

NEAFC request to ICES to define the fisheries that use collection bags in the NEAFC Regulatory Area (ICES subareas 1 and 2) and to assess their impact on species caught and bycaught

Advice summary

Shrimp trawl fisheries in the NEAFC Regulatory area are obliged to use sorting grids; regulations on the use of collecting bags vary by country, however, with some prohibiting their use and others allowing it. ICES advises that the use of collecting bags in these fisheries in the NEAFC Regulatory Area (RA) began in around 2010; there are currently seven vessels reporting the use of collecting bags, with Atlantic cod and Greenland halibut being the main bycatch fish species. The discard ratios of the commonly-caught species Atlantic cod, Greenland halibut, and American plaice (long rough dab) are generally less than 5% of the total catch. Available data did not allow for definitive conclusions to be made regarding the catch of juvenile fish in collecting bag fisheries compared to the catch with other gears in the same area. Theoretical analyses, assuming fishing with a codend with diamond-mesh size of 35 mm, a Nordmøre grid with bar spacing 22 mm and collecting bag with diamond-mesh size of 135 mm, estimated the percentage of fish in collecting bags that would be considered below minimum landing size (MLS) to be 1.1% for Atlantic cod and 12.1% for Greenland halibut. The proportion of undersized fish that could be retained, however, is expected to vary depending on the size composition of the species in the area of the fishery. The fishery using collecting bags appears to occur primarily on the north western boundary of the Loophole area of the NEAFC Regulatory Area (RA) 3 (ICES Subdivision 27.1.a). There was a clear seasonal trend in the landings of some of the species caught in the Loophole in the collecting bag fishery. Atlantic cod had a strong increasing trend of landings per unit effort from Q1 to Q4. For northern shrimp the opposite trend was found, with a decreasing pattern in landings per unit effort through the year. No trend was detected for Greenland halibut. Comparison of reported landings in the collecting bag fishery relative to all other fisheries in subareas 1 and 2 for Atlantic cod, Greenland halibut, haddock, and redfish indicate that the catches of these species in the collecting bag fisheries represent a small proportion of total catches.

Request

ICES is requested to identify and detail the collecting bag fishery in the NEAFC Regulatory Area (ICES subareas 1 and 2) in order to assess the impact on species caught and by-caught in this fishery.

In doing so, ICES is requested specifically to:

- a) list and describe the conservation, technical and management measures concerning collecting bags established for the high seas and those adopted for areas under national jurisdictions,*
- b) assess the amount of juvenile fish caught (below minimum legal landing/conservation size) by species in collecting bags and compare them with other gears used in the same area,*
- c) describe the history of collecting bag fishery, e.g. the fish species being caught and by-caught in this fishery,*
- d) establish whether there is a seasonal pattern in caught and by-caught species,*
- e) estimate the amount of annual catches, by-catches and discards and the catchability of vessels in the fisheries, and compare them with other gears used in the same area to catch fish species identified under item d),*
- f) provide maps of areas where the collecting bag fishery is taking place.*

ICES may provide its advice on other aspects of the fishery using the collecting bags it deems necessary.

The collecting bag fishery is defined as the fishery targeting shrimp is using on a standard shrimp trawl an extra codend for catching fish as by-catch. The extra codend called as "collecting bag" is placed on fish escapement opening before Nordmøre grids.

Elaboration on the advice

- a) Conservation, technical and management measures concerning collecting bags established for the high seas and those adopted for areas under national jurisdictions.*

Collecting bags (also called 'collection bags' or 'extra codends') are used in connection with sorting grids in shrimp trawl fisheries. All nations active in shrimp trawl fisheries within the NEAFC regulatory areas have adopted sorting grids as a measure to reduce bycatch. The Nordmøre grid is the most commonly used sorting grid in the shrimp fisheries. The

collecting bag is an extra codend mounted on the fish escape opening of a sorting grid of a standard shrimp trawl for retaining groundfish as bycatch. The use of sorting grids applies both in domestic as well as international waters, i.e. areas beyond national jurisdictions (Table 1). The prescribed maximum bar spacing of the sorting grid varies by country or geographical area, between 19 and 22 mm, which largely excludes bycatch of roundfish larger than 25 cm. In the NEAFC regulatory area, the NEAFC recommendation 11:2015 (NEAFC, 2015) specifies that spacing should not exceed 22 mm. The regulations on the use of collecting bags, vary by country with some prohibiting its use while others allow it (Table 1). Where allowed, mesh sizes in the collecting bags are not always specified. However, it is noted that the mesh sizes in place in the targeted fisheries for demersal species in the area vary between 130 and 140 mm.

