

12 Capelin in the Iceland-East Greenland-Jan Mayen Area

12.1 Stock description and management units

See stock annex.

12.2 Fishery independent abundance surveys

The capelin stock in Iceland-East Greenland-Jan Mayen area has been assessed by acoustics annually since 1978. The surveys have been conducted in autumn (September–December) and in winter (January–February). An overview is given in the stock annex.

12.2.1 Autumn survey during September and October 2020

The survey was conducted with the aim of assessing both the immature and the maturing part of the stock. Since 2010, the autumn surveys have started in September, a month earlier than in previous years because of difficulties in covering the stock due to drift ice and weather during later months. The survey was conducted on the research vessels Arni Fridriksson (14 September–5 October) and Eros (7–26 September).

The survey area was on and along the shelf edge off East Greenland from about 63°30'N towards about 73°20' N, also covering the Denmark Strait and the slope off west, north and east Iceland. The Iceland Sea, Kolbeinsey ridge and Greenland basin were also surveyed but with less transect density (Bardarson *et al.*, 2020). Survey tracks are shown on Figure 12.2.1.

Eros departed from Helgúvík harbour on 7 September and sailed westwards over Irminger Sea to start surveying from the southwest end of the survey area. Eros followed preset transects covering the Greenlandic shelf areas until Tasilaq region. There, the plan was to survey Angmaksalik fjord towards Kungmiut but was aborted due to weather and ice conditions. Hence, Eros continued covering the East-Greenland shelf areas to northeast. The morning of 16 September, Eros sailed to Helgúvík harbour for personnel change on 17 September. Eros was back on the research area on 18 September and surveyed, in collaboration with Arni, the preset transects in Denmark Strait until finishing his last transect early on 25 September and arriving to Helgúvík harbour on 26 September. Eros was held up for more than 2 days due to bad weather and also delayed by changing the order of transects in 3 cases to have better conditions to do hydrography and zooplankton transects.

Arni departed from Hafnarfjörður harbour on 14 September and sailed north of Iceland towards the shelf edge northeast off Langanes. From there Arni followed transects westwards covering the shelf edges north of Iceland towards Denmark Strait. Arni mainly covered the northeastern Denmark Strait in coordination with Eros which covered the remaining southeast Denmark Strait. Drift ice was distributed along the Greenlandic coast and extending into the northeast Denmark Strait. The ice hindered the coverage of Arni having to shorten transects of up to 30 nmi towards the Greenlandic coast. Then, Arni followed preset transects perpendicular to the East Greenlandic shelf edge until reaching the area east of Scoresby. There, a trial was made to launch acoustic probe (Simrad WBT-Tube) intended for estimation of acoustic properties of capelin, but the associated optical cable winch broke down and the operation was cancelled. Also, the retrieval of an oceanographic mooring in the proximity of Scoresby for the Greenland Institute of

Natural Resources (GINR) had to be aborted due to drift ice. In the region north of Scoresby drift ice obstructed the coverage severely and winds slowed the progress. Hence, Arni changed from the preset transects towards zik-zak stragedy northeastwards along the ice edge. East of Kong Oscar Fjord, the vessel had to leave the shelf area due to heavy northern winds and seek calmer seas further east where the vessel managed to survey further northwards to 73°20'N and then return to the shelf areas off Kong Oscar Fjord as weather was getting calmer. From there Arni crossed the West Jan-Mayen Ridge and followed the Kolbeinsey Ridge southwards. In the end Arni scouted along the shelf edges east of Iceland and arrived to Hafnarfjordur harbour the 5 October.

Maturing capelin was mainly observed along the East Greenlandic continental shelf and shelf edges in Denmark Strait and the Scoresby Sund areas, but was absent in explorable areas north of Kong Oscar fjord. In Denmark Strait maturing capelin was mixed with immature capelin, but mainly maturing capelin was found further north. No capelin was found by West Jan Mayen ridge or Kolbeinsey ridge. In general, there were no signs of any important quantities of capelin east of Kolbeinsey ridge. Juveniles (0-group) of various species, including 3 capelin (although not quantified) were observed along the continental shelf north of Iceland. Immature capelin was found along the Greenlandic shelf, dominating in southwestern part of the survey area and western Denmark Strait. High abundances of immature capelin were found in the proximities of Angmagssalik fjord and Kangerdlugssuaq fjord. The distribution of capelin was westerly as in recent years. Figure 12.2.2 shows the distribution and relative density of the capelin during the survey.

The total number of capelin amounted to 162 billion whereof the 1-group was about 140.6 billion. The total estimate of 2 group capelin was about 20 billion. The total biomass estimate was 1078 000 tonnes of which about 406 000 tonnes were 2 years and older. About 0.6 % in numbers of the 1-group was estimated to be maturing to spawn, about 67.5 % of the 2-year-old and 99.1 % of the 3-year-old capelin appeared to be maturing. This gives about 344 000 tonnes of maturing 1–4 year old capelin. Tables 1–6 give the age disaggregate biomass, numbers and weights of the capelin stock components. High estimate of numbers immature is under further scrutiny with multi-frequency acoustic methods.

Tables 12.2.2 and 12.2.3 show the historic time series of abundance and mean weights by age and maturity in autumn. On the basis of the estimate of the maturing part of the stock the Marine and Freshwater Research Institute recommended no fishery (intermediate TAC of 0 tonnes) for the fishing season 2020/2021 (Anon, 2020). This recommendation was in accordance with existing HCR and management plan between Iceland, Norway and Greenland.

12.2.2 Surveys in winter 2020/2021

Winter surveys were conducted in December–February resulting in 4 separate coverages of stock components. The main objective of the winter surveys was to assess the maturing part of the stock with coverages designed for acoustic stock assessment. This was a coordinated collaboration of several research and fishing vessels where each coverage was based on combined acoustic and trawl data from 2–5 vessels assisted by up to 3 scouting vessels. Scientists from MFRI were on board each vessel performing acoustic stock estimates and all assessments were based on acoustic data from calibrated echosounders.

12.2.2.1 Winter surveys 1. Coverage in 6–11 December 2020

The acoustic measurements were conducted by the fishing vessels Asgrimur Halldorsson, Jona Edvalds, Kap and Iivid with 3 scientists from the Marine and Freshwater Research Institute onboard each vessel.

The survey area was on and along the shelf edge from Víkurall northwest of Iceland to Vopnafjardargrunn east of Iceland (Figure 12.2.3). Three vessels, Asgrímur Halldorsson, Jóna Edvalds and Kap, started their transects in the proximity of Kolbeinsey-ridge while Iivíð started at the western part of the survey area progressing from west to east towards the coverage of Kap. In the beginning, the echosounders of Asgrímur Halldorsson and Jóna Edvalds were calibrated in Eskifjörður, while Iivíð was calibrated in Hvalfjörður, but Kap had previously been calibrated in March. The vessels managed to cover the planned survey area except for considerably hindered coverage in Denmark Strait due to sea ice.

Immature capelin dominated in the western most part of the survey region while mature capelin was found further east in the Denmark Strait (in the proximity of the sea ice edge). Mixtures of immature and mature capelin were found between Denmark Strait and Kolbeinsey-ridge. Further to the east, in the proximity of Kolbeinsey-ridge, mature capelin dominated. Total SSB was estimated 487 000 tonnes but due to restricted coverage because of sea ice in the Denmark Strait, this could be an underestimate.

12.2.2.2 Winter surveys 2. Coverage in 4–9 January 2021

The acoustic measurements were conducted by the research vessels Arni Friðriksson and Bjarni Sæmundsson and the fishing vessels Aðalsteinn Jónsson, Asgrímur Halldorsson and Polar Amaroq with 3 scientists from the Marine and Freshwater Research Institute onboard each vessel.

The survey area was on and along the shelf edge from Víkurall northwest of Iceland to Heradsdjúp east of Iceland (Figure 12.2.4). Arni Friðriksson and Bjarni Sæmundsson started north of the Vestfirðir peninsula in the proximity of Kögurgrunn bank, Arni covering westwards and Bjarni to the east. Three vessels, Aðalsteinn Jónsson, Polar Amaroq and Asgrímur Halldorsson started their transects northeast of Iceland in the proximity of Rífsbanki bank where Aðalsteinn and Polar Amaroq progressed from east to west towards the coverage of Bjarni while Asgrímur progressed eastwards. During sailing to and from the research areas all vessels searched for capelin on shallower shelf areas. Before the survey, the echosounders of Aðalsteinn Jónsson and Polar Amaroq were calibrated in Eskifjörður and Norðfjörður respectively, but other vessels had been previously calibrated. The vessels managed to cover the planned survey area except coverage in Denmark Strait was considerably hindered due to sea ice.

Mature capelin dominated in main parts of the survey area although immature capelin was observed in occasional samples. Total SSB was estimated 144 000 tonnes but due to restricted coverage because of sea ice in the Denmark Strait and much lower observed abundance than in same areas in December 2020, it is likely that a good part of the population was undiscovered during this coverage.

12.2.2.3 Winter surveys 3. Coverage in 17–20 January 2021

The acoustic measurements were conducted by the fishing vessels Asgrímur Halldorsson and Polar Amaroq with 3 scientists from the Marine and Freshwater Research Institute onboard each vessel. Further, the fishing vessel Bjarni Ólafsson searched for capelin with some assistance from the fishing vessel Venus.

Due to very short weather window the survey area was limited to a small region along and outside the shelf edge east of Iceland extending from about 66°N southwards to about 64°15'N (Figure 12.2.5). The initiative of this survey was based on confirmed observations of abundant capelin in the area and hence the need to measure the capelin before it migrates further south into areas less favourable for acoustic measurements. Both Asgrímur Halldorsson and Polar Amaroq were measuring along east-west transects progressing from south to north while Bjarni Ólafsson

mainly searched on eastern edge of the survey region. Also, the fishing vessel Venus searched the shelf just west of the measured transects while passing by.

Mature capelin dominated in the region with the greatest abundance measured south of 65°N mainly 10–25 nmi east off the shelf edge. Total SSB was estimated 401 000 tonnes where of 325 000 tonnes were observed south of 65°N. The main part of the estimated abundance is likely to have been outside the first January survey coverage.

