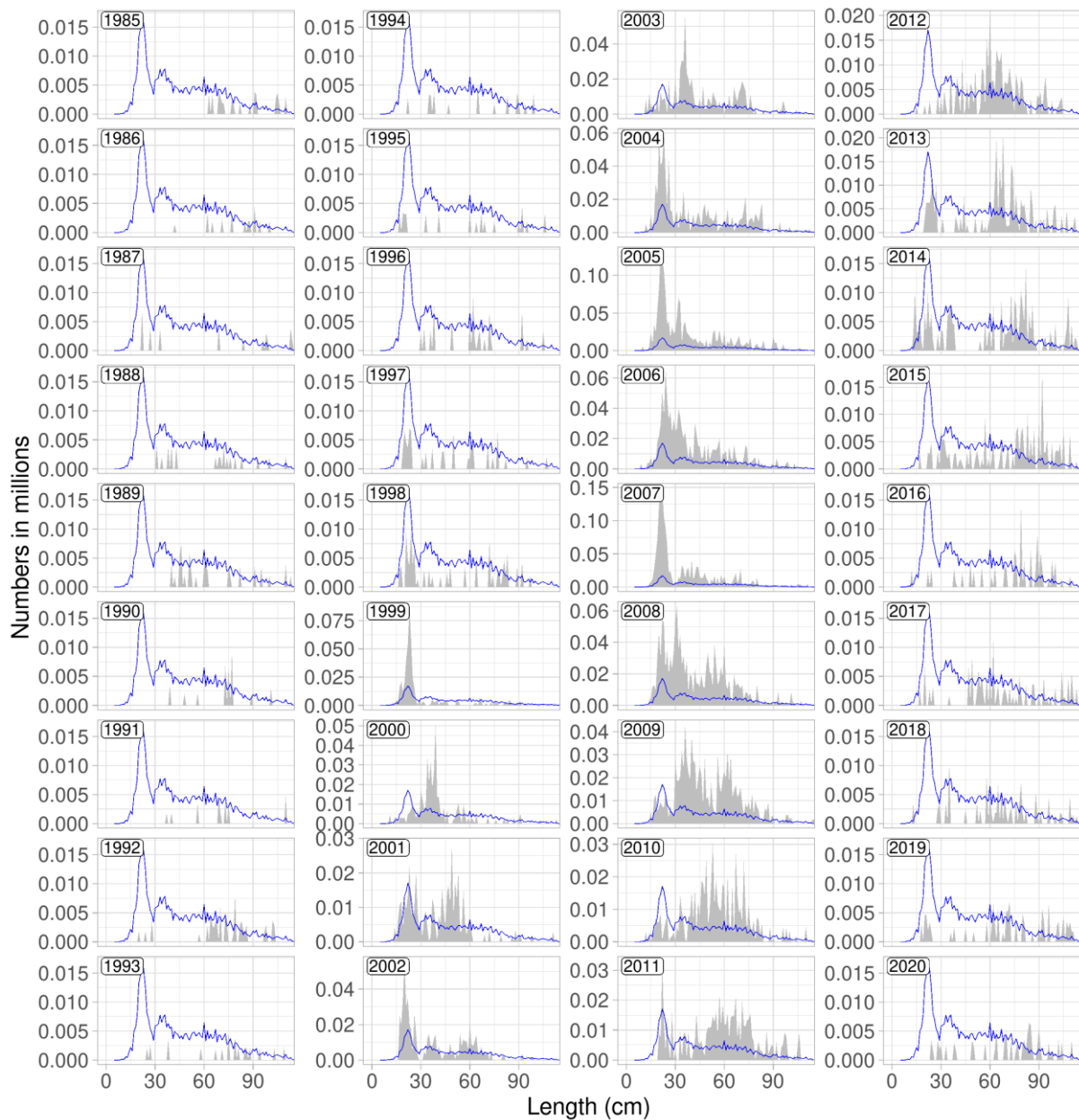
The annual Iceland spring groundfish survey (hereafter spring survey) has been conducted in March since 1985 and covers the whole Icelandic anglerfish distribution area. An additional autumn groundfish survey (hereafter autumn survey) has been conducted annually from 1996 but does not represent the anglerfish distribution and abundance as well as the spring survey. The autumn survey was conducted in 2011.