Table 1 Regulations associated with the use of sorting grids and collecting bags in the shrimp trawl fisheries of NEAFC member countries by area and nation.

Area	Country	Sorting grid	Collecting bag	Reference
International waters, Barents Sea	Iceland	Mandatory	Allowed, 135 mm mesh, but bycatch of cod is prohibited (<i>Loophole agreement</i>)	Einarsson <i>et al.</i> (2018)
	Faroe Islands	Mandatory (coastal state regulations, cf. Svalbard Treaty)	Prohibited (coastal state regulations, cf. Svalbard Treaty)	High Commissioner of the Faroe Islands (2021)
	Norway	Mandatory	Prohibited	Forskrift om utøvelse av fisket i sjøen (2005); Forskrift om utforming og innmontering av sorteringsrist i rekestrål (2012)
	EU	Mandatory	Allowed, in use by some EU countries	-
	Russia	Mandatory	Prohibited	Ministry of Agriculture of the Russian Federation (2021); JRNFC (2021)
	UK	Mandatory	Allowed	-
Icelandic Exclusive Economic Zone (EEZ)	-	Mandatory	Allowed	Einarsson <i>et al.</i> (2018)
Faroe Islands EEZ	-	Unknown	Unknown	-
Norwegian EEZ south of 62°N	-	Mandatory	Allowed, 122/160 mm mesh	Forskrift om utforming og innmontering av sorteringsrist i rekestrål (2012)
Norwegian EEZ north of 62°N	-	Mandatory	Prohibited	Forskrift om utforming og innmontering av sorteringsrist i rekestrål (2012)
EU EEZ	-	Mandatory	Allowed	Regulation (EU) 2019/1241 (2019)
Russian EEZ	-	Mandatory	Prohibited	Ministry of Agriculture of the Russian Federation (2021); JRNFC (2021)
Greenland EEZ	-	Mandatory	Prohibited	-
UK EEZ	-	Mandatory	Allowed	The Shrimp Fishing Nets Order 2002, amended by Fisheries Act 2020

- b) *Catches of juvenile fish in collecting bags: assess the amount of juvenile fish caught (below minimum legal landing/conservation size) by species in collecting bags and compare them with other gears used in the same area.*

Few detailed data were provided by ICES member countries to allow for the adequate estimation of the retention of juvenile fish caught in collecting bags in comparison with other gears used in the same area. This limited the type of analyses on the retention and discarding of fish (mostly juveniles) to using the data submitted by Estonia.

The available data from a published study (Hubel, 2020) and from theoretical analyses based on gear selectivity for a combination of 135 mm mesh codend and grid with bar spacing of 22 mm (ICES, 2021a) provided information on the percentage of fish in collecting bags that are considered to be juveniles (using the Norwegian and Russian Minimum Landings Sizes for areas north of 62 degrees latitude - see Annex A). For Atlantic cod the percentages were 1.7% and 1.1%, while for Greenland halibut these percentages were 9.1% and 12.1% respectively for the published study and the theoretical analyses (Table 2).

Fishery observations of discards (largely juveniles) in the Estonian fishery provided information on the proportion of fish (in weight) caught in the collecting bag and the codend that are then discarded. Mean discards in the Estonian collecting bag fishery ranged from 0.7% to 3.3% for cod and from 0.7% to 5% for Greenland halibut.

The theoretical analyses also provided estimates of the percentage of fish below the minimum landing sizes (44 cm for cod and 45 cm for Greenland halibut) entering the trawl that would be expected to be retained in the collecting bag and the codend. The case-specific theoretical analyses indicated that 43.6% of cod below the minimum landing size would be retained, while 87.2% of Greenland halibut below the minimum landing size would be retained (ICES, 2021a). Note, however, that these percentages depend on the characteristics of the theoretical fishery; the effect of an actual fishery would depend on the size distribution and relative proportion of fish below the MLS in the fished area. The retention of the collecting bag only is considered to be similar to that of a codend of a standard bottom trawl using the same mesh size.