12.2.2.4 Winter surveys 4. Coverage in 26–30 January 2021

The acoustic measurements were conducted by the research vessels Arni Friðriksson and Bjarni Sæmundsson and the fishing vessels Aðalsteinn Jónsson, Asgrimur Halldorsson and Borkur with 2–3 scientist from the Marine and Freshwater Research Institute onboard each vessel. Further, the fishing vessels Bjarni Olafsson, Hakon and Jona Edvalds searched for capelin.

The vessels Arni Fridriksson, Asgrimur Halldorsson, Adalsteinn Jonsson and Borkur started measurements in the southeast end of the survey area assisted by the scouting of Bjarni Olafsson on the shelf side while Jona Edvalds scouted deep areas east of the main survey transects. The aim was to start measuring capelin north of 65°N in the east and progressing northwards along eastfjords and then westward. When the vessels were arriving towards 65°N they observed high abundance of capelin on shelf areas just south of 65°N, hence they extended the coverage further to the south on the shelf. At the beginning of the survey there were no conditions for acoustic measurements in the Denmark Strait and other northwestern areas due to weather but consistent winds from east and northeast in Denmark Strait had caused a favourable retreat of the sea ice in that region. Hence, based on forecasted calm weather window in Denmark Strait Arni Fridriksson headed towards Denmark Strait on the evening of 26 January and the day after Bjarni Saemundsson and Hakon left harbour to also measure and search the northwestern regions. Early on the 28 January the three vessels arrived to their first transects by the shelf edge north of Straumnes and Arni Fridriksson progressed along the shelf edges westwards, Bjarni Saemundsson eastwards along the shelf edges while Hakon searched the shallower shelf areas off north-west Iceland. On the morning of 30 January, the following four vessels met about 40 nmi west of Kolbeinsey, Bjarni Saemundsson approaching from the west, Adalsteinn Jonsson, Borkur and Asgrimur Halldorsson approaching from the east and hence closing the coverage gap between them. Although, Bjarni Saemundsson continued to finish unfinished transects in the north that had to be abandoned earlier due to weather and icy conditions. Further, Arni Fridriksson continued progressing westwards along unfinished transects. The whole survey was finished the 30 January. The echosounder on Borkur was calibrated after the survey, other vessels had previously calibrated echosounders.

Immature capelin dominated in Denmark Strait while mixtures of immature and mature capelin were found between Denmark Strait and Rífsbanki north of Melrakkasletta peninsula. Further to the east mature capelin dominated. Total SSB was estimated 415 000 tonnes where of 325 000 tonnes were north of 65°N.

12.3 The fishery (fleet composition, behaviour and catch)

Initial catch quota for the 2020/2021 fishing season was 270 000 tonnes, but no summer or autumn fishery took place in 2020.

The intermediate TAC advice based on the autumn survey recommended no fisheries (TAC = 0 tonnes) and this advice was updated to a final quota of 127 300 t in winter 2021. In total, 129 433 t were caught in the 2020/2021 fishing season.

The total catches in numbers by age during the summer/autumn since 1985 are given in Table 12.3.2 and for the winter since 1986 in Table 12.3.3.

Initial and final TAC as well as landings for the fishing seasons since 1992/93 are given in Table 12.3.4 and total catch by season is shown in Figure 12.3.1.

12.4 Biological data

12.4.1 Growth

Seasonal growth pattern, with considerably increased growth rate during summer and autumn has been observed in this capelin stock in a study of the period 1979–1992. Where immature fish had slower growth during winter, the maturing fish had faster summer growth that continued throughout the winter until spawning in March/April, followed by almost 100% spawning mortality (Vilhjalmsson, 1994). Further examination of the growth of immature capelin at age 1 in autumn to mature at age 2 in autumn the year after in the period 1979–2013 showed on average almost 4-fold weight increase during one year (Gudmundsdottir and Sigurdsson, 2014). This considerable weight increase and seasonal pattern in growth the year before spawning should be taken into account when deciding the timing of the capelin fisheries.

Immature capelin has considerably low fat content, usually less than 3–4%. The fat content rises from approximately 5% in the summer to 20% in late autumn. In the fall and winter the fat content slowly declines, until the spawning migration begins in early January where the fat content drops drastically from about 15% to 5% in mid-April (Engilbertsson *et al.*, 2012).

12.5 Methods

The objective of the HCR for the stock is to leave at least 150 000 tonnes ($= B_{lim}$) for spawning (escapement strategy). The initial (preliminary), intermediate and final TACs are based on acoustic surveys.

- a) The initial TAC advice for the subsequent fishing season is issued by ICES around 1 December. It is based on the autumn survey abundance estimate of immature 1- and 2-year-old capelin. Before 2017, this advice was issued later (May/June).
- b) The intermediate TAC advice is issued by MFRI in autumn based on the biomass estimate of maturing capelin.
- c) The final TAC advice is issued by MFRI in January/February based on the biomass estimate of maturing capelin.

The initial (preliminary) quota follows a simple forecast that is based on a linear relation between historic observations of the abundance of 1- and 2-year-old juveniles from the acoustic autumn surveys and the corresponding final TACs nearly 1½ year later. This rule was applied by ICES NWWG (subgroup online video conferencing meeting in November 2018) to advice the initial quota for the fishing season 2019/20. Figure 12.8.1 shows the relation and the associated precautionary initial quota.

The intermediate and final TACs are set so that there is at least 95% probability that there will be at least 150 000 tonnes ($= B_{lim}$) of mature capelin left for spawning at the spawning time (15 March). This was done for the first time in 2015/2016 by the Icelandic Marine Research Institute and was not evaluated by ICES.

These methods were endorsed by the benchmark working group WKICE in 2015. See WKICE (ICES, 2015) and the Stock Annex for the capelin in the Iceland-East Greenland-Jan Mayen area.

Previously, (since early 1980s) the stock has been managed according to an escapement strategy, leaving 400 000 tonnes to spawning (uncertainty of the estimates were not considered). To predict the TAC for the next fishing season a model was developed in the early 1990s

(Gudmundsdottir and Vilhjalmsón, 2002). These models were not endorsed by the benchmark working group WKSHORT 2009.

12.6 Reference points

During WKICE, a B_{lim} of 150 000 tonnes was defined (ICES, 2015). No other reference points are defined for this stock.

12.7 State of the stock

The spawning stock biomass (SSB) was estimated to 649 000 tonnes in January 2020. The predation model (ICES, 2015), accounting for catches (in this case 127 300 t) and predation between survey and spawning by cod, saithe and haddock, estimated that 344 000 tonnes were left for spawning in spring 2020 (Table 12.7.1). Given the uncertainty estimates, there was 95% probability that at least 150 000 tonnes was left for spawning. This was above B_{lim} within the sustainable HCR.

The acoustic estimate of immature capelin at age 1 and 2 from the autumn survey in September 2020 was 146.3 billion. The estimate is above long-term average (Figure 12.7.1) and the initial advice according to the HCR is 400 000 tonnes in the fishing season 2021/22 (Figure 12.7.2).

12.8 Uncertainties in assessment and forecast

The uncertainty of the assessment and forecast depends largely on the quality of the acoustic surveys in terms of coverage, conditions for acoustic measurements and the aggregation (high patchiness leads to high variance) of the capelin.

The uncertainty is estimated by bootstrapping (see stock annex). The CV for the immature abundance was estimated to 0.23 in the 2020 autumn survey. The CV for the mature biomass was estimated to 0.18 in the 2020 autumn survey but in the winter survey (January) used for the assessment in 2021 it was 0.22.

Spatial coverage in the autumn survey 2020 was hindered by sea ice in northeast Denmark Strait and also the eastern areas of the survey region (assumed to be on periphery of capelin distribution) had less dense coverage. Hence, it is likely that the mature component of the stock was underestimated in the autumn survey (affecting intermediate TAC advice 2020/2021) although the immature component is believed to have been successfully covered (affecting initial advice 2021/2022). The final estimate was based on combination of partial coverages within two surveys based on assumptions about southern direction of capelin spawning migration east of Iceland. Unexpected migration behaviour might lead to bias in the estimate. The final estimate did not involve repeated surveying with and against the migration direction. Although some components of the stock are likely to have been measured with the survey migration and others against it, there could be some bias due to migration direction.

12.9 Comparison with previous assessment and forecast

For the fishing season 2020/2021 170 000 t initial quota was advised and intermediate TAC was set to 0 tonnes while final advice was 127 300 t. This is the initiative of capelin fisheries after a two fishing seasons with no fisheries. High juvenile index in autumn 2020 predicts large fishable stock in 2021/2022.

12.10 Management plans and evaluations

See Section 12.5.

12.11 Management considerations

The fishing season for capelin has since 1975 started in the period from late June to July/August when surveys on the juvenile part of the stock the year before have resulted in the setting of an initial (preliminary) catch quota. During summer, the availability of plankton is at its highest and the fishable stock of capelin is feeding very actively over large areas between Iceland, Greenland and Jan Mayen, increasing rapidly in length, weight and fat content. By late September/beginning of October this period of rapid growth is over. The growth is fastest the first two years, but the weight increase is highest in the year before spawning (Vilhjálmsen, 1994).

Given the large weight increase in the summer before spawning (Section 12.4) it is likely that there will be more biomass of maturing fish in autumn than in summer, even though the level of natural mortality is not well known during this time period. This should be considered for optimal timing of fishery in relation to yield and ecological impact. This is also supported by information for the Barents Sea capelin where it has been shown that fishing during autumn would maximize the yield, but from the ecosystem point of view a winter fishery were preferable (Gjøsæter *et.al.*, 2002). As the biology and role in the ecosystem of these two capelin stocks are similar, this is considered to be valid for the capelin in the Iceland-East Greenland-Jan Mayen area as well - until it is studied for this specific stock.

During the autumn surveys, juvenile and adult capelin is often found together. This should be considered during summer fishing because the survival rate of juvenile capelin that escapes through the trawl net is unknown.

12.12 Ecosystem considerations

Capelin is an important forage fish and its dynamics are expected to have implications on the productivity of their predators (see further in Section 7.3).

The importance of capelin in East Greenlandic waters is not well documented but effort has been increased considerably during autumn surveys towards evaluation of capelin role in the ecosystem e.g. by research on feeding of capelin, estimates of prey availability, predators distributions and environmental monitoring.

