

SHRIMP IN ÍSAFJARÐARDJÚP – RÆKJA Í ÍSAFJARÐARDJÚPI

Pandalus borealis

THE FISHERY

Shrimp fishing started in Ísafjarðardjúp in the 1930's. The catch fluctuated between 1000 and 3100 tonnes between 1978 and 2002. No fishing was allowed in 2003-2010 due to low biomass indices, but since 2011 annual catches have been between 300 and 1100 tonnes (Figure 1). CPUE fluctuated without a trend between 1978 and 2003. However, since 2011 CPUE has been higher compared with the years before the closure, mainly due to increased density of shrimp within the innermost part of the fjord.

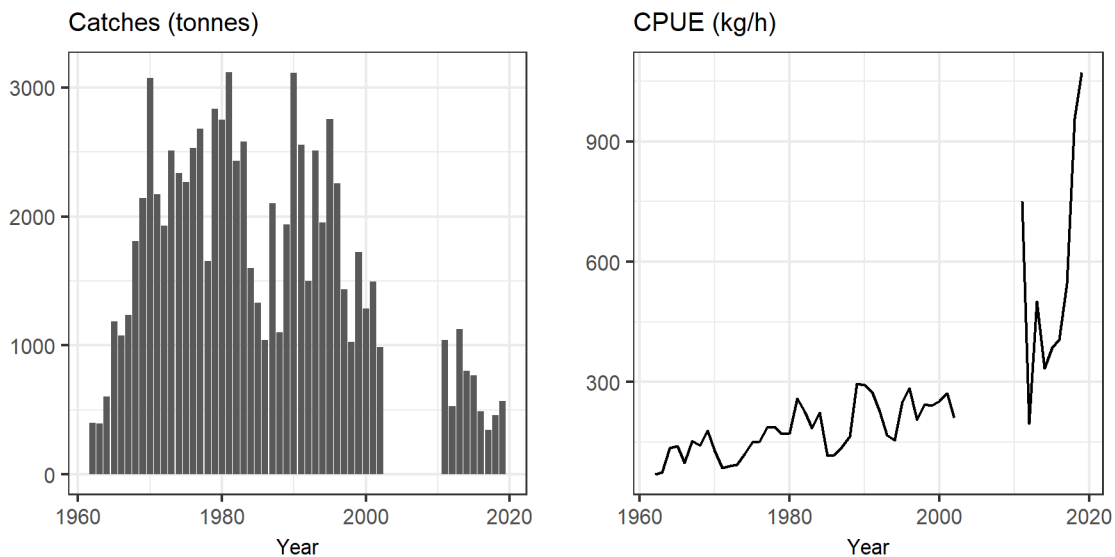


Figure 1. Shrimp in Ísafjarðardjúp. Total catch and catch per unit effort.

Mynd 1. Rækja í Ísafjarðardjúpi. Heildarafli og afli á sóknareiningu.

The distribution of the fishery has varied over time (Figure 2). From 2012-2017, there have been two main fishing areas; at the innermost part of the fjord and the outermost part. In 2018 and 2019, most of the catch was caught at the innermost part of the fjord.