Table 2 Summary of information on the percentage of juvenile fish (i.e. below minimum landing size) relative to the total numbers caught in the study conducted by Hubel (2020) and in the theoretical analysis (ICES, 2021a) and the % of discards by weight in the Estonian fishery based on observer data

Species	Year	Data source	% discards by weight	% juvenile fish by numbers
Atlantic cod	-	Hubel (2020); Estonian shrimp trawl fishery, traditional 135 mm collection bag codend	-	1.7
	-	ICES (2021a); theoretical analysis	-	1.1
	2017	Estonian Observer dataset	1.8	
	2018	Estonian Observer dataset	2.6	
	2019	Estonian Observer dataset	0.7	
	2020	Estonian Observer dataset	3.3	
Greenland halibut	-	Hubel (2020); Estonian shrimp trawl fishery traditional 135 mm collection bag codend	-	9.1
	-	ICES (2021a); theoretical analysis	-	12.1
	2017	Estonian Observer dataset	0.9	
	2018	Estonian Observer dataset	5.0	
	2019	Estonian Observer dataset	2.6	
	2020	Estonian Observer dataset	0.7	
Haddock	-	ICES (2021a); theoretical analysis		5.5
Redfish	-	ICES (2021a); theoretical analysis		5.4
	2017	Estonian Observer dataset	98.9	
	2018	Estonian Observer dataset	-	
	2019	Estonian Observer dataset	-	
	2020	Estonian Observer dataset	100.0	
American plaice (long rough dab)	2017	Estonian Observer dataset	2.1	
	2018	Estonian Observer dataset	0.0	
	2019	Estonian Observer dataset	1.1	
	2020	Estonian Observer dataset	3.8	

c) History of the collecting bag fishery, e.g. the fish species being caught and by-caught in this fishery.

The history of the collecting bag fishery is linked to the introduction of the Nordmøre grid in shrimp fisheries in Iceland. In the North Atlantic, the use of the Nordmøre grid has been mandatory in shrimp fisheries in almost all countries since the early 1990s. Implementing grids in the North Atlantic shrimp fishery minimised unwanted bycatch of undersized species like redfish, cod, and Greenland halibut.

Before the Nordmøre grid became mandatory in Iceland in 1995, the Icelandic shrimp fishery in ICES Division 5.a was landing bycatch species in hundreds of tonnes every year. Once the use of the grid became mandatory, the fish bycatch dropped considerably. A gear trial in 2005, using a small mesh cover bag (e.g. a collecting bag) over the release opening of the Nordmøre grid, was followed by an industry-requested trial using a collecting bag with 135 mm mesh to select possible bycatch of fish species in commercial sizes. The idea was to diversify the offshore shrimp fishery with additional revenue from bycatch during the period of low shrimp quota (Einarsson *et al.*, 2018). This trial showed a low number of retained under-sized fish in the collecting bag. Permission to use collecting bags was granted; their use in the commercial fishery in Iceland, however, only began in 2008 as the offshore shrimp fishery was largely inactive until then.

According to Hubel (2020) the collecting bag fishery started in NEAFC RA 3 (ICES Subdivision 27.1.a) in the 2010–2012 period, involving deep sea freezing trawlers from Iceland and EU (Estonia). Other ICES member countries, such as Lithuania, Poland, Latvia, and UK then also began the use of this fishing method in this area. As the design of the collecting bag has not been regulated in NEAFC waters, trawlers used different gear designs. Over the history of the fishery, seven vessels from Estonia, three vessels from Lithuania, and one vessel from UK have declared the use of the collecting bag in shrimp trawls for catching groundfish as bycatch in the Northeast Arctic (ICES, 2021a). In 2020, seven vessels used this gear (three Estonian, three Lithuanian and one from UK). Denmark, Lithuania, and Estonia have reported using collecting bags with 130–140 mm diamond-mesh in shrimp fisheries. Estonia specifically reported using 135 mm mesh. The use of collecting bags in NEAFC RA 3 takes place in the trawl shrimp fishery: cod and Greenland halibut are the main fish species caught, but other species include American plaice (long rough dab), haddock and redfish.

d) Seasonal patterns in caught and by-caught species.

There was a clear seasonal trend in the landings of some of the species caught in the Loophole (NEAFC RA 3, ICES Subdivision 27.1.a) in the collecting bag fishery conducted by Estonian vessels in the period 2015–2020 (ICES, 2021a). Cod was the only species with a strong increasing trend of landings per unit effort from Q1 to Q4. This is considered to be related to the migration from and to the spawning grounds near the coast. For northern shrimp, the opposite trend was found with a decreasing pattern in landings per unit effort through the year. No trend was detected for Greenland halibut. Trends for other species (e.g. redfish, haddock, American plaice, wolffishes) that could be caught in the collecting bag fishery were not examined, since they were not reported in the landings data set.

e) Catches, by-catches and discards and the catchability of vessels in the fisheries (estimate the amount of annual catches, by-catches and discards and the catchability of vessels in the fisheries, and compare them with other gears used in the same area to catch fish species identified under item d).