In Icelandic waters, capelin is the main single item in the diet of Icelandic cod, a key prey to several species of marine mammals and seabirds and also important as food for several other commercial fish species (see e.g. Vilhjálmsen, 2002).

12.13 Regulations and their effects

Over the years, the fishery has been closed during April–late June and the season has started in July/August or later, depending on the state of the stock.

Areas with high abundances of juvenile age 1 and 2 capelin (on the shelf region off NW-, N- and NE-Iceland) have usually been closed to the summer and autumn fishery.

It is permissible to transfer catches from the purse seine of one vessel to another vessel, in order to avoid slippage. However, if the catches are beyond the carrying capacity of the vessel and no other vessel is nearby, slippage is allowed. In recent years, reporting of such slippage has not

been frequent. Industrial trawlers do not have the permission to slip capelin in order to harmonize catches to the processing.

In Icelandic waters, fishing with pelagic trawl is only allowed in limited area off the NE-coast (fishing in January) to protect juvenile capelin and to reduce the risk of affecting the spawning migration route (shuttering of migrating capelin schools by pelagic trawling has been hypothesized).

Taking precautionary measures to protect juvenile capelin, the coastal states (Iceland, Greenland and Norway) have agreed that from 2021 fishing shall not start until 15 October.

12.14 Changes in fishing technology and fishing patterns

The catches in 2020/21 (129 433, preliminary numbers) were taken by purse-seining (95%) and pelagic trawl (5%), but historically a variable amount of the catches have been taken with pelagic trawl through the fishing seasons. Discards have been considered negligible.

12.15 Changes in the environment

Icelandic and East Greenlandic waters are characterized by highly variable hydrographical conditions, with temperatures and salinities depending on the strength of Atlantic inflow through the Denmark Strait and the variable flow of polar water from the north. A rise in ambient sea temperatures for the migrating and spawning capelin was especially abrupt around 2003, coinciding with a decrease in recruitment, and a change in nursery areas that may partly be a consequence of a change in spawning distribution (Jansen *et al.*, 2021). Including consequences on the progress of spawning migration (Singh *et al.*, 2020). The acoustic surveys in autumn 2010, 2012–2019 confirmed this change in distribution of immatures and maturing capelin. Fisheries data suggests that the major part of the spawning still takes place on the usual grounds by the South and Southwest coasts of Iceland and possibly to increased extent by the North coast of Iceland.

A more detailed environmental description is in Section 7.3.

12.16 Recommendations

In coming years when experience of the new HCR will be gained it is recommended that assumptions and practical operation of the HCR will be evaluated. E.g. by refining the model for the initial TAC, reviewing the predation/prey relationships and how SSB estimates from autumn and winter surveys should be weighted when final TAC is calculated. NWWG therefore recommends that the assessment of this capelin stock goes through a benchmark workshop in near future. Further, it is recommended that the option to run this benchmark jointly with a benchmark workshop for the Barents Sea capelin stock will be examined.

Studies of optimal harvesting of capelin should be conducted. These estimates should take account of ecological impact, growth, mortality and gear selection in relation to the timing of the fishery.

Profound changes in the distribution, migration and productivity of this capelin stock, likely caused by environmental changes, urge the need for further biological studies i.e. regarding life history (including changes in spawning grounds, larval drift and migration at times not observed by autumn and winter surveys) and the role of capelin (predation/prey relationships) as a key species in the ecosystem.

The assessment and advice on the final TAC for capelin based on the autumn and winter surveys are issued directly to the Coastal States by the Icelandic Marine and Freshwater Research Institute. This process is not internationally peer reviewed prior to the release of the advice. Among the reasons for using this process is the need for fast advice once the survey result is available. The ICES ACOM procedure is more time consuming. NWWG has recommended that a fast track workflow based on online meetings is established if possible. The coastal states evaluated this recommendation in 2017 and concluded that a current regime for setting intermediate and final TAC should be maintained. When planning acoustic surveys for capelin stock assessment, allocation of effort in terms of ship time, number of ships and manpower, should be sufficient for a likely full coverage in the first attempt given the demanding weather and ice conditions during autumn and winter surveys.

12.17 References

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12.18 Tables

Table 12.2.1 Icelandic Capelin. Estimated stock size of the capelin total stock component in numbers (millions) by age (years) and length (cm), and biomass (thous. tonnes) from the acoustic survey in 7. September – 5. October 2020.

Length (cm)	Numbers at Age (10 ⁹)				Numbers (10 ⁹)	Biomass (10 ³ t)	Mean weight (g)
	1	2	3	4			
8	886.95	0	0	0	886.95	1493.03	1.68
8.5	1034.77	0	0	0	1034.77	1930.59	1.87
9	6356.45	0	0	0	6356.45	15206.7	2.39
9.5	13156.37	0	0	0	13156.37	36230.28	2.75
10	21434.54	295.65	0	0	21730.19	71691.88	3.3
10.5	17314.33	0	0	0	17314.33	67021.41	3.87
11	24724.43	295.65	0	0	25020.08	112589.9	4.5
11.5	17962.26	739.12	0	0	18701.38	97141.82	5.19
12	19849.42	739.12	0	0	20588.54	133841.1	6.5
12.5	9662.76	295.65	0	0	9958.41	75495.34	7.58
13	6527.54	924.7	0	0	7452.24	62638.8	8.41
13.5	1347.27	94.39	0	0	1441.66	14001.55	9.71
14	192.41	1728.46	0	0	1920.87	22526.2	11.73
14.5	147.82	1151.18	6.83	0	1305.84	18542.11	14.2
15	18.88	2954.37	25.71	0	2998.95	47257.75	15.76
15.5	0	1117.86	77.12	0	1194.98	21539.33	18.02
16	0	2209.64	47.8	0	2257.44	45079.92	19.97
16.5	0	1882.26	305.28	0	2187.54	50554.52	23.11
17	0	2445.45	267.53	0	2712.98	68105.01	25.1
17.5	0	1606.34	327.38	0	1933.71	54642.13	28.26
18	0	947.98	320.55	0	1268.53	38789.82	30.58
18.5	0	485.63	53.02	0	538.66	18340.3	34.05
19	0	47.8	20.49	0	68.29	2660.24	38.96
19.5	0	13.66	6.83	0	20.49	860.57	42.01
20	0	6.83	0	0	6.83	301.15	44.1

Table 12.2.1 Icelandic Capelin. Summary of the capelin stock components from the acoustic survey in 7. September – 5. October 2020. Age (years) aggregated spawning stock component summary. T = Total, S = Stock, N = Numbers (billions), W = Weight(grams), L = Length(Cm), p = %

	Age				Total	Mean
	1	2	3	4		
TSN	140.62	19.98	1.46	0	162.06	
TSB	672.05	367.87	38.56	0	1078.48	
MeanW	4.78	18.41	26.44	0		6.65
MeanL	10.95	15.34	17.16	0		11.55
TSNp	86.77	12.33	0.9	0	100	
SSN	0.82	13.49	1.44	0	15.76	
SSB	8.23	297.33	38.51	0	344.08	
MeanW	10.02	22.03	26.66	0		21.83
MeanL	13.21	16.23	17.15	0		16.15
SSNp	5.21	85.62	9.17	0	100	
ISN	139.79	6.47	0.01	0	146.28	
ISB	663.7	70.06	0.43	0	734.19	
MeanW	4.75	10.83	31.29	0		5.02
MeanL	10.94	13.5	18	0		11.05
ISNp	95.57	4.42	0.01	0	100	

Table 12.2.2. Icelandic Capelin. Abundance of age-classes in numbers (10³) measured in acoustic surveys in autumn.

Year	Mon	Day	Age1	Age1	Age2	Age2	Age3	Age3	Age4	Age5
			Imm.	Mat.	Imm.	Mat.	Imm.	Mat.	Mat.	Mat.
1978	10	16				60.0		13.9	0.4	
1979	10	14	10.0			49.7		9.1	0.4	
1980	10	11	23.5			19.5		4.8		
1981	11	26	21.0		1.1	11.9		0.6		
1982	10	2	68.0		1.7	15.0		1.6		
1983	10	3	44.1		8.2	58.6		5.6	0.1	
1984	11	1	73.8		4.6	31.9		10.3	0.3	
1985	10	8	33.8		12.6	43.7		14.4	0.4	0.1
1986	10	4	58.6		1.4	19.9		29.8	0.3	
1987	11	18	21.3		2.5	52.0		13.5		
1988	10	6	43.9		6.7	53.0		17.0	0.4	
1989	10	26	29.2		1.8	2.9		0.6		
1990	11	8	24.9		1.3	16.4		2.7	0.1	
1991	11	15	60.0		5.3	44.7		4.2		
1992	10	13	104.6		2.3	54.5		4.3	0.1	
1993	11	18	100.4		9.8	55.1		4.9		
1994	11	25	119.0		6.9	29.2		4.4		
1995	11	30	165.0		30.1	84.6		7.0		
1996	11	27	111.9		16.4	70.0		15.9		
1997	11	1	66.8		30.8	52.5		8.5		
1998	11	13	121.0		5.9	20.5		3.3		
1999	11	15	89.8		4.4	18.1		0.9		
2000	11	10	103.7		10.9	11.6	0.1	0.6		
2001	11	12	101.8		2.4	22.1	0.0	0.7		
2002	11	12	1.0		0.5					
2003	11	6	4.9		3.1	1.7	0.1	0.2		
2004	11	22	7.9		0.1	7.3		0.8	0.0	
2005	11									
2006	11	6	44.7		0.3	5.2		0.4		
2007	11	7	5.7		0.1	1.3		0.0		
2008	11	17	7.5	5.1	0.4	12.1		1.8		
2009	11	24	13.0	2.4		5.0		0.7		
2010	10	1	91.6	9.6	6.3	25.8	0.1	0.8	0.02	
2011	11	29	9.0	0.6	3.6	19.9	0.05	2.1		
2012	10	3	18.5	0.9	2.0	21.2	0.07	11.4	0.1	
2013	9	17	60.1	0.6	6.9	25.0	1.3	6.9	0.1	
2014	9	16	57.0	1.0	3.3	26.5	0.2	7.6	0.1	
2015	9	16	5.0	0.4	1.2	21.2		6.7		

Year	Mon	Day	Age1	Age1	Age2	Age2	Age3	Age3	Age4	Age5
			Imm.	Mat.	Imm.	Mat.	Imm.	Mat.	Mat.	Mat.
2016	9	10	8.7	0.5	0.7	4.5	0.0	0.9	0.01	
2017	9	7	24.6	1.3	1.5	35.5	0.0	5.1	0.05	
2018	9	6	10.3	1.5	0.4	8.8	0.0	1.0		
2019	9	12	81.5	1.8	1.1	6.1		0.6	0.0	
2020	9	7	139.8	0.8	6.5	13.5	0.0	1.44		

1987 - The number at age 1 was from survey earlier in autumn.