For the purpose of monitoring and advice, harvestable biomass and a juvenile index was estimated from the spring survey (Figure 7). The harvestable biomass index is calculated as total biomass of individuals 40 cm and larger. From 1998 to 2005 the biomass index increased rapidly and remained high until 2011, followed by a sharp decline in the next five years. Since 2016, the harvestable biomass index has remained at similar levels (Figure 7). The juvenile index estimated as abundance of one- and two-year-old individuals, where age is estimated from length distribution, shows a dramatic reduction in recruitment starting in 2008. This resulted in a change in relative length distribution towards larger individuals (Figure 8).



**Figure 7. Anglerfish, Total survey biomass index, harvestable biomass index ( $\geq 40$  cm) and juvenile abundance index ( $\leq 40$  cm). Blue lines indicate spring survey and red dots indicate autumn survey. Shaded areas and error bars indicate 95% CI.**

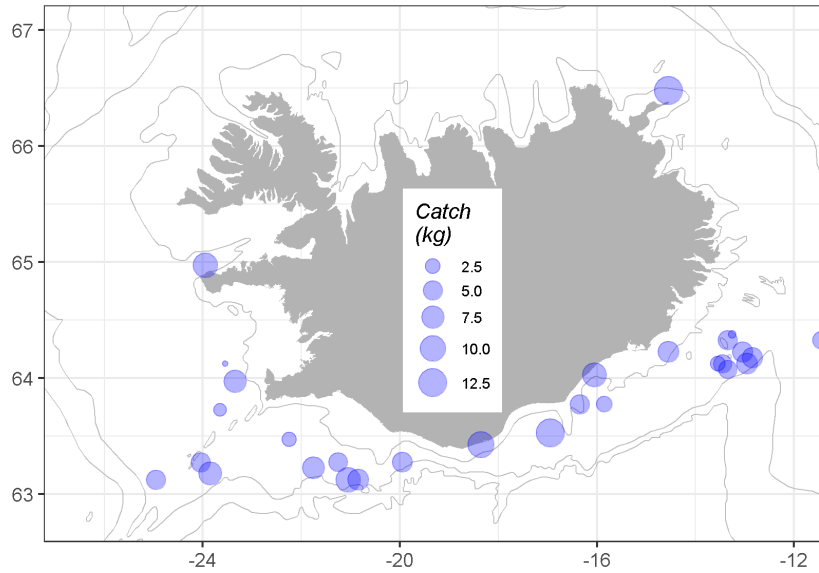
*Mynd 7. Skötuselur. Heildarlífsmassavísitala, lífmassavísitala veiðistofns ( $\geq 40$  cm) og nýliðunarvísitala (fjöldi  $\leq 40$  cm) ásamt 95% vikiörkum. Gögn úr stofnmælingum að vori (blátt) og hausti (rautt) .*



**Figure 8. Anglerfish. Length disaggregated abundance indices from the spring survey 1985-2020. The blue line shows the mean for all years. Note different scales on y-axes.**

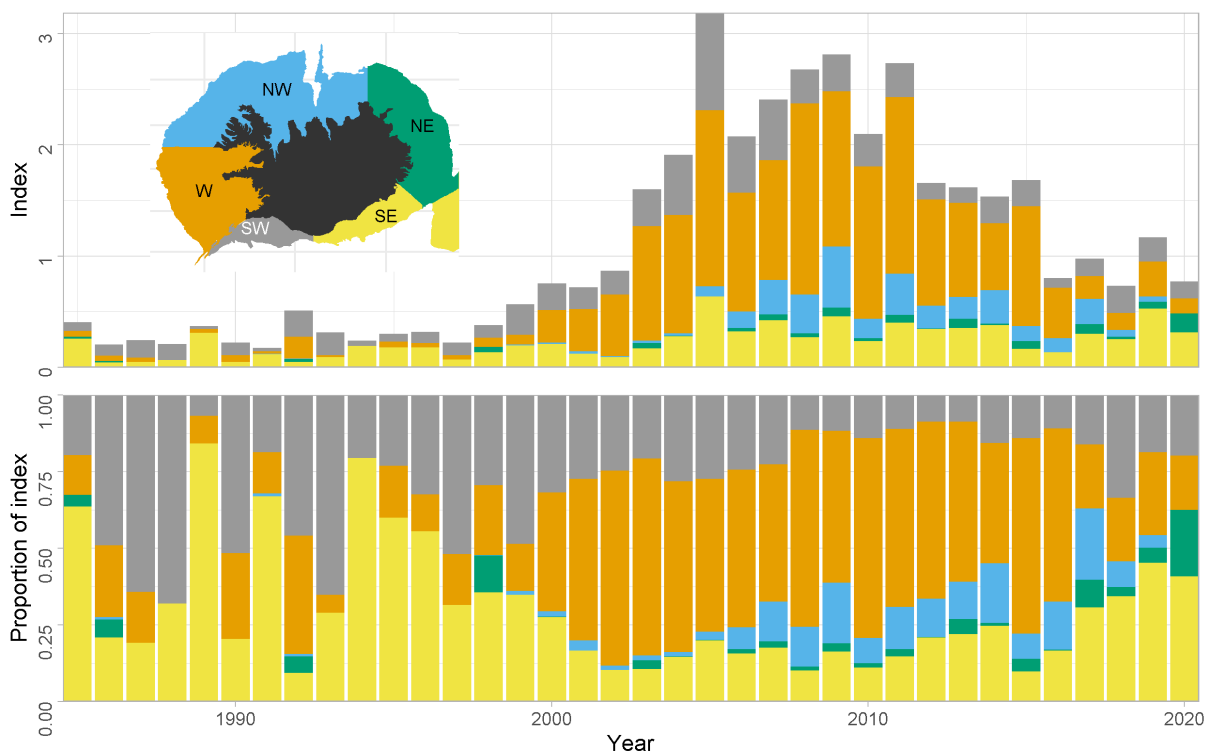
**Mynd 8. Skötuselur. Lengdarskiptar vísitölur úr stofnmælingu botnfiska að vori 1985-2020 ásamt meðaltali allra ára (blá lína). Athugið mismunandi skali á y-ás milli ára.**