The last available ICES fisheries nominal catch statistics reported for 2019 around 19 892 tonnes of shrimp landed in the NEAFC RA 3 (ICES Subdivision 27.1.a; Table 3), accounting for around 27% of the overall annual catch of 73 582 tonnes of shrimp in ICES subareas 27.1 and 27.2. There are no catches of shrimp in the ICES divisions 27.2.a.1 and 27.2.b.1, which are also in the NEAFC RA.

Comparison with other gears in the same areas was limited to the shrimp fishery with and without collecting bags. In the shrimp fishery without the collecting bags, the bycatch ratio of cod and Greenland halibut were negligible and represented 0.06% and 0.02% (by weight) of the combined catch of shrimp and the species respectively in the period 2016–2020 (section 4.2.4.7 of ICES 2021a). In the fishery with collecting bags, the bycatch ratio of cod and Greenland halibut in the Estonian fishery were 13.6% and 10.9% of the shrimp and the species catch respectively in the period 2014–2020.

Landings in 2019 in the NEAFC RA 3 amounted to 7558 tonnes for cod and 1084 tonnes for Greenland halibut. Assuming the same bycatch ratios as in the Estonian fishery with collecting bags, additional annual landings of 3131 tonnes of cod

and 2433 tonnes of Greenland halibut could have been expected if all the vessels in the shrimp trawl fishery would have used a collecting bag.

Table 3 Landings (tonnes) in 2019 in the NEAFC RA 3 (ICES Subdivision 27.1.a) of the main species caught.

Species Code	Common name	Species name	Landings (tonnes)
PRA	Northern Shrimp	<i>Pandalus borealis</i>	19 892
COD	Atlantic cod	<i>Gadus morhua</i>	7558
PLA	American plaice	<i>Hippoglossoides platessoides</i>	1493
GHL	Greenland halibut	<i>Reinhardtius hippoglossoides</i>	1084
CRQ	Snow crab	<i>Chionoecetes opilio</i>	696
HAD	Haddock	<i>Melanogrammus aeglefinus</i>	420
POK	Saithe	<i>Pollachius virens</i>	267
RED	Redfish species	<i>Sebastes spp</i>	32
CAS	Spotted wolffish	<i>Anarhichas minor</i>	25
RJR	Thorny skate	<i>Raja radiata</i>	17
CAA	Atlantic wolffish	<i>Anarhichas lupus</i>	7
CAB	Northern wolffish	<i>Anarhichas denticulatus</i>	2
Total			31 494

Discard of northern shrimp in 2020 is quantified to be around 0.5%, with an insignificant effect of the collecting bag. As indicated under item (b) above, mean discards in the Estonian collecting bag fishery ranged from 0.7% to 3.3% for cod and from 0.7% to 5% for Greenland halibut in the period 2017–2020.

Comparison of reported landings in the collecting bag fishery relative to all other fisheries in subareas 1 and 2 for cod, shrimp, Greenland halibut, haddock, and redfish (Tables 4–8) indicate that the catches of these species in the collecting bags represent a small proportion of total catches.

Comparing the catch per unit effort (CPUE) of the shrimp trawl fishery in the NEAFC Regulatory Areas with studies in other regions, the quantified catch rates (kg/h) both for northern shrimp and fish species appear to be higher. No effect of the collecting bag on shrimp CPUE was found in NEAFC RA 3 (ICES Subdivision 27.1.a). Catch rates of shrimp in 2020 were 493 kg/h (478–508 kg/h) in the collecting bag fishery and 499 kg/h (483–516 kg/h) in the codend-only configuration. While there were reports for American plaice, there were no reports of Greenland halibut and cod in the landings of the main codend in the Estonian shrimp fishery. It may be argued that small individuals of cod and Greenland halibut entering the main codend have been either discarded or not reported. In the collecting bag fishery in 2020, catch rates for cod and Greenland halibut in the collecting bags were estimated to be 192 kg/h and 67 kg/h, respectively.

Table 4 Annual landings (tonnes) of Atlantic cod in all fisheries in ICES subareas 27.1 and 27.2 by country. CB – landings from hauls performed in the collecting bag fishery and are the sum of the collecting bag and the main codend. CD – landings from fisheries without the use of a collecting bag.