2005 - Scouting vessels searched for capelin. r/s ÁF measured. No samples taken for age determination. Estimated to be < 50 000 t.

2011 - Only limited coverage of the traditional capelin distribution area. 2001–2009 and 2016 – Not full coverage of stock.

Table 12.2.3. Icelandic Capelin. Mean weight (g) of age-classes measured in acoustic surveys in autumn. (imm = immature, mat = mature). See footnotes in Table 12.2.2.

Year	Mon	Age1	Age1	Age2	Age2	Age3	Age3	Age4	Age5
		Imm.	Mat.	Imm.	Mat.	Imm.	Mat.	Mat.	Mat.
1978	10				19.8		25.4	26.3	
1979	10	6.2			15.7		23.0	20.8	
1980	10	7.3			19.4		26.7		
1981	11	3.6		12.3	19.4		22.5		
1982	10	3.8		8.5	16.5		24.1		
1983	10	5.1		9.5	16.8		22.5	23.0	
1984	11	2.9		8.3	15.8		25.7	23.2	
1985	10	3.8		8.5	15.5		23.8	29.5	31.0
1986	10	4.0		6.1	18.1		24.1	28.8	
1987	11	2.8		8.7	17.9		25.8		
1988	10	3.0		8.0	15.4		23.4	20.9	
1989	10	3.5		8.0	12.9		24.0		
1990	11	3.9		8.4	18.0		25.5	36.0	
1991	11	4.7		7.9	16.3		25.4		
1992	10	3.7		8.6	16.5		22.6	22.0	
1993	11	3.6		8.9	16.2		23.3		
1994	11	3.3		7.9	15.9		23.6		
1995	11	3.7		7.0	14.0		20.8		
1996	11	3.1		7.4	15.8		20.6		
1997	11	3.3		8.5	14.3		20.1		
1998	11	3.5		9.9	13.7		18.8		
1999	11	3.6		8.0	15.4		19.5		
2000	11	3.9		8.5	13.4	13.0	20.8		
2001	11	3.8		8.8	16.3	15.7	23.9		
2002	11								
2003	11	7.2		14.9	17.0	22.6	23.7		
2004	11	7.4		7.6	16.0		18.0	14.5	

Year	Mon	Age1	Age1	Age2	Age2	Age3	Age3	Age4	Age5
		Imm.	Mat.	Imm.	Mat.	Imm.	Mat.	Mat.	Mat.
2005									
2006	11	3.7		7.9	15.0		16.7		
2007	11	5.5		8.6	14.9		15.8		
2008	11	6.2	11.0	6.9	18.6		22.4		
2009	11	5.1	9.8		20.0		23.8		
2010	10	5.8	12.9	12.2	19.0	12.9	24.0	21.2	
2011	11	6.8	11.4	11.1	18.7	15.8	24.4		
2012	10	6.5	16.0	15.3	22.0	22.4	28.0	26.6	
2013	9	5.8	12.6	10.9	18.0	11.2	20.9	23.6	
2014	9	4.2	9.9	12.7	18.3	16.6	21.2	25.0	
2015	9	8.5	12.3	13.4	18.4	21.5	23.1		
2016	9	9.0	15.1	13.1	25.5	11.5	31.7	39.2	
2017	9	8.0	12.6	15.0	22.2	22.3	27.2	33.2	
2018	9	8.8	12.9	16.5	21.7	21.2	27.1		
2019	9	7.3	13.4	14.5	24.0	15.7	27.1	28.4	
2020	9	4.8	10.0	10.8	22.0	31.3	26.7		

Table 12.2.4. Icelandic Capelin. Estimated stock size of Iceland-Greenland-Jan Mayen capelin total stock in numbers (millions) by age (years) and length (cm), and biomass (thous. tonnes) from the acoustic surveys in 17. – 30. January 2021.

Length (cm)	Numbers at Age (10 ⁹)				Numbers (10 ⁹)	Biomass (10 ³ t)	Mean weight (g)
	1	2	3	4			
9	0	28.43	0	0	28.43	69.65	2.45
9.5	0	85.29	0	0	85.29	226.01	2.65
10	0	184.78	0	0	184.78	590.88	3.2
10.5	0	787.6	0	0	787.6	2970.02	3.77
11	0	1039.31	0	0	1039.31	4529.8	4.36
11.5	0	1692.83	0	0	1692.83	8783.71	5.19
12	0	1799.37	0	0	1799.37	10798.35	6
12.5	0	2005.44	9.76	0	2015.2	14144.46	7.02
13	0	1748.12	23.97	0	1772.09	14481.92	8.17
13.5	0	984.87	53.24	2.52	1040.63	9660.07	9.28
14	0	813.08	138.19	0	951.27	10215.56	10.74
14.5	0	443.06	224.41	0	667.47	8350.4	12.51
15	0	169.52	765.45	0	934.97	13489.03	14.43
15.5	0	81.33	993.38	9.76	1084.46	17909.93	16.52
16	0	14.21	1809.52	35.77	1859.5	34906.54	18.77
16.5	0	4.58	2423.49	148.16	2576.23	55266.04	21.45
17	0	14.21	3228.05	148	3394.85	81416.96	23.98
17.5	0	0	3400.49	282.74	3683.22	98668.71	26.79
18	0	0	4149.24	518.67	4667.91	138373.6	29.64
18.5	0	0	3056.47	616.99	3673.46	120496.4	32.8
19	0	0	1887.82	92.98	1980.8	70261.6	35.47
19.5	0	0	590.08	139.87	729.95	28580.83	39.15
20	0	0	38.71	0	38.71	1703.16	44

Table 12.2.4 Icelandic Capelin. Summary of the capelin stock components from the acoustic surveys in 17. – 30. January 2021. Age (years) aggregated spawning stock component summary. T = Total, S = Stock, N = Numbers(billions), W = Weight(grams), L = Length(Cm), p = %

	Age				Total	Mean
	1	2	3	4		
TSN	0	11.9	22.79	2	36.69	
TSB	0	84.24	602	59.55	745.89	
MeanW	0	7.08	26.41	29.84		20.33
MeanL	0	12.35	17.37	18		15.78
TSNp	0	32.42	62.12	5.44	100	
SSN	0	0.77	21.43	1.97	24.17	
SSB	0	9.49	580.66	59.03	649.3	
MeanW	0	12.3	27.09	30.02		26.86
MeanL	0	14.16	17.49	18.03		17.43
SSNp	0	3.19	88.65	8.13	100	
ISN	0	11.12	1.36	0.03	12.51	
ISB	0	74.66	21.42	0.52	96.59	
MeanW	0	6.71	15.74	17.66		7.72
MeanL	0	12.22	15.48	16		12.59
ISNp	0	88.89	10.88	0.23	100	

Table 12.3.1 Capelin. The international catch since 1964 (thousand tonnes).

Year	Winter season					Summer and autumn season						Total
	Iceland	Norway	Faroes	Greenland	Season total	Iceland	Norway	Faroes	Greenland	EU	Season total	
1964	8.6	-	-		8.6	-	-	-		-	-	8.6
1965	49.7	-	-		49.7	-	-	-		-	-	49.7
1966	124.5	-	-		124.5	-	-	-		-	-	124.5
1967	97.2	-	-		97.2	-	-	-		-	-	97.2
1968	78.1	-	-		78.1	-	-	-		-	-	78.1
1969	170.6	-	-		170.6	-	-	-		-	-	170.6
1970	190.8	-	-		190.8	-	-	-		-	-	190.8
1971	182.9	-	-		182.9	-	-	-		-	-	182.9
1972	276.5	-	-		276.5	-	-	-		-	-	276.5
1973	440.9	-	-		440.9	-	-	-		-	-	440.9
1974	461.9	-	-		461.9	-	-	-		-	-	461.9
1975	457.1	-	-		457.1	3.1	-	-		-	3.1	460.2
1976	338.7	-	-		338.7	114.4	-	-		-	114.4	453.1
1977	549.2	-	24.3		573.5	259.7	-	-		-	259.7	833.2
1978	468.4	-	36.2		504.6	497.5	154.1	3.4		-	655	1,159.60
1979	521.7	-	18.2		539.9	442	124	22		-	588	1,127.90
1980	392.1	-	-		392.1	367.4	118.7	24.2		17.3	527.6	919.7
1981	156	-	-		156	484.6	91.4	16.2		20.8	613	769
1982	13.2	-	-		13.2	-	-	-		-	-	13.2
1983	-	-	-		-	133.4	-	-		-	133.4	133.4
1984	439.6	-	-		439.6	425.2	104.6	10.2		8.5	548.5	988.1
1985	348.5	-	-		348.5	644.8	193	65.9		16	919.7	1,268.20
1986	341.8	50	-		391.8	552.5	149.7	65.4		5.3	772.9	1,164.70