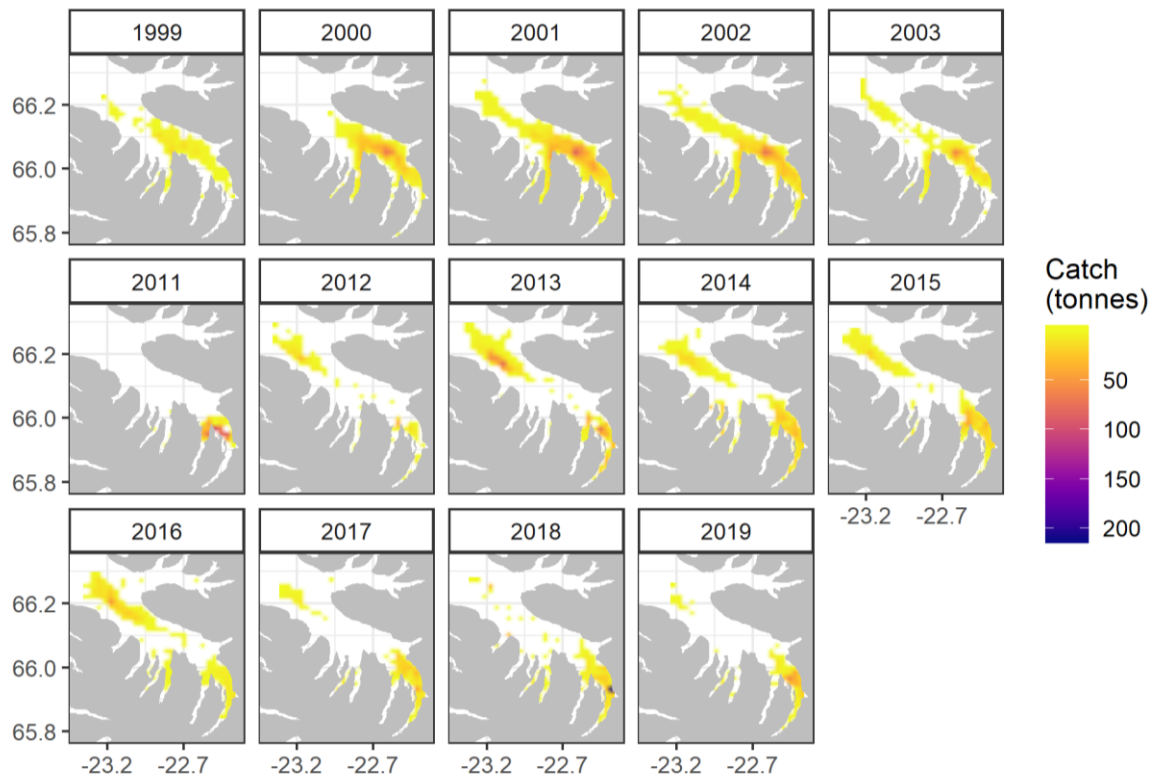


Figure 2. Shrimp in Ísafjarðardjúp. Distribution of shrimp catch.

Mynd 2. Rækja í Ísafjarðardjúpi. Dreifing rækjuaflla.

SURVEY DATA

The annual Icelandic shrimp survey has been conducted in the autumn since 1988 in Ísafjarðardjúp. The 2020 survey was conducted on 28 Sept - 4 October 2020 and included 28 fixed and 12 random stations at depths of 36-128 m. Information on sampling procedure can be found in the report 'Northern shrimp research in Icelandic waters, 1988-2015' (Jónsdóttir et al. 2017).

From 1988, shrimp was found within the inner part of the fjord as well as in Jökulfirðir. Following the decrease in the biomass index, the distributional area of shrimp decreased (Figure 3). Since 2011, shrimp has been found within a small area at the innermost part of the fjord and in less density at the outermost part of the fjord.