Device	Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CB	Estonia *	-	-	225	226	249	272	391	796	963	551	698
	Lithuania	-	-	-	-	-	-	-	138	260	455	147
CD	<i>Faroe Islands</i>	<i>15 977</i>	<i>13 429</i>	<i>17 523</i>	<i>13 833</i>	<i>33 298</i>	<i>26 568</i>	<i>24 084</i>	<i>28 637</i>	<i>26 152</i>	<i>22 270</i>	<i>21 679</i>
	<i>France</i>	<i>4499</i>	<i>1173</i>	<i>2841</i>	<i>7858</i>	<i>8149</i>	<i>7480</i>	<i>7946</i>	<i>9554</i>	<i>6605</i>	<i>6371</i>	<i>5796</i>
	<i>Germany</i>	<i>8442</i>	<i>4621</i>	<i>8500</i>	<i>8010</i>	<i>6225</i>	<i>6427</i>	<i>6336</i>	<i>5977</i>	<i>9768</i>	<i>8470</i>	<i>9725</i>
	<i>Greenland</i>	<i>6584</i>	<i>7155</i>	<i>8520</i>	<i>7885</i>	<i>10 864</i>	<i>7055</i>	<i>8607</i>	<i>13 638</i>	<i>12 743</i>	<i>7553</i>	<i>7391</i>
	<i>Iceland</i>	<i>11 299</i>	<i>12 734</i>	<i>9536</i>	<i>14 734</i>	<i>18 205</i>	<i>16 120</i>	<i>16 031</i>	<i>11 925</i>	<i>10 708</i>	<i>12 294</i>	<i>9734</i>
	<i>Norway</i>	<i>264 701</i>	<i>331 535</i>	<i>315 739</i>	<i>438 734</i>	<i>431 846</i>	<i>377 983</i>	<i>348 949</i>	<i>357 419</i>	<i>333 539</i>	<i>282 120</i>	<i>289 472</i>
	<i>Russia</i>	<i>267 547</i>	<i>310 326</i>	<i>329 943</i>	<i>432 314</i>	<i>433 479</i>	<i>381 188</i>	<i>394 107</i>	<i>396 180</i>	<i>340 364</i>	<i>316 813</i>	<i>312 683</i>
	<i>Spain</i>	<i>12 657</i>	<i>13 291</i>	<i>12 814</i>	<i>15 042</i>	<i>16 378</i>	<i>19 905</i>	<i>14 640</i>	<i>14 414</i>	<i>13 143</i>	<i>13 939</i>	<i>11 403</i>
	<i>UK</i>	<i>9091</i>	<i>8210</i>	<i>11 166</i>	<i>12 536</i>	<i>14 762</i>	<i>11 778</i>	<i>13 583</i>	<i>16 731</i>	<i>11 533</i>	<i>11 214</i>	<i>12 113</i>
	<i>Others</i>	<i>9185</i>	<i>17 354</i>	<i>10 856</i>	<i>15 037</i>	<i>12 994</i>	<i>9608</i>	<i>14 748</i>	<i>12 868</i>	<i>12 848</i>	<i>10 559</i>	<i>12 063</i>
Total		609 982	719 828	727 663	966 209	986 449	864 384	849 422	868 277	778 626	692 609	692 904

Note: values in italics come from the ICES report (2020, 2021b) and represent landings of all fisheries.

* Estonia did not report landings from the main codend.

Table 5 Annual landings (tonnes) of Northern shrimp in all fisheries in ICES subareas 27.1 and 27.2 by country. CB – landings from hauls performed in the collecting bag fishery and are the sum of the collecting bag and the main codend. CD – landings from fisheries without the use of a collecting bag.

Device	Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CB	Estonia	-	-	235	486	1821	1476	3523	4592	6082	3866	4257
	Lithuania	-	-	-	-	-	-	-	1138	3593	3869	3267
CD	Estonia	5921	4942	3963	4035	3463	5259	3426	2683	1625	5658	4299
	Lithuania	388	863	679	437	375	691	929	1676	130	445	1000
	<i>Norway</i>	<i>14 158</i>	<i>19 928</i>	<i>14 158</i>	<i>8846</i>	<i>10 234</i>	<i>16 618</i>	<i>10 896</i>	<i>7010</i>	<i>23 126</i>	<i>23 925</i>	<i>19 118</i>
	<i>Russia</i>	-	-	-	<i>1067</i>	<i>741</i>	<i>1151</i>	<i>2491</i>	<i>3849</i>	<i>12 561</i>	<i>28 081</i>	<i>21 265</i>
	<i>Others</i>	<i>4289</i>	<i>4493</i>	<i>5721</i>	<i>4378</i>	<i>4330</i>	<i>8827</i>	<i>9481</i>	<i>9493</i>	<i>8824</i>	<i>7738</i>	<i>8671</i>
Total		24 756	30 226	24 756	19 249	20 964	34 022	30 746	30 441	55 941	73 582	61 877

Note: values in italics come from the NAFO/ICES report (2021) and represent landings of all fisheries.