Year	Winter season					Summer and autumn season						Total
	Iceland	Norway	Faroes	Greenland	Season total	Iceland	Norway	Faroes	Greenland	EU	Season total	
1987	500.6	59.9	-		560.5	311.3	82.1	65.2		-	458.6	1,019.10
1988	600.6	56.6	-		657.2	311.4	11.5	48.5		-	371.4	1,028.60
1989	609.1	56	-		665.1	53.9	52.7	14.4		-	121	786,1
1990	612	62.5	12.3		686.8	83.7	21.9	5.6		-	111.2	798
1991	202.4	-	-		202.4	56	-	-		-	56	258.4
1992	573.5	47.6	-		621.1	213.4	65.3	18.9	0.5	-	298.1	919.2
1993	489.1	-	-	0.5	489.6	450	127.5	23.9	10.2	-	611.6	1,101.20
1994	550.3	15	-	1.8	567.1	210.7	99	12.3	2.1	-	324.1	891.2
1995	539.4	-	-	0.4	539.8	175.5	28	-	2.2	-	205.7	745.5
1996	707.9	-	10	5.7	723.6	474.3	206	17.6	15	60.9	773.8	1,497.40
1997	774.9	-	16.1	6.1	797.1	536	153.6	20.5	6.5	47.1	763.6	1,561.50
1998	457	-	14.7	9.6	481.3	290.8	72.9	26.9	8	41.9	440.5	921.8
1999	607.8	14.8	13.8	22.5	658.9	83	11.4	6	2	-	102.4	761.3
2000	761.4	14.9	32	22	830.3	126.5	80.1	30	7.5	21	265.1	1,095.40
2001	767.2	-	10	29	806.2	150	106	12	9	17	294	1,061.20
2002	901	-	28	26	955	180	118.7	-	13	28	339.7	1,294.70
2003	585	-	40	23	648	96.5	78	3.5	2.5	18	198.5	846.5
2004	478.8	15.8	30.8	17.5	542.9	46	34	-	12		92	634.9
2005	594.1	69	19	10	692	9	-	-	-	-	9	701.1
2006	193	8	30	7	238	-	-	-	-		-	238
2007	307	38	19	12.8	376.8	-	-	-	-	-	-	376.8
2008	149	37.6	10.1	6.7	203.4	-	-	-	-	-	-	203.4
2009	15.1	-	-	-	15.1	-	-	-	-	-	-	15.1
2010	110.6	28.3	7.7	4.7	150.7	5.4	-	-	-	-	5.4	156.1
2011	321.8	30.8	19.5	13.1	385.2	8.4	58.5		5.2	-	72.1	457.3

Year	Winter season					Summer and autumn season						Total
	Iceland	Norway	Faroes	Greenland	Season total	Iceland	Norway	Faroes	Greenland	EU	Season total	
2012	576.2	46.2	29.7	22.3	674.4	9	-		1	-	10	684.4
2013	454	40	30	17	541	-	-		-	-	-	541
2014	111.4	6.2	8	16.1	141.7	-	30.5		5.3	9.7	45.5	187.2
2015	353.6	50.6	29.9	37.9	471.9	-	-		2.5	-	2.5	474.4
2016	101.1	58.2	8.5	3.3	171.1	-	-		-	-	-	171.1
2017	196.8	60.4	15	27.4	299.8	-	-		-	-	-	299.8
2018	186.3	74.5	14.3	11.4	286.5	-	-		-	-	-	286.5
2019	-	-	-	-	-	-	-		-	-	-	-
2020	-	-	-	-	-	-	-		-	-	-	-
2021*	67	49.4	6.4	6.6	129.4							

* Preliminary, provided by working group members.

Table 12.3.2 Icelandic capelin. The total international catch of capelin in the Iceland-East Greenland-Jan Mayen area by age group in numbers (billions) and the total catch by numbers and weight (thousand tonnes) in the autumn season (August–December) since 1985.

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Total number	Total weight
1985	0.8	25.6	15.4	0.2		42.0	919.7
1986	+	10.0	23.3	0.5		33.8	772.9
1987	+	27.7	6.7	+		34.4	458.6
1988	0.3	13.6	5.4	+		19.3	371.4
1989	1.7	6.0	1.5	+		9.2	121.0
1990	0.8	5.9	1.0	+		7.7	111.2
1991	0.3	2.7	0.4	+		3.4	56.0
1992	1.7	14.0	2.1	+		17.8	298.1
1993	0.2	24.9	5.4	0.2		30.7	611.6
1994	0.6	15.0	2.8	+		18.4	324.1
1995	1.5	9.7	1.1	+		12.3	205.7
1996	0.2	25.2	12.7	0.2		38.4	773.7
1997	1.8	33.4	10.2	0.4		45.8	763.6
1998	0.9	25.1	2.9	+		28.9	440.5
1999	0.3	4.7	0.7	+		5.7	102.4
2000	0.2	12.9	3.3	0.1		16.5	265.1
2001	+	17.6	1.2	+		18.8	294.0
2002	+	18.3	2.5	+		20.8	339.7
2003	0.3	11.8	1	+		14.3	199.5
2004	+	5.3	0.5	-		5.8	92.0
2005	-	0.4	+	-		0.4	9.0
2006	-	-	-	-		-	-
2007	-	-	-	-		-	-
2008	-	-	-	-		-	-
2009	-	-	-	-		-	-
2010	0.01	0.23	0.02	-		0.25	5.4
2011	-	2.45	1.61	-	0.08	4.13	72.1
2012	-	0.2	0.2	-	-	0.4	10.4
2013	-	-	-	-	-	-	-
2014	0.01	2.22	0.6	0.02	-	2.8	45.5
2015	0.03	0.08	0.03			1.4	2.5
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-
2021	-	-	-	-	-	-	-

Table 12.3.3 Icelandic capelin. The total international catch of capelin in the Iceland-East Greenland-Jan Mayen area by age group in numbers (billions) and the total catch by numbers and weight (thousand tonnes) in the winter season (January–March) since 1986.

Year	age 1	age 2	age 3	age 4	age 5	Total number	Total weight
1986		0.1	9.8	6.9	0.2	17.0	391.8
1987		+	6.9	15.5	-	22.4	560.5
1988		+	23.4	7.2	0.3	30.9	657.2
1989		0.1	22.9	7.8	+	30.8	665.1
1990		1.4	24.8	9.6	0.1	35.9	686.8
1991		0.5	7.4	1.5	+	9.4	202.4
1992		2.7	29.4	2.8	+	34.9	621.1
1993		0.2	20.1	2.5	+	22.8	489.6
1994		0.6	22.7	3.9	+	27.2	567.1
1995		1.3	17.6	5.9	+	24.8	539.8
1996		0.6	27.4	7.7	+	35.7	723.6
1997		0.9	29.1	11	+	41.0	797.6
1998		0.3	20.4	5.4	+	26.1	481.3
1999		0.5	31.2	7.5	+	39.2	658.9
2000		0.3	36.3	5.4	+	42.0	830.3
2001		0.4	27.9	6.7	+	35.0	787.2
2002		0.1	33.1	4.2	+	37.4	955.0
2003		0.1	32.2	1.9	+	34.4	648.0
2004		0.6	24.6	3	+	28.3	542.9
2005		0.1	31.5	3.1	-	34.7	692.0
2006		0.1	10.4	0.3	-	10.8	230.0
2007		0.3	19.5	0.5	-	20.3	376.8
2008		0.5	10.6	0.4	-	11.5	202.4
2009		0.1	0.6	0.1	-	0.7	15.1
2010		0.7	5.3	0.9	0.01	6.9	150.7
2011		0.1	16.2	0.6	-	17.0	385.2
2012	0.02	0.6	25.0	6.1	0.02	31.8	674.4
2013	-	0.3	12.1	9.7	0.2	22.3	541.0
2014	-	0.1	4.8	1.3	+	6.1	141.8
2015	-	0.3	17.5	4.7	0.1	22.7	471.9
2016		0.4	5.5	2.0	0.02	8.0	171.1
2017		0.4	5.4	4.1	0.1	10.0	299.8
2018		0.6	10.4	0.9	0.01	11.91	286.5
2019	-	-	-	-	-	0	0
2020	-	-	-	-	-	-	-
2021	-	0.0	4.8	0.3	-	5.2	129.4

Table 12.3.4. Initial quota and final TAC and landings by seasons.

Fishing season	Initial advice	Final TAC	Landings
1992/93 ¹	500	900	788
1993/94 ¹	900	1250	1179
1994/95	950	850	842
1995/96 ¹	800	1390	930
1996/97 ¹	1100	1600	1571
1997/98	850	1265	1245
1998/99	950	1200	1100
1999/00	866	1000	934
2000/01	650	1090	1065
2001/02	700	1300	1249
2002/03	690	1000	988
2003/04 ²	555	900	741
2004/05 ³	335	985	783
2005/06	No fishery	235	238
2006/07	No fishery	385	377
2007/08	207	207	202
2008/09 ⁴	No fishery		15
2009/10	No fishery	150	151
2010/11	No fishery	390	391
2011/12	366	765	747
2012/13	No fishery	570	551
2013/14 ¹	No fishery	160	142
2014/15	225 ⁵	580	517
2015/16	No fishery ⁵	173	174
2016/17	No fishery ⁵	299	300
2017/18	No fishery ⁵	285	287
2018/19	No fishery ⁵	0	0
2019/20	No fishery ⁵	0	0
2020/21 ⁶	170 ⁵	127	129

1) The final TAC was set on basis of autumn surveys in the season.

2) Indices from April 2003 were projected back to October 2002.

3) The initial quota was set on a basis of an acoustic survey in June/July 2004

4) No fishery was allowed, 15 000 t was assigned to scouting vessels.

5) Initial advice based on low probability of exceeding final TAC.

6) Preliminary landings.

Table 12.7.1 Icelandic capelin in the Iceland-East Greenland-Jan Mayen area since the fishing season 1978/79. (A fishing season e.g. 1978/79 starts in summer 1978 and ends in March 1979). Recruitment of 1-year-old fish (unit 10³) as measured in autumn survey. Spawning stock biomass ('000 t) is given at the time of spawning at the end of the fishing season. Landings ('000 t) are sum of total landings in the season.

Season (Summer/winter)	Recruitment	Landings	Spawning stock biomass
1978/79	-	1195	600
1979/80	22	980	300
1980/81	23.5	684	170
1981/82	21	626	140
1982/83	68	0	260
1983/84	44.1	573	440
1984/85	73.8	896	460
1985/86	33.8	1312	460
1986/87	58.6	1334	420
1987/88	2.6	1116	400
1988/89	43.9	1036	440
1989/90	29.2	807	115
1990/91	27.2	313	330
1991/92	60	677	475
1992/93	104.6	788	499
1993/94	100.4	1178	460
1994/95	119	864	420
1995/96	165	930	830
1996/97	111.9	1570	430
1997/98	66.8	1246	492
1998/99	121	1100	500
1999/00	89.8	932	650
2000/01	103.7	1071	450
2001/02	101.8	1249	475
2002/03	-	988	410
2003/04	4.9	742	535
2004/05	7.9	784	602
2005/06	-	247	400
2006/07	44.7	377	410
2007/08	5.7	203	406
2008/09	12.6	150	328
2009/10	15.4	151	410
2010/11	101.2	391	411
2011/12	9.6	747	418
2012/13	19.4	551	417
2013/14	60.7	142	424
2014/15	58	518	460
2015/16	5.4	174	304*

Season (Summer/winter)	Recruitment	Landings	Spawning stock biomass
2016/17	9.4	300	361*
2017/18	25.9	287	352*
2018/19	10.3	0	127*
2019/20	81.5	0	157*
2020/21	146.3	129	344*

* Based on predation model in current HCR.