Anglerfish is caught in the spring survey mainly to the southeast, southwest, and west of Iceland (Figures 9 and 10). The cold waters northeast and east of Iceland are almost completely void of anglerfish. Until 1999, anglerfish was caught almost exclusively south of Iceland after which it was captured in greater numbers in the west and northwest until 2016-2017. Since then, the relative abundance has decreased in the northwest and west (Figure 10).



**Figure 9. Anglerfish. Spatial distribution in the spring survey in 2020. Grey lines indicate depth of 100, 500 and 1000 meters.**

*Mynd 9. Skötuselur. Útbreiðsla í stofnmælingum botnfiska að vori árið 2020. Sýndar eru 100, 500 og 1000 metra dýptarlínur.*

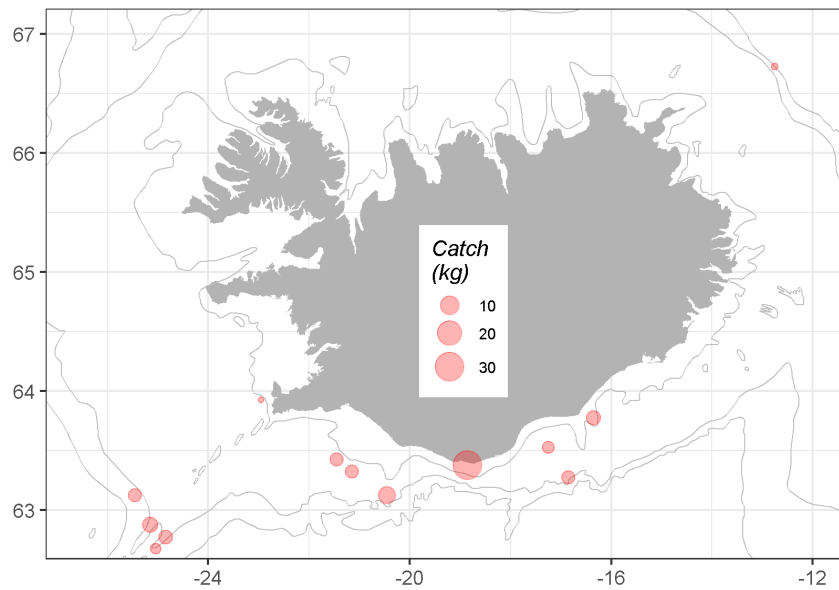


**Figure 10. Anglerfish. Spatial distribution of biomass index from the spring survey 1985-2020.**

*Mynd 10. Skötuselur. Dreifing lífmassavísitölu í stofnmælingum botnfiska að vori 1985-2020.*