Table 6 Annual landings (tonnes) of Greenland halibut in all fisheries in ICES subareas 27.1 and 27.2 by country. CB – landings from hauls performed in the collecting bag fishery and are the sum of the collecting bag and the main codend. CD – landings from fisheries without the use of a collecting bag.

Device	Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CB	Estonia	-	-	-	-	-	-	348	515	573	585	569
	Lithuania	-	-	-	-	-	-	-	66	169	371	223
CD	Lithuania	-	234	-	-	-	-	-	-	7.1	6	3.2
	<i>Faroe Islands</i>	272	538	564	783	887	312	483	917	409	350	514
	<i>France</i>	14	80	40	49	33	33	9	21	50	44	72
	<i>Germany</i>	102	46	40	168	269	227	229	177	150	105	49
	<i>Greenland</i>	15	4	12	22	20	14	17	26	32	23	41
	<i>Iceland</i>	16	7	13	106	86	53	79	10	0	9	19
	<i>Ireland</i>	-	-	1	-	-	-	-	-	-	-	-
	<i>Latvia</i>	-	-	-	-	-	-	-	1	-	32	149
	<i>Norway</i>	7700	8270	9331	10 403	11 232	10 874	12 932	13 741	14 712	14 813	14 532
	<i>Poland</i>	3	169	22	30	19	13	8	27	27	122	97
	<i>Portugal</i>	11	21	1	7	-	1	19	13	6	8	28
	<i>Russia</i>	6888	7053	10 041	10 310	10 061	12 953	10 576	10 714	12 072	12 198	12 266
	<i>Spain</i>	182	144	190	196	206	159	198	56	60	87	96
	<i>UK</i>	26	40	35	92	212	104	39	83	134	75	45
Total		15 229	16 606	20 290	22 166	23 025	24 743	24 937	26 367	28 401	28 828	28 703

Note: values in italics come from the ICES reports (2020, 2021b) and represent landings of all fisheries.

* Estonia did not report landings from the main codend.

Table 7 Annual landings (tonnes) of redfish (both beaked redfish and golden redfish) in all fisheries in ICES subareas 27.1 and 27.2 by country. Landings from fisheries without the use of a collecting bag. No landings are reported in the collecting bags.

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<i>Denmark</i>	-	-	-	-	-	1	7	-	1	-	-
<i>Estonia</i>	-	-	-	-	-	-	-	4	-	-	-
<i>Faroe Islands</i>	1150	1008	346	780	810	733	685	566	571	392	315
<i>France</i>	226	228	182	353	434	102	164	62	104	395	164
<i>Germany</i>	52	844	588	81	452	266	497	782	2539	1692	1892
<i>Greenland</i>	84	51	58	66	35	259	161	127	159	671	161
<i>Iceland</i>	24	24	59	9	29	38	79	68	77	93	57
<i>Ireland</i>	-	-	12	1	-	-	-	-	-	-	-
<i>Latvia</i>	243	536	447	280	215	537	1243	562	1020	-	2
<i>Lithuania</i>	457	565	449	262	167	192	1065	790	1010	656	1081
<i>Netherlands</i>	-	1	5	-	4	3	-	2	374	243	1483
<i>Norway</i>	8059	7152	6361	5606	16 556	22 208	22 322	20 581	23 563	29 827	39 899
<i>Poland</i>	1	59	352	103	124	22	234	129	311	490	13
<i>Portugal</i>	321	638	1055	1114	510	678	1066	1150	766	1495	956
<i>Russia</i>	6979	5956	4782	4474	2510	1806	9283	7890	12331	15373	16 489
<i>Spain</i>	1187	1684	1780	1459	1162	2531	3213	2882	2469	2287	750
<i>UK</i>	123	68	100	493	211	109	198	596	100	615	457
Total	18 906	18 814	16 576	15 081	23 219	29 485	40 217	36 191	45 395	54 229	63 719

Note: values in italics come from the ICES reports (2020, 2021b) and represent landings of all fisheries.

Table 8 Annual landings (tonnes) of Haddock in all fisheries in ICES subareas 27.1 and 27.2 by country. Landings from fisheries without the use of a collecting bag. No landings are reported in the collecting bags.