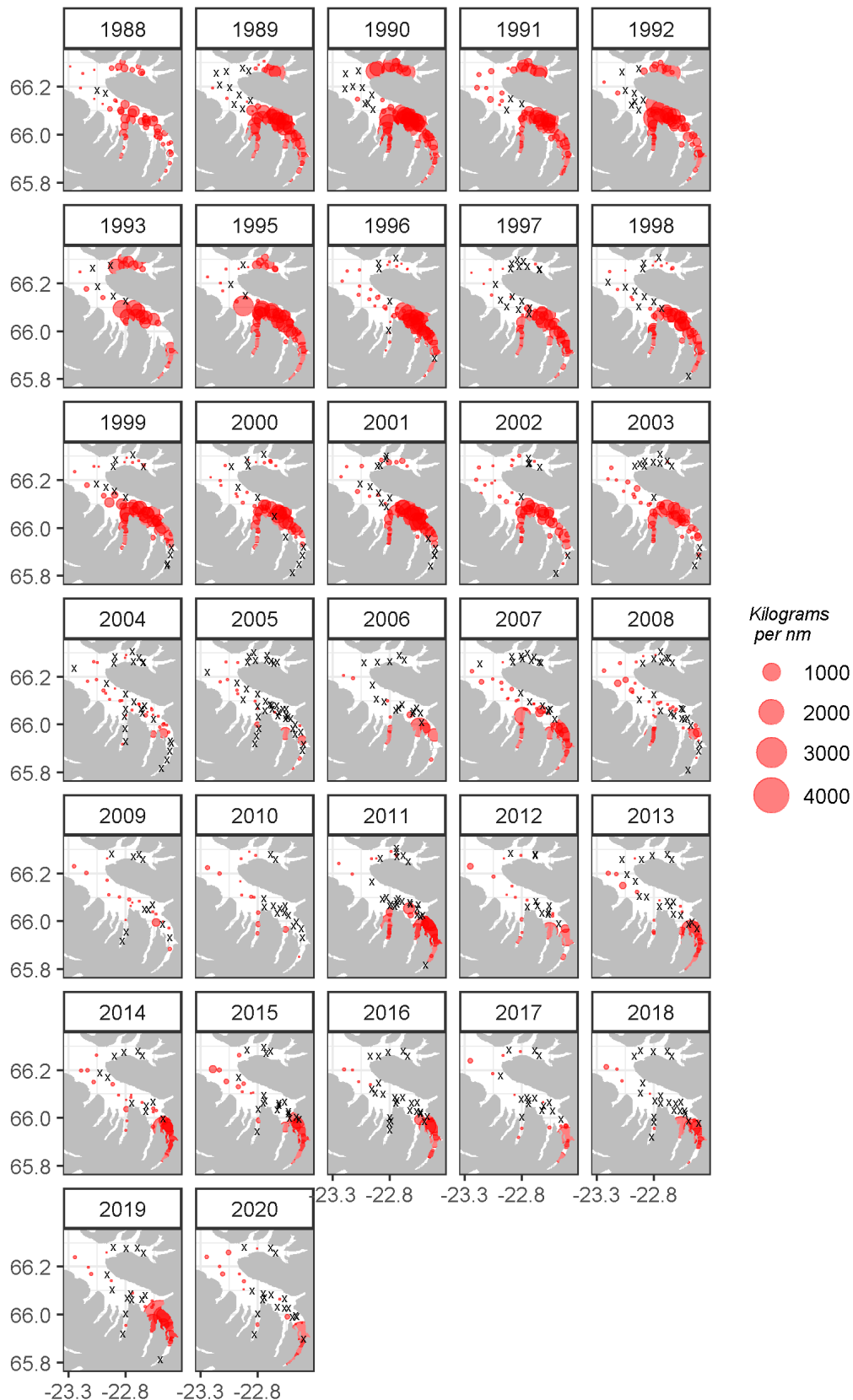


Figure 3. Shrimp in Ísafjarðardjúp. Distribution and abundance of shrimp in the annual shrimp survey. X denotes stations where no northern shrimp was found.

Mynd 3. Rækja í Ísafjarðardjúpi. Útbreiðsla og magn rækju í stofnmælingu. x sýnir stöðvar þar sem engin rækja fékkst.

INDICES

Four indices are used to assess the state of the stock: total biomass, fishable biomass, female biomass and juvenile biomass. Juveniles include all individuals equal to and below 13 mm carapace length while the fishable biomass index includes all individuals equal to and above 15.5 mm carapace length. Individuals between 13 and 15.5 mm carapace length are divided between the juvenile and fishable biomass indices. The female biomass includes all females.

All the indices, except the juvenile index, gradually decreased from 1990 to 2004 when they were at historically low levels (Figure 4). In 2011, the indices increased and fluctuated for three years. Since 2013 the indices have decreased but have been relatively stable from 2018 to 2020 and the fishable index was above the reference level where the state of the stock is considered critical. The fishable index value of 20% of the mean of the three highest indices (I_{lim}) is used as a proxy for B_{lim} .