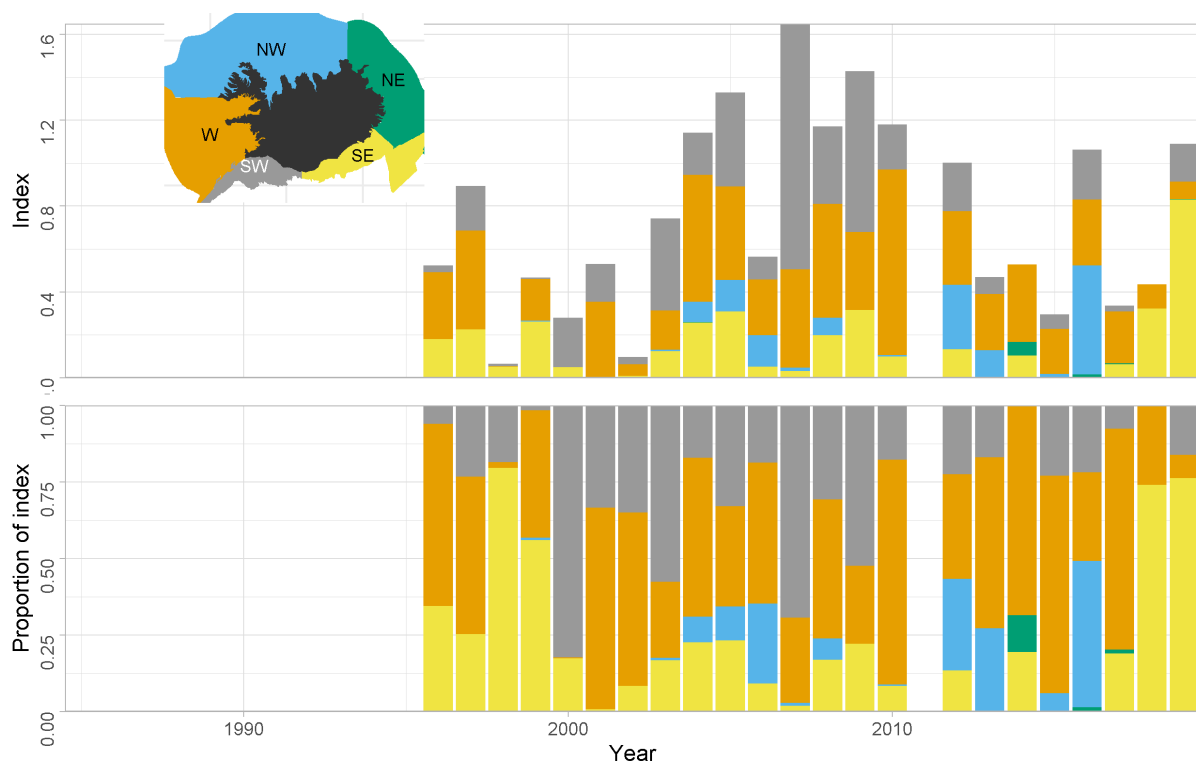


In the autumn survey anglerfish is mainly caught south of Iceland (Figures 11 and 12). Relative abundance in the NW area was usually high in 2005-2017, in accordance to the spring survey



**Figure 11. Anglerfish. Spatial distribution in the autumn survey 2019. Grey lines indicate depth of 100, 500 and 1000 meters.**

*Mynd 11. Skötuselur. Útbreiðsla í stofnmælingum botnfiska að hausti árið 2019. Sýndar eru 100, 500 og 1000 metra dýptarlínur.*



**Figure 12. Anglerfish. Spatial distribution of biomass index from the autumn survey 1996-2019. The survey was not conducted in 2011.**

*Mynd 12. Skötuselur. Dreifing lífmassavísitölu í stofnmælingum botnfiska að hausti 1996-2019. Ekki var farið í leiðangur 2011.*