12.19 Figures

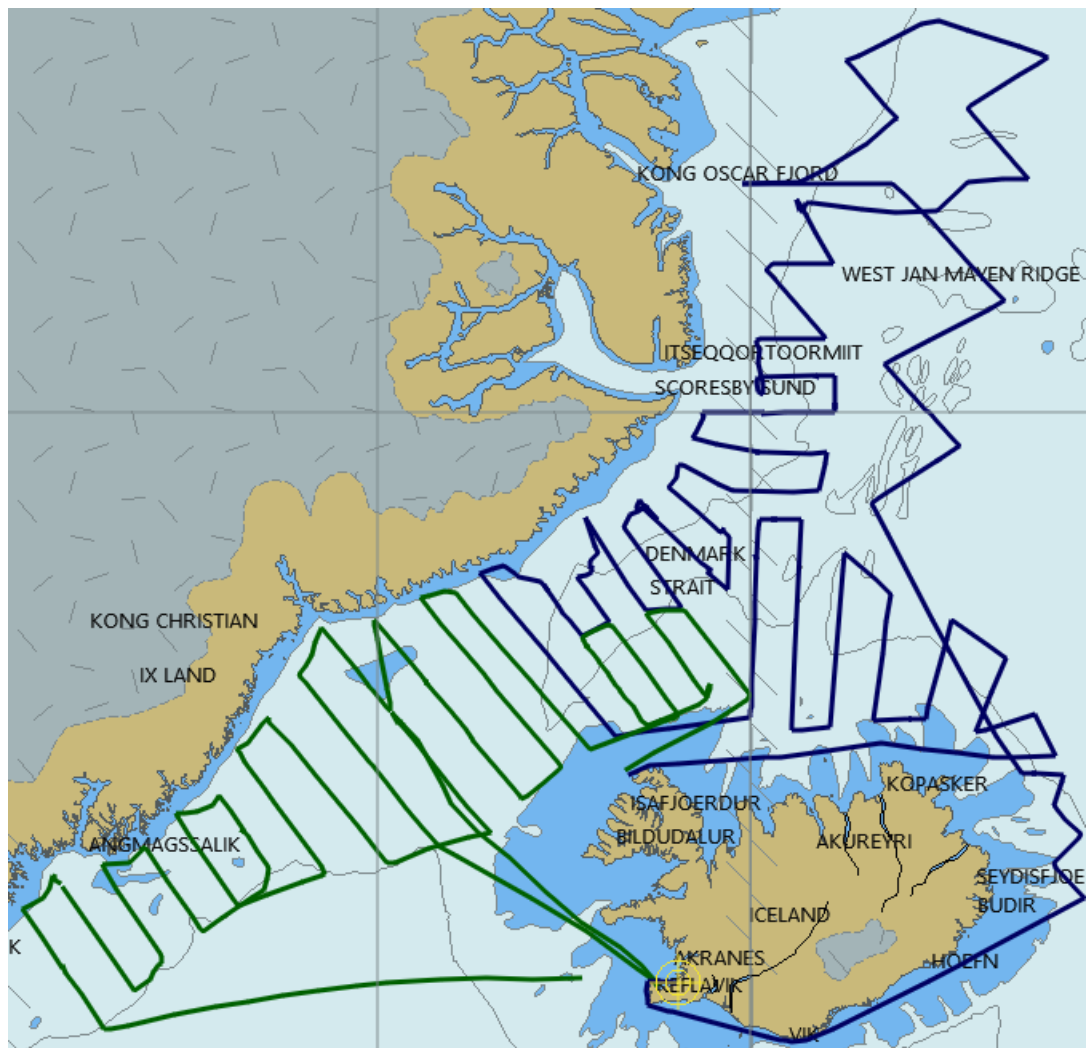


Figure 12.2.1. Icelandic capelin. Cruise tracks during an acoustic survey by r/v Arni Fridriksson (blue) and Eros (GREEN) during 7 September – 5 October 2020.

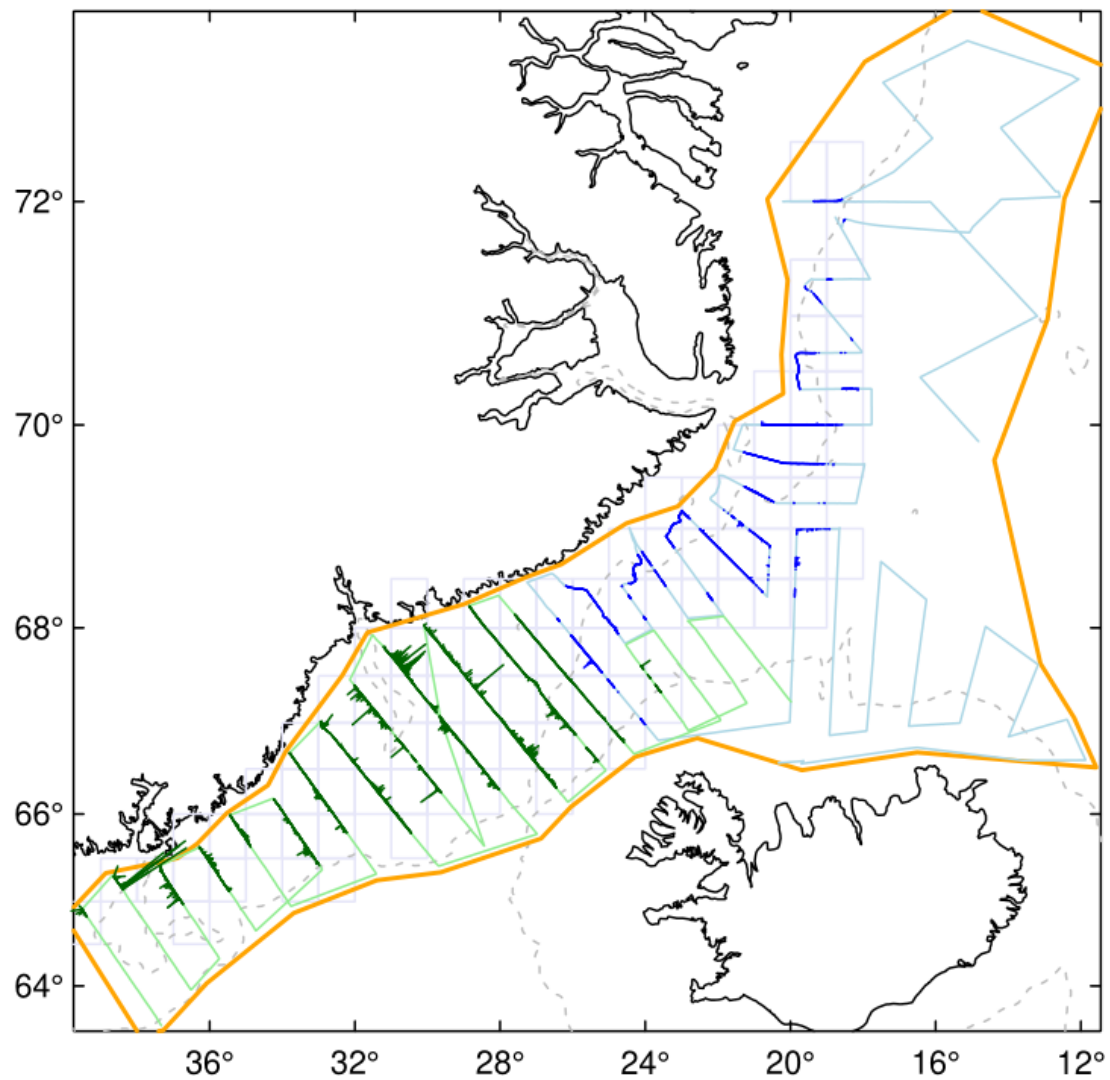


Figure 12.2.2. Icelandic capelin. Relative density and distribution of capelin shown as peri bars during an acoustic survey by r/v Arni Friðriks-son Eros during 7 September – 5 October 2020.

