

**Advice for TAC of
Capelin in the Iceland-East Greenland-Jan Mayen area
for
the 2020/2021 fishing season
based on
Autumn survey (7. September – 5. October 2020).**

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Advice for the mature/maturing part of the stock (for current season)

Based on current HCR the Marine Research Institute advises **0** catch of capelin during the fishing year 2020/2021. This TAC advice set at catch giving 5% probability that the spawning stock biomass will be below 150 000 t ($p(\text{SSB} < \text{Blim} = 150\text{kt}) < 0.05$), is a re-evaluation of earlier advice (of 170 000 tonnes) from autumn 2019. This advice will be revised based on the results of acoustic measurements in early 2021.

Summary of results

Below are results for the advice on TAC for the maturing part in current season. This methodology is in accordance with the Stock Annex for the capelin stock in the Iceland-East Greenland- Jan Mayen area (WKICE2015).

Inputs: Bootstrap replications of survey estimates of SSB fed into the predation model.

Bootstrap model:

Acoustic and biological data from the collaborative acoustic autumn surveys in 2020 were used. The capelin stock was covered once during the surveys. Stock estimates were made based on average nautical area backscattering coefficient (NASC) within quadrangles split into 3 subareas, which had quadrangles of 30 x 60 minutes latitude and longitude (See survey report). The squares, trawl stations, and biological samples within each subarea (strata) were bootstrapped with 10 000 replications to estimate the coefficient of variation (CV) as an estimate of uncertainty (Table 1).

Table 1 Quantiles of stock assessment. Where, EA = Echo Abundance (NASC*Area, millions m²), N = Number of individuals (Billions), B = Biomass (Thous. tonnes), SS. = mature, imm. = immature.

	<i>Mean</i>	<i>CV</i>	<i>5%</i>	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>95%</i>
<i>EA</i>	7.94	0.19	5.7	6.84	7.79	8.9	10.71
<i>N</i>	162.12	0.21	112.17	137.11	158.74	183.13	224.91
<i>B</i>	1075.08	0.18	796.21	938.4	1058.18	1193.12	1405.2
<i>SSN</i>	15.69	0.2	11.01	13.48	15.44	17.64	21.18
<i>SSB</i>	342.42	0.18	246.55	298.76	338.23	382.57	450.29
<i>ImmN</i>	146.43	0.23	97.49	121.99	142.9	167	208.13
<i>ImmN1</i>	139.99	0.24	92.03	116.19	136.41	160.32	200.06
<i>ImmN2</i>	6.43	0.41	2.89	4.56	6.04	7.85	11.23
<i>ImmB</i>	732.66	0.22	498.33	615.01	717.11	833.43	1022.61
<i>Prop. N3 in SSB</i>	0.09	0.39	0.05	0.06	0.08	0.11	0.16
<i>Prop. B3 in SSB</i>	0.11	0.4	0.06	0.07	0.1	0.13	0.19

Predation model results:

Harvest control rule for this stock was adopted by managers in spring 2015. The HCR is based on leaving 150 thous. tonnes of capelin to spawn with 95% probability. The HCR incorporates uncertainty in stock size estimates and model estimation of predation by cod, haddock and saithe on capelin.

The model predictions give, when catch is 0 tonnes, less than 95% probability that there will be 150 000 tonnes (Blim) left for spawning at assumed spawning time the 15. March 2021 (Figure 1 **Error! Reference source not found.** & 2 and Table 2).

Table 2 Quantiles and mean of SSB at time of spawning (15. March) and total predator consumption in thous. tonnes based on the predation model.

	<i>Mean</i>	<i>5%</i>	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>95%</i>
<i>SSB</i>	187	86.83	138.99	181.85	229.33	304.04
<i>Predation</i>	156	83.66	118.98	150.64	187.91	247.49