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<i>Faroe Islands</i>	<i>3173</i>	<i>1759</i>	<i>2055</i>	<i>1886</i>	<i>1470</i>	<i>2459</i>	<i>2460</i>	<i>2776</i>	<i>2333</i>	<i>1515</i>	<i>1392</i>
<i>France</i>	<i>764</i>	<i>268</i>	<i>322</i>	<i>342</i>	<i>198</i>	<i>145</i>	<i>340</i>	<i>108</i>	<i>183</i>	<i>143</i>	<i>96</i>
<i>Greenland</i>	<i>1970</i>	<i>2110</i>	<i>3984</i>	<i>1795</i>	<i>1150</i>	<i>1047</i>	<i>1401</i>	<i>1810</i>	<i>1317</i>	<i>1208</i>	<i>910</i>
<i>Germany</i>	<i>3539</i>	<i>1724</i>	<i>1111</i>	<i>500</i>	<i>340</i>	<i>124</i>	<i>170</i>	<i>170</i>	<i>385</i>	<i>204</i>	<i>282</i>
<i>Norway</i>	<i>123 384</i>	<i>158 202</i>	<i>159 602</i>	<i>99 215</i>	<i>91 306</i>	<i>95 094</i>	<i>108 718</i>	<i>113 132</i>	<i>93 839</i>	<i>93 860</i>	<i>88 108</i>
<i>Poland</i>	<i>379</i>	<i>502</i>	<i>441</i>	<i>439</i>	<i>187</i>	<i>246</i>	<i>200</i>	<i>228</i>	<i>169</i>	<i>280</i>	<i>45</i>
<i>UK</i>	<i>1758</i>	<i>1379</i>	<i>833</i>	<i>639</i>	<i>355</i>	<i>450</i>	<i>575</i>	<i>372</i>	<i>453</i>	<i>456</i>	<i>320</i>
<i>Russia</i>	<i>111 372</i>	<i>139 912</i>	<i>143 886</i>	<i>85 668</i>	<i>78 725</i>	<i>91 864</i>	<i>115 710</i>	<i>106 714</i>	<i>90 486</i>	<i>76 125</i>	<i>89 030</i>
<i>Others</i>	<i>2862</i>	<i>4763</i>	<i>3393</i>	<i>3260</i>	<i>3791</i>	<i>3327</i>	<i>3838</i>	<i>2279</i>	<i>2111</i>	<i>1611</i>	<i>2286</i>
Total	249 201	310 619	315 627	193 744	177 522	194 756	233 412	227 588	191 276	175 402	182 468

Note: values in italics come from the ICES reports (2020, 2021b) and represent landings of all fisheries.

f) Location of the collecting bag fishery in the NEAFC area (provide maps of areas where the collecting bag fishery is taking place).

Using the Estonian data, catches of around 3000 hauls for both 2019 and 2020 were mapped (Figure 1). The fishing activity was distributed mostly on the north western boundary of the Loophole area (NEAFC RA 3, ICES Subdivision 27.1.a). There was no fishing activity reported in the so-called Banana hole (NEAFC RA 2, ICES subdivisions 27.2.a.1 and 27.2.b.1) by the shrimp trawlers. The highest aggregated catches in both 2019 and 2020 were found in rectangles 77J4 and 77J5, with values of 1243–1922 tonnes of shrimp in 2019 and 949–1702 tonnes in 2020.

The location of the Estonian fishery in 2019 and 2020 in Subdivision 27.1.a generally corresponds to the locations of shrimp fishing vessels reported by STECF (2018) for Estonia, Lithuania, and Denmark in 2016 and 2017.