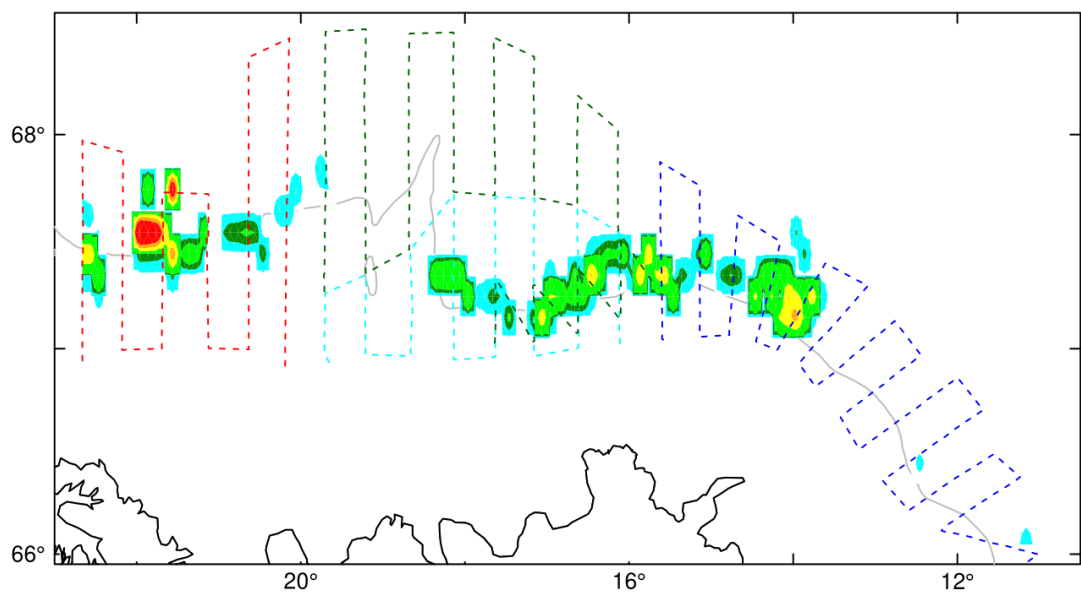
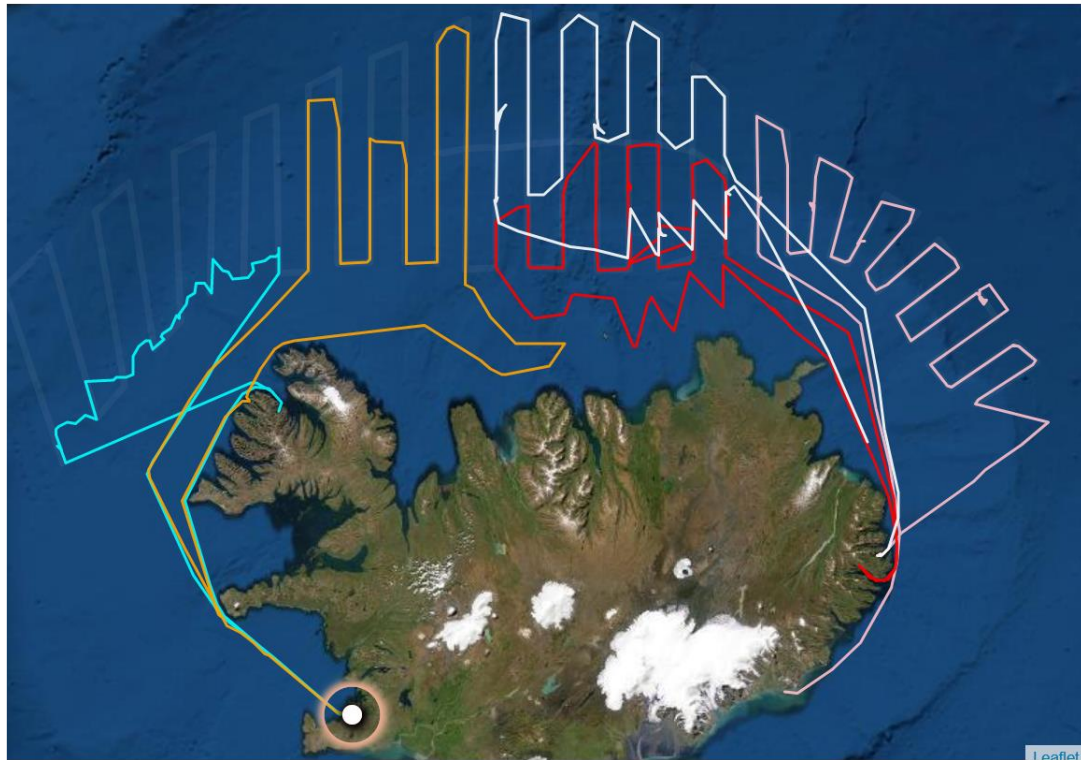


Figure 12.2.3. Icelandic capelin. Survey tracks (A) of the participating vessels during 4–9 January 2021 and distribution (B) of capelin.

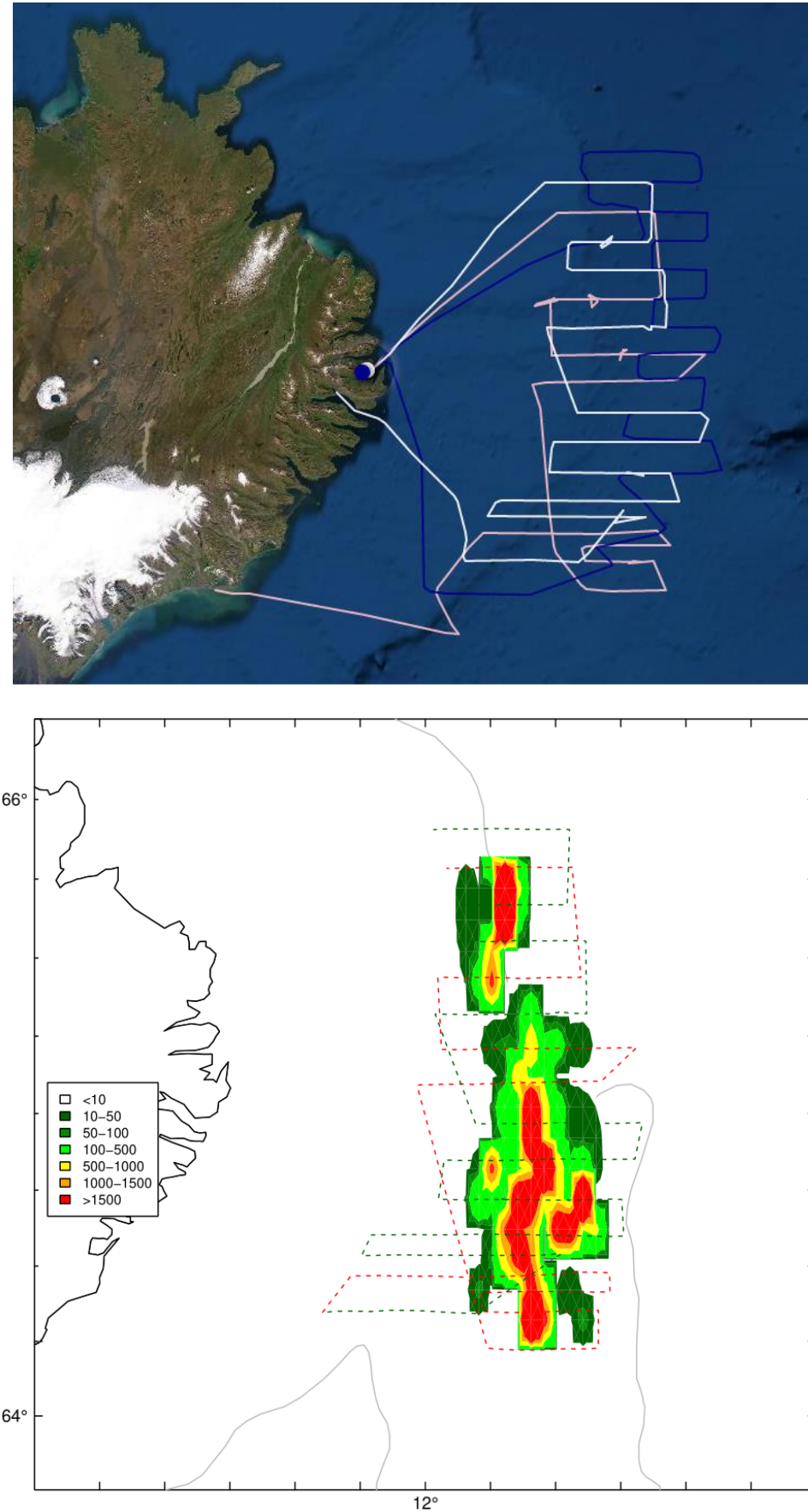


Figure 12.2.4. Icelandic capelin. Survey tracks (A) of participating vessels during 17–20 February 2021 and distribution (B) of capelin.

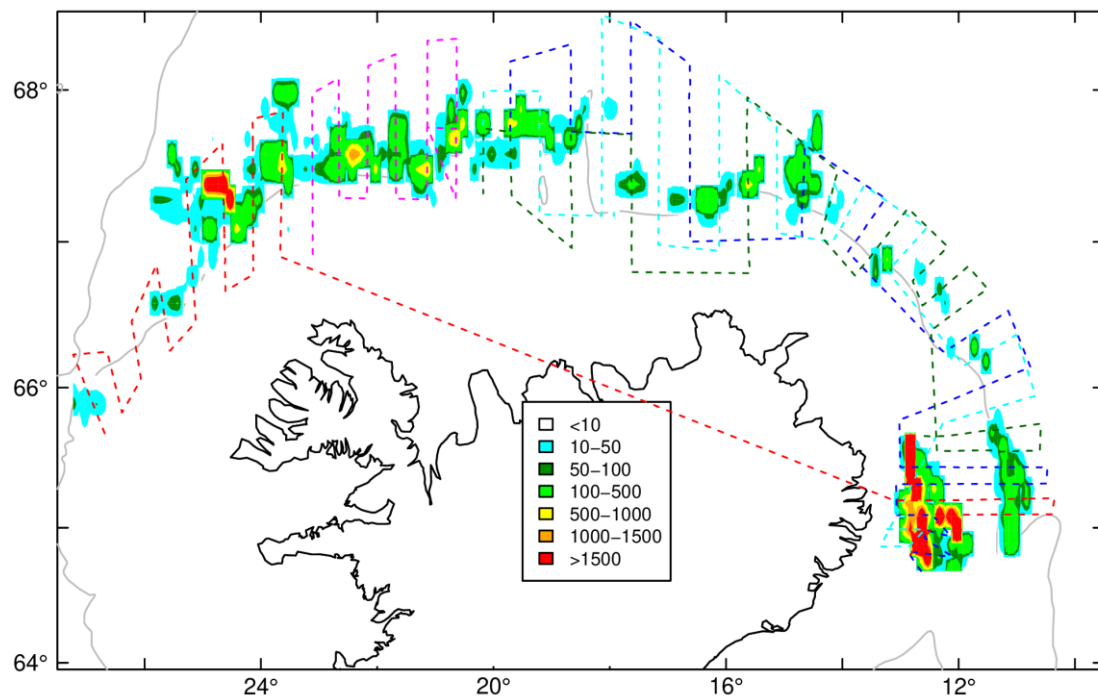
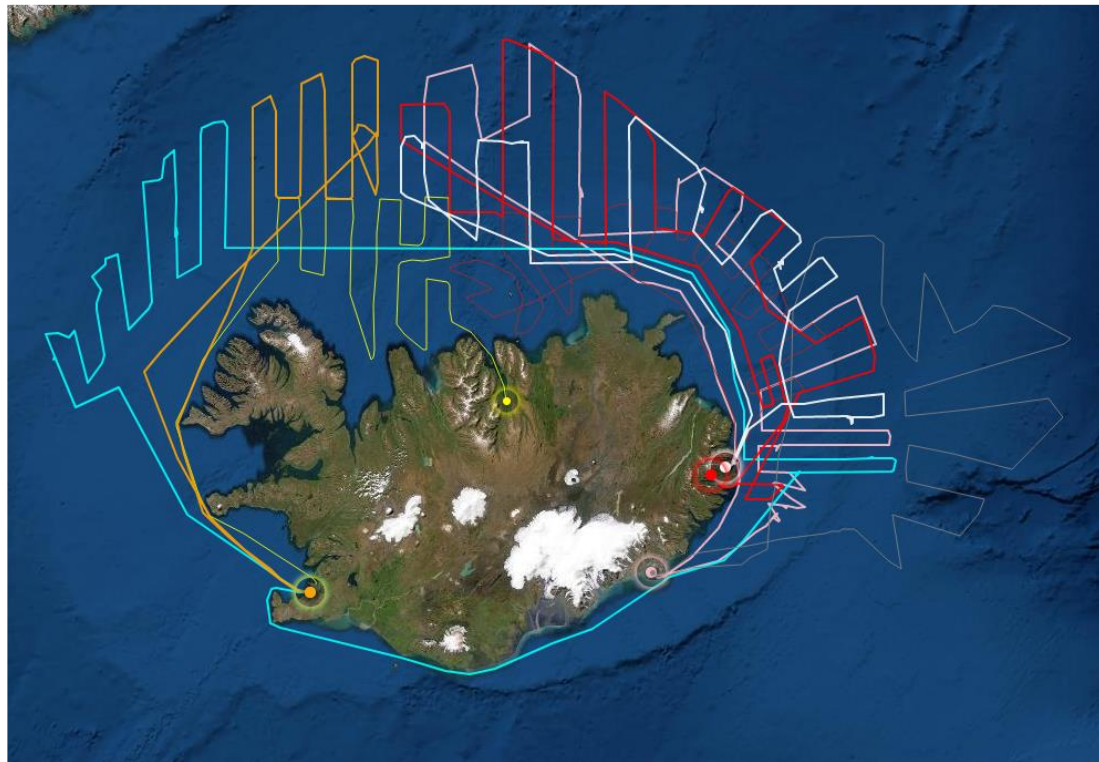