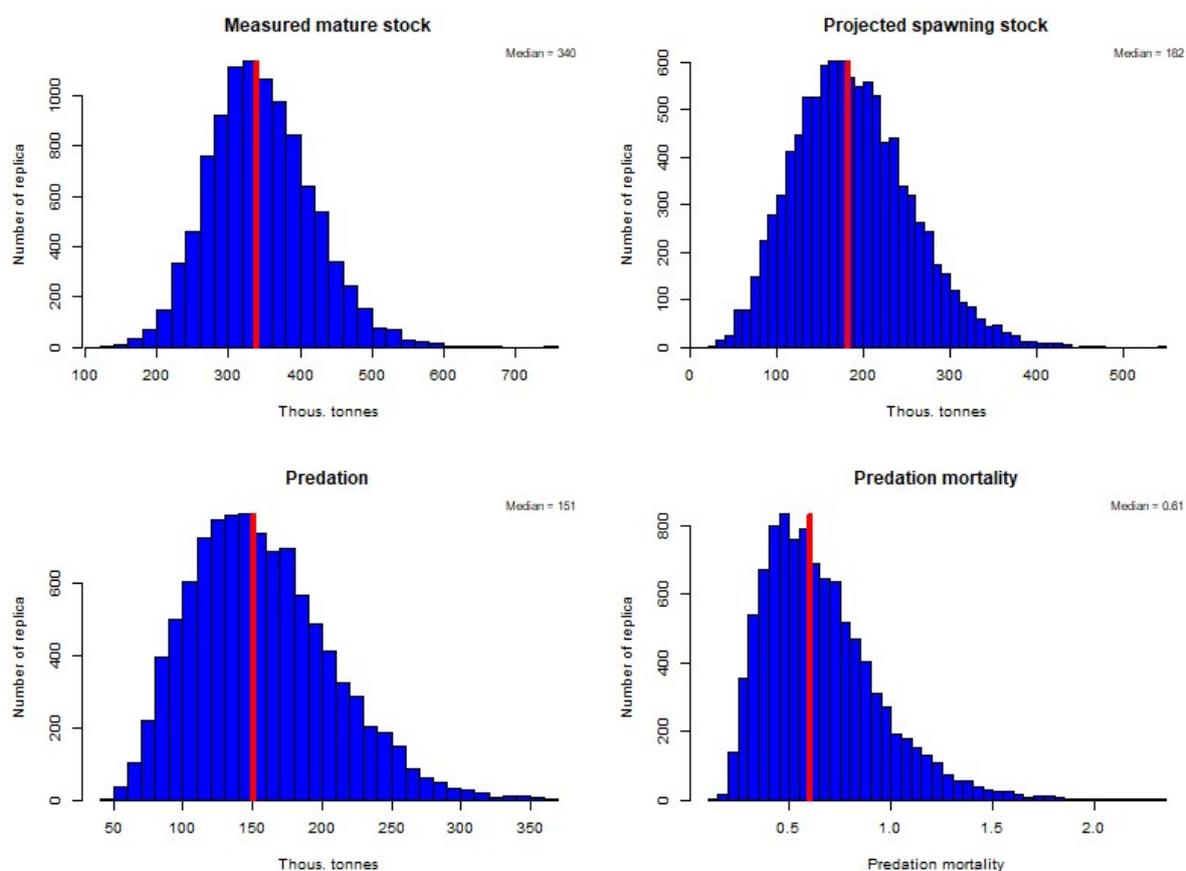


Figure 1 Summary of results from the 2020 autumn acoustic survey and predation model predictions. Biomass survey estimates of mature capelin (top-left), the projected spawning stock biomass left for spawning based on the predation model (top-right), predicted predation in tonnes (bottom-left) and the applied predation mortality (bottom-right).

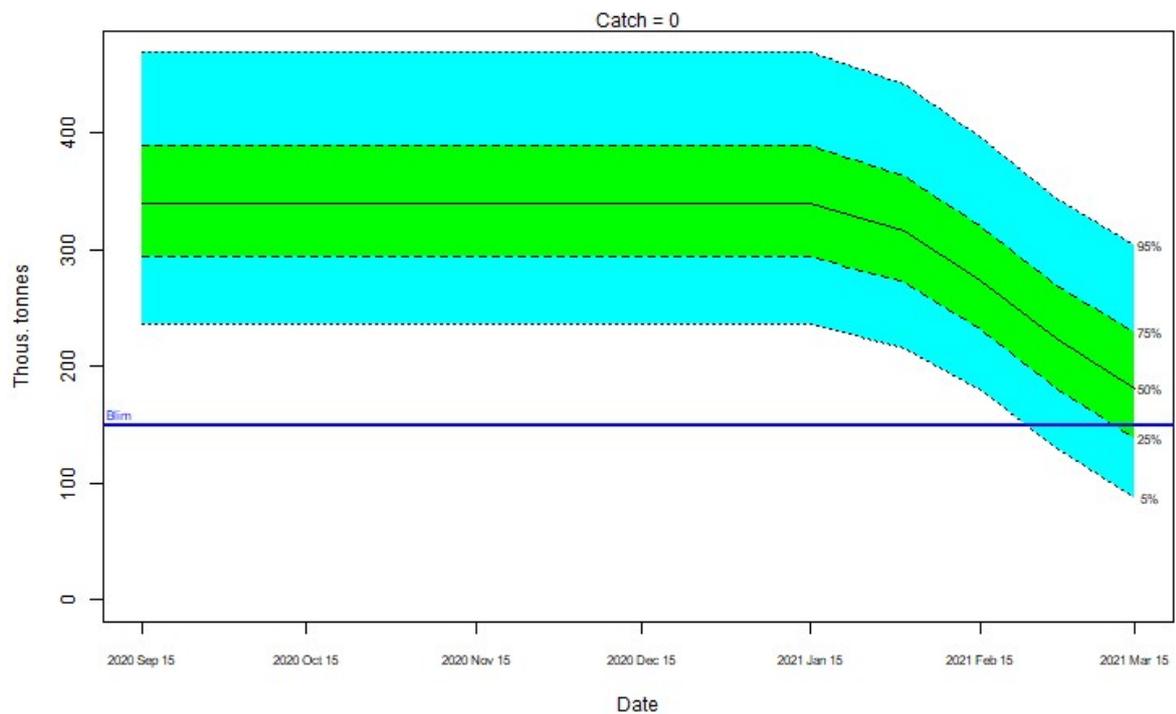


Figure 2 Predicted development of the SSB with no catch based on the predation model.

Issues relevant to the advice:

Sea ice in part of the northern survey areas prevented survey coverage slightly from what had been planned. In some of these areas capelin was found. Thus, this might have caused an unquantifiable underestimation of the size of the mature part of the stock.

References:

ICES. 2015. Report of the Benchmark Workshop on Icelandic Stocks (WKICE), ICES CM 2015/ACOM:31. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/WKICE%202015/wkice_2015_final.pdf