## MANAGEMENT

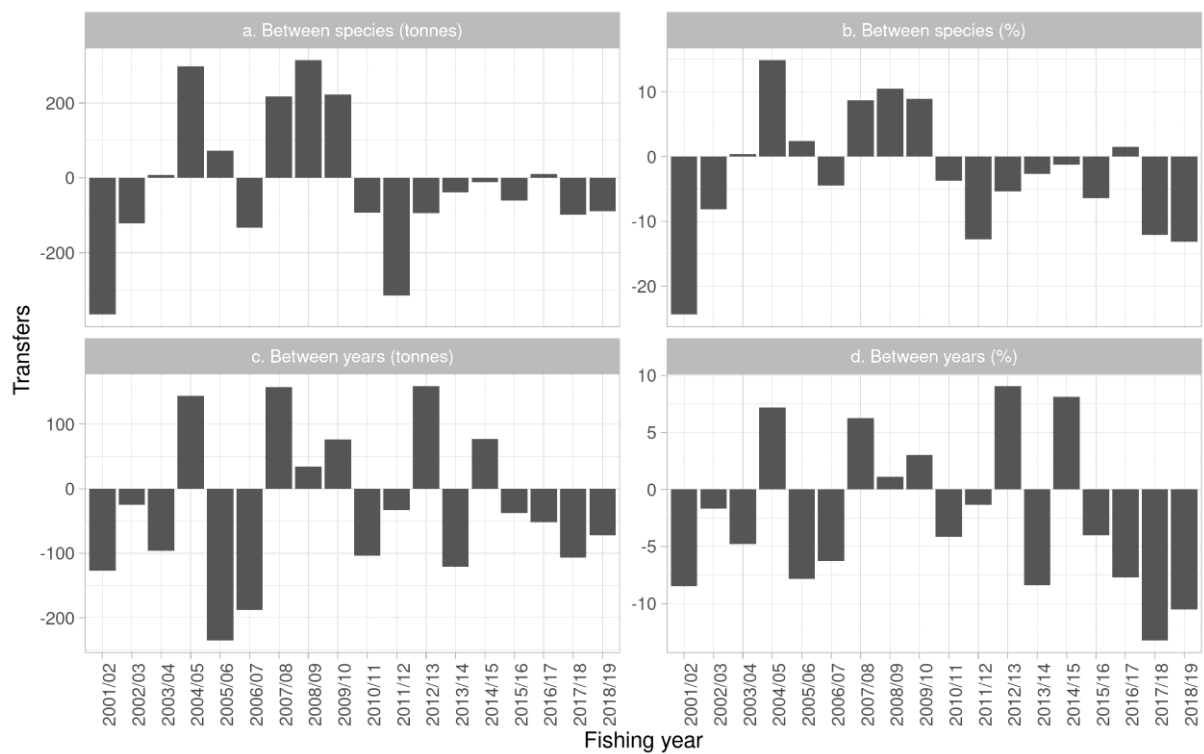
The Ministry of Industries and Innovation is responsible for management of the Icelandic fisheries and implementation of legislation. Anglerfish has been subject to TAC limitations from the 2001/2002 quota year. From the quota year 2003/2004 to 2012/2013, TAC limitations were set higher than recommended by the Marine Research Institute and, additionally, catches were sometimes higher than the TAC. Since 2015/2016 however, catches were 5-9% lower than the set TAC until 2017/2018 when they were 23% lower (Table 2).

Figure 12 shows the net transfer of quota to and from anglerfish in the Icelandic ITQ system. During years with high catches, quota from other species was transferred to anglerfish. Since the population started declining, anglerfish quota has been transferred to other species, which amounted to 12% in the 2017/2018 quota year. Transfer of anglerfish quota to the next fishing year has usually been under 12%.

**Table 2. Anglerfish. Recommended TAC, national TAC set by the Ministry, and landings (tonnes).**

*Tafla 2. Skötuselur. Tillögur Hafrannsóknastofnunar um hámarksafla, ákvörðun stjórnvalda um aflamark og landaður afli (tonn).*

FISHING YEAR	REC. TAC	NATIONAL TAC	CATCH
2001/02	-	1500	1001
2002/03	-	1500	1363
2003/04	1500	2000	1903
2004/05	1500	2000	2420
2005/06	2200	3000	2832
2006/07	2200	3000	2672
2007/08	2200	2500	2962
2008/09	2500	3000	3436
2009/10	2500	3200	3598
2010/11	2500	3000	3376
2011/12	2500	2850	3006
2012/13	1500	1800	1930
2013/14	1500	1500	1398
2014/15	1000	1000	1080
2015/16	1000	1000	913
2016/17	711	711	677
2017/18	853	853	653
2018/19	722	722	565
2019/20	441	441	
2020/21	503		



**Figure 13. Anglerfish. Net transfers of quota in the Icelandic ITQ system by quota year. Between species (upper):** Positive values indicate a net transfer of other species' quota to anglerfish, but negative values indicate a net transfer of anglerfish quota to other species. **Between years (lower):** Net transfer of quota in a given quota year.

*Mynd 13. Skötuselur. Nettó tilfærsla á kvóta eftir fiskveiðiárum. Tilfærsla milli tegunda (efri myndir): Jákvæð gildi tákna tilfærslu á kvóta annarra tegunda yfir á skötusel en neikvæð gildi tilfærslu skötuselskvóta á aðrar tegundir. Tilfærsla milli ára (neðri myndir): Nettó tilfærsla kvóta á viðkomandi fiskveiðiári.*