Figure 12.2.5. Icelandic capelin. Survey tracks (A) of participating vessels during 26–30 January 2021 and distribution (B) of capelin.

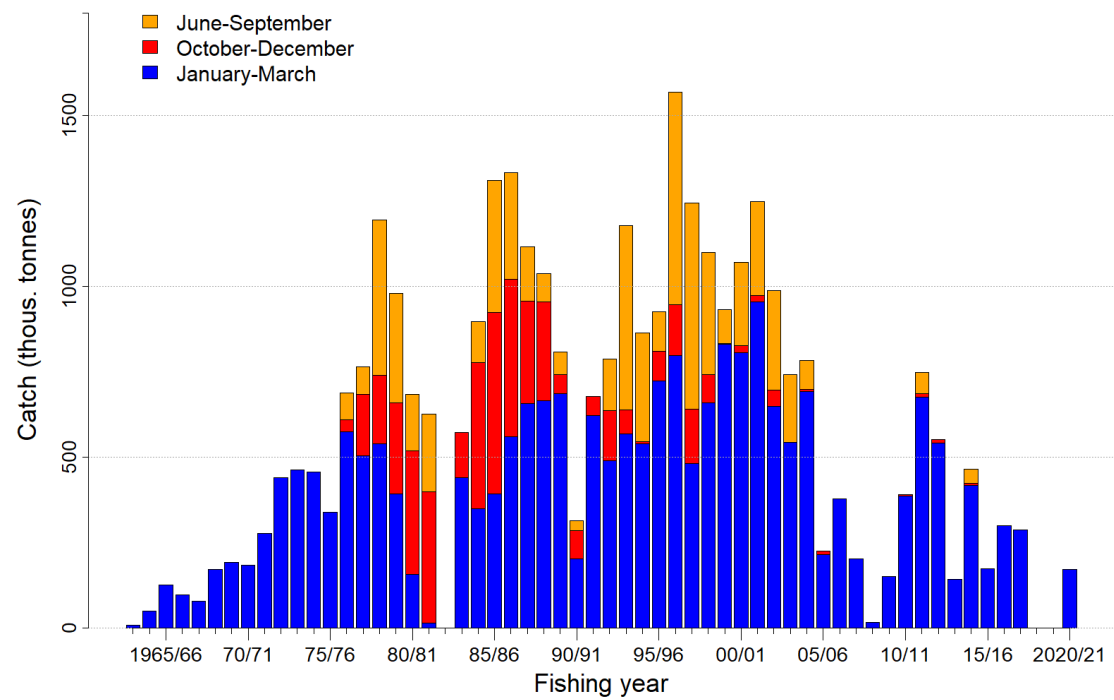


Figure 12.3.1. Icelandic capelin. The total catch (in thousand tonnes) of the Icelandic capelin since 1963/64 by season.

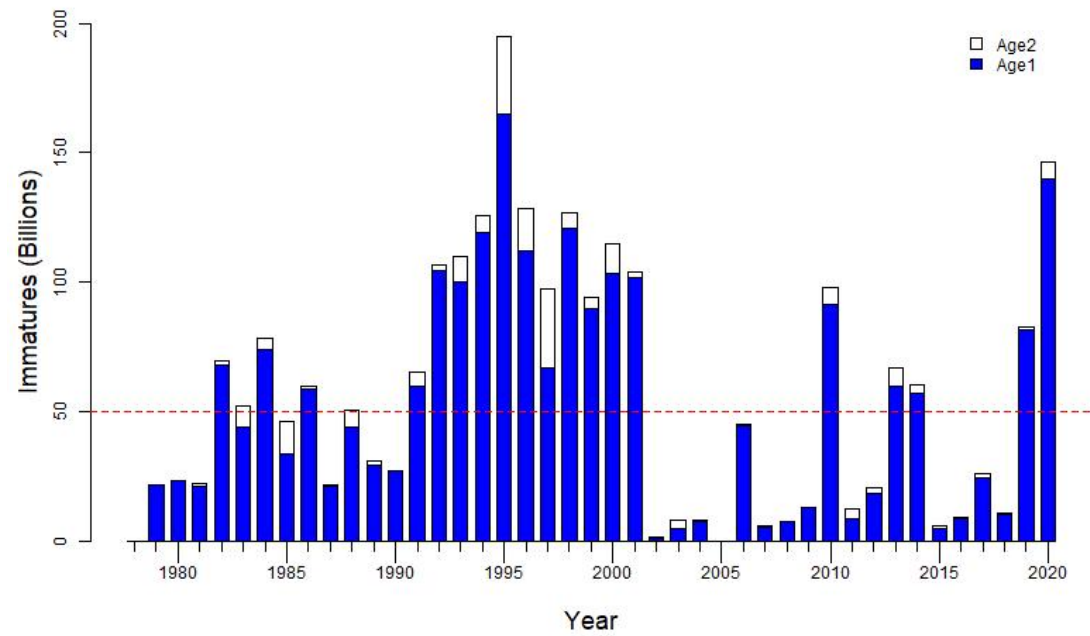


Figure 12.7.1. Icelandic capelin. Indices of immature 1 and immature 2 years old capelin from acoustic surveys in autumn since 1979.

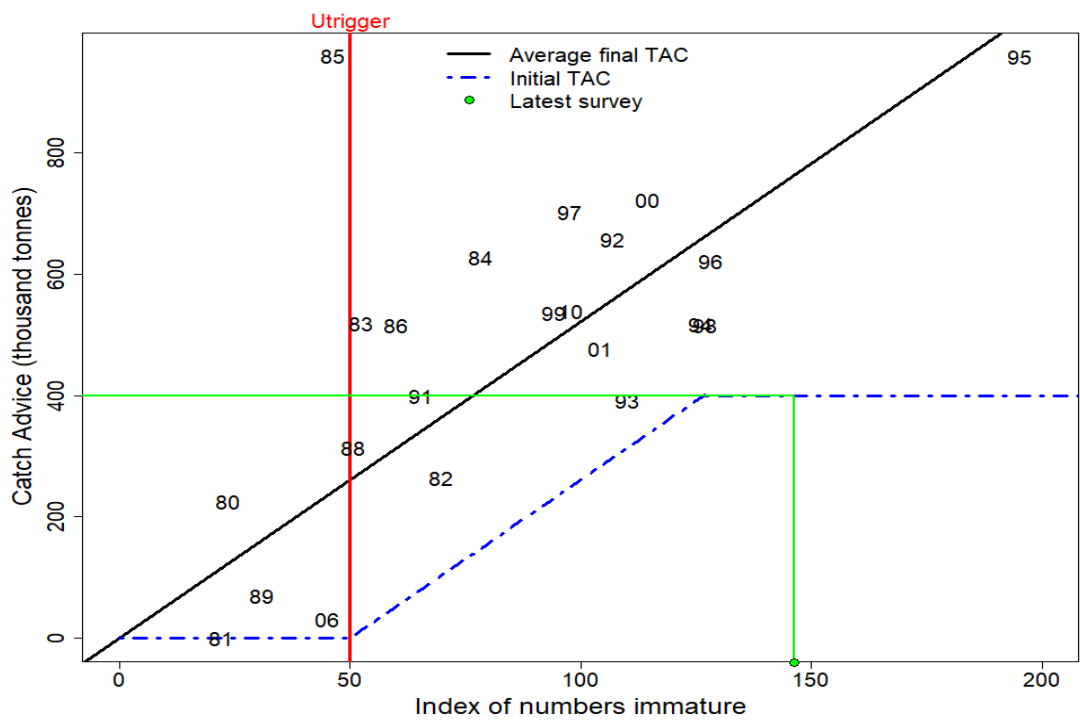


Figure 12.7.2 Icelandic Capelin. Catch advice according to the proposed stochastic HCR, based on the measured number of immature capelin about 15 months earlier. The figure shows the estimated final TAC (black unbroken line) and the initial (preliminary) TAC (blue dashed line). The latter is set using a Utrigger (red vertical line) of 50 billion immature fish, with a cap on the initial (preliminary) TAC of 400 kt. The green lines show the index value from the autumn survey 2020, with the corresponding initial TAC for 2021/2022 shown on the y-axis. (The figure adapted from stock-annex, WKICE 2015).