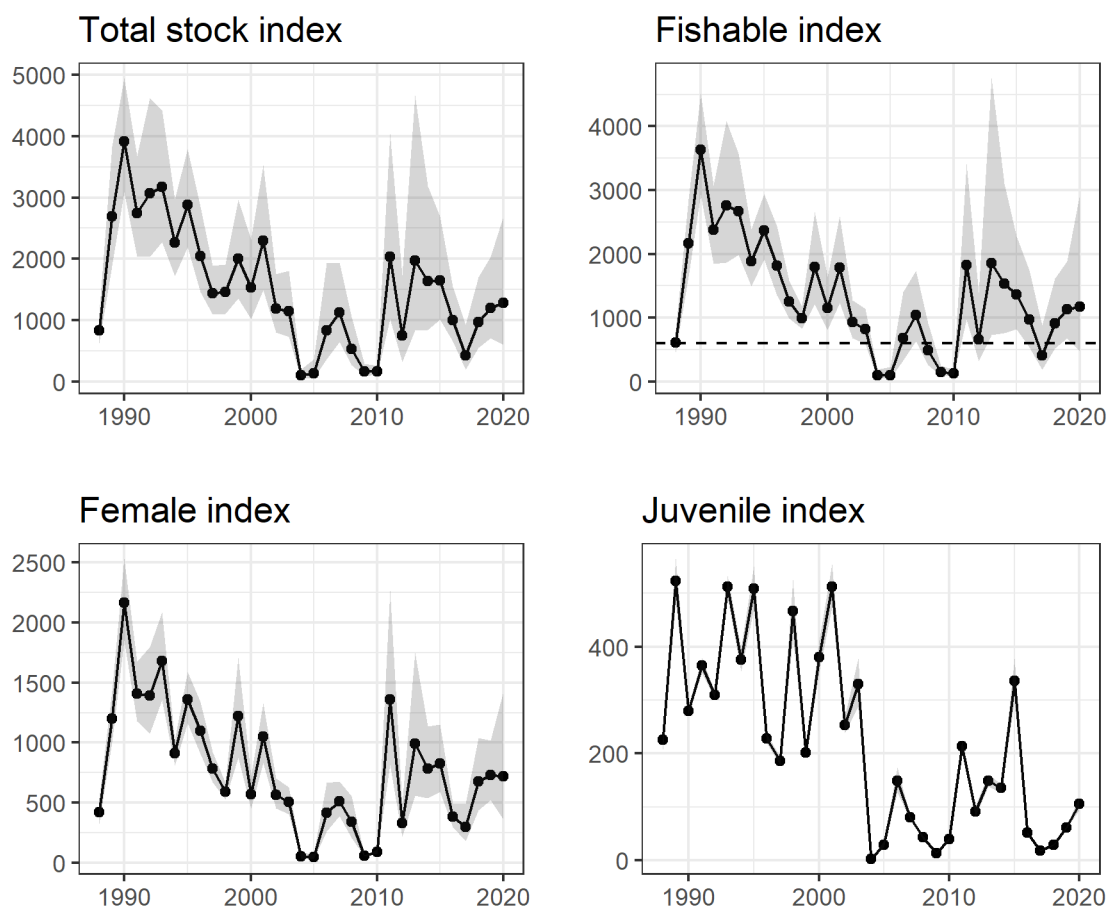


Figure 4. Shrimp in Ísafjarðardjúp. Stock biomass index, fishable biomass index, female biomass index and juvenile biomass index of shrimp. The horizontal line indicates a value where the state of the stock is considered to be critical (20% of the mean of the three highest indices).

Mynd 4. Rækja í Ísafjarðardjúpi. Heildarstofnsvísitala, veiðistofnsvísitala, kvendýravísitala og vísitala ungrækju. Lárétt lína sýnir viðmiðunargildi fyrir ástand stofnsins (20% af meðaltali þriggja hæstu vísitalna).

ABUNDANCE OF COD AND HADDOCK

0-group cod and haddock indices have fluctuated throughout the study period. The number of 0-group cod and haddock was low in 2020 (Figure 6). Cod abundance fluctuated between 1994 and 2010. In 2011 it increased and was in general at higher levels compared with before 2011. Cod abundance was low in 2020. Haddock abundance index increased steadily in 1995-2005 and has since then fluctuated at higher levels (Figure 6). In 2020, haddock abundance was the highest observed in the study period.

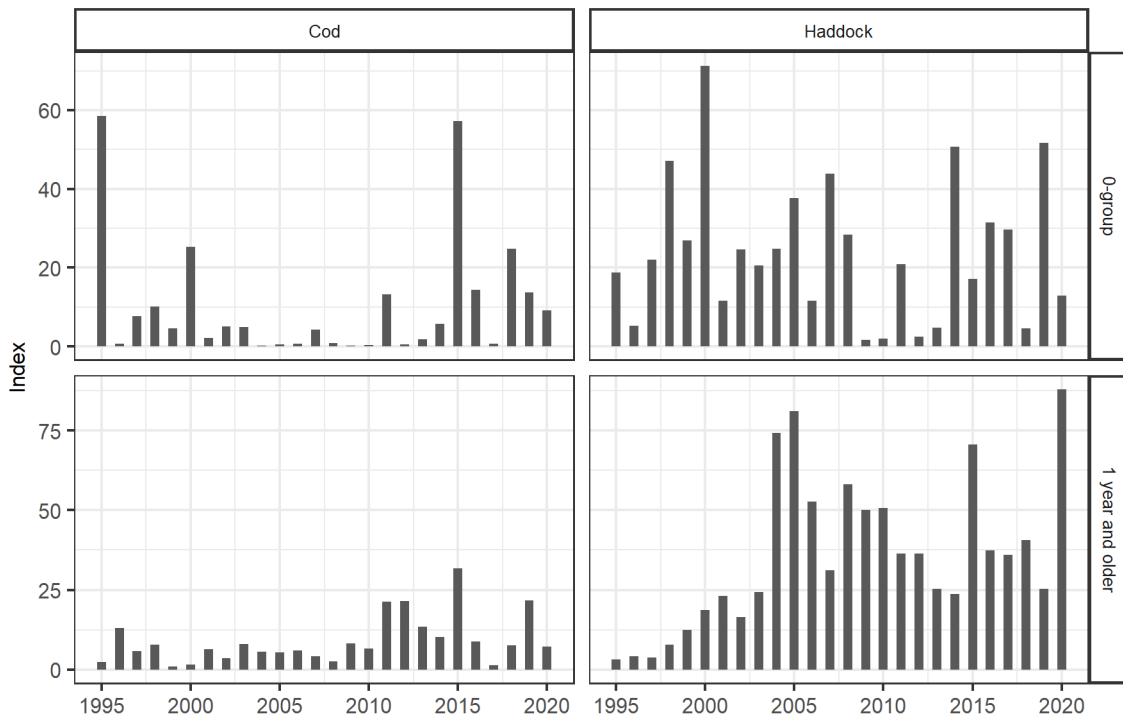


Figure 6. Cod and haddock in Ísafjarðardjúp. Abundance indices of cod and haddock in the annual shrimp survey.

Mynd 6. Þorskur og ýsa í Ísafjarðardjúpi. Vísitala þorsks og ýsu í stofnmælingu rækju.

MANAGEMENT

The Ministry of Industries and Innovation is responsible for management of all marine fisheries in Iceland and implementation of legislation. The quota year has been from early winter (following the survey in October) until 30 April but was in 2017 changed to 31 August.

Table 1. Shrimp in Ísafjarðardjúp. Fishable biomass index, state of the stock (relative to the mean of the three highest indices), advice, catch (tonnes in fishing year) and F_{proxy} .

Tafla 1. Rækja í Ísafjarðardjúpi. Veidistofnsvísitala, ástand stofns (vísitala miðað við meðaltal þriggja hæstu vísitölu gilda), ráðgjöf, afli og vísitala veiðihlutfalls (F_{proxy}).

Year	Biomass index	Relative state	Rec. TAC	National TAC	Catch	F_{proxy}
1988/89	607	0.20				1.81
1989/90	2169	0.70				0.89
1990/91	3636	1.17	3000	3000	3309	0.86
1991/92	2377	0.76	2500	2500	2554	1.07
1992/93	2759	0.89	2500	2500	2501	0.91
1993/94	2663	0.86	2500	2500	2511	0.94
1994/95	1885	0.61	2100	2100	1955	1.04
1995/96	2370	0.76	2700	2700	2756	1.16
1996/97	1814	0.58	2300	2300	2254	1.25
1997/98	1249	0.40	1450	1450	1435	1.15
1998/99	988	0.32	1000	1000	1025	1.04
1999/00	1799	0.58	1800	1800	1722	0.96
2000/01	1153	0.37	1200	1200	1287	1.11
2001/02	1782	0.57	1500	1500	1497	0.87
2002/03	931	0.30	1000	1000	989	1.07
2003/04	819	0.26	0	0	0	-
2004/05	94	0.03	0	0	0	-
2005/06	100	0.03	0	0	3	-
2006/07	680	0.22	0	0	3	-
2007/08	1044	0.34	0	0	9	-
2008/09	489	0.16	0	0	2	-
2009/10	151	0.05	0	0	1	-
2010/11	129	0.04	0	0	0	-
2011/12	1823	0.59	1000	1000	1040	0.57
2012/13	663	0.21	500*	500	527	0.79
2013/14	1858	0.59	1100*	1100	1128	0.61
2014/15	1532	0.48	750	750	801	0.52
2015/16	1365	0.42	700	700	767	0.56
2016/17	967	0.31	484	484	491	0.51
2017/18	404	0.13	322*	322	343	0.85
2018/19	912	0.30	456	456	459	0.50
2019/20	1135	0.38	568	565	570	0.50
2020/21	1171	0.39				

* Recommended TAC re-evaluated after a survey in February.