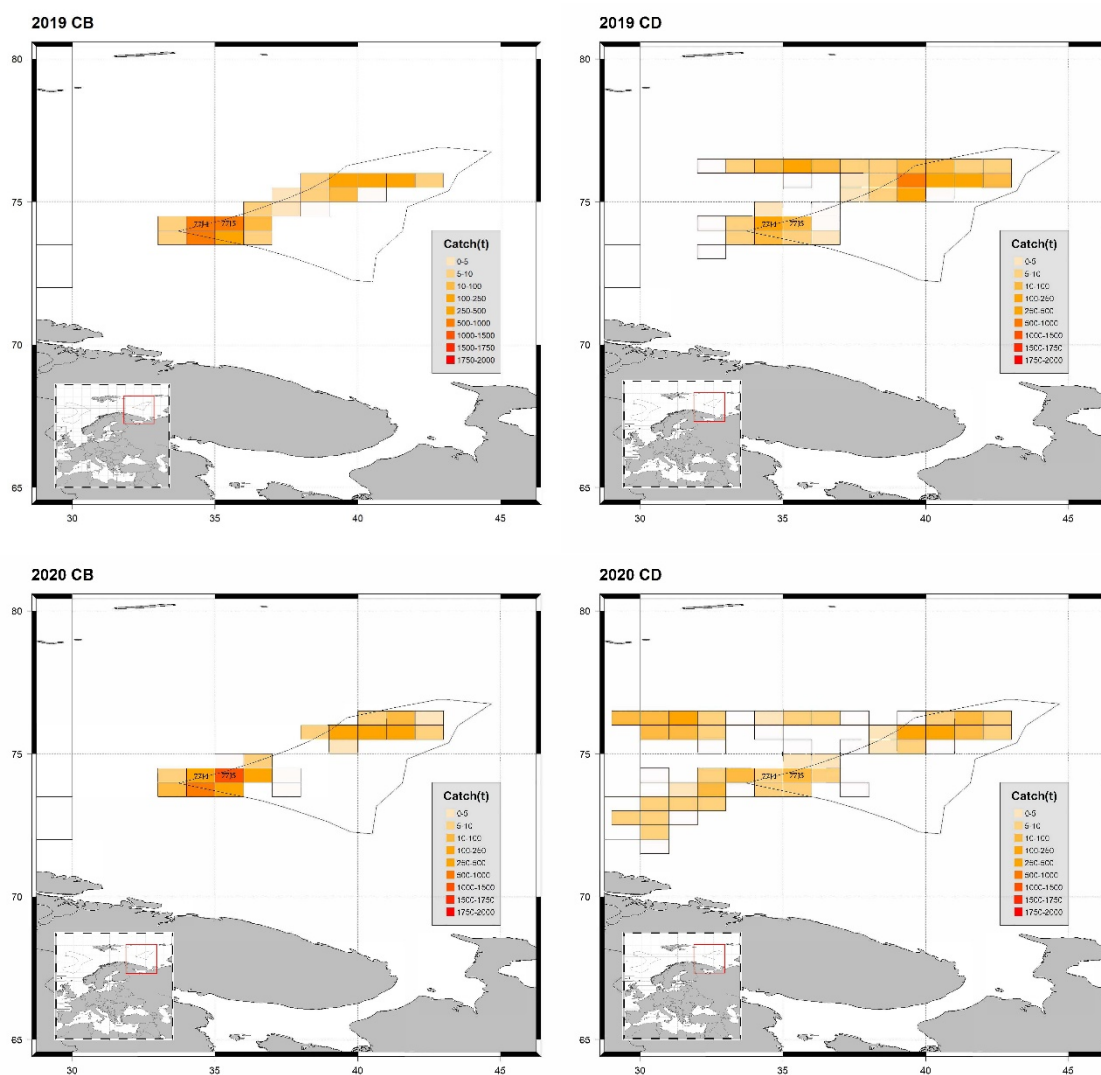


Figure 1 Estonian shrimp trawl fishery with (CB) and without collecting bag (CD) in 2019 (top) and 2020 (bottom) in and around the Loophole (NEAFC RA 3, ICES Subdivision 27.1.a).

Suggestions

The data call focussed on a selected set of species; a further data call and analysis could consider all species potentially caught in the fishery, including snow crab.

Since fishery using the collecting bags is a relatively recent practice, the gear selectivity is not fully quantified and survival rates of fish escaping from these remain nearly unknown. It could be useful to assess the selectivity, as well as the damage and mortality of fish escaping from the codend and the collecting bag.

Basis of the advice

Background

In the North Atlantic shrimp fishery, it has been mandatory to use the Nordmøre grid in almost all countries since the early 1990s. This is to minimise unwanted bycatch like redfish, cod, and Greenland halibut. All nations active in shrimp trawl fisheries within the NEAFC Regulatory Areas have adopted sorting grids as a mandatory measure to reduce bycatch. This measure is active both in domestic as well as international waters, e.g. areas beyond national jurisdictions. The use of collecting bags, as a means of retaining fish evicted from the trawl by the sorting grids, varies by country. EU and UK both allow collecting bags but only a few EU countries use them when fishing in the Northeast Arctic. Following the bilateral agreement with EU, Norway allows the use of collecting bags in fishing areas south of 62°N.

ICES received a request to define the fisheries that use collection bags in the NEAFC Regulatory Area (ICES subareas 1 and 2) and to assess their impact on species caught and bycaught on 23 November 2020. The request was subsequently agreed and the Workshop on the use of collecting bags in shrimp fisheries (WKCB; ICES, 2021a) was planned to examine and analyse available data to respond to the request.

Methods

In order to respond to the advice request, a literature review of relevant studies and of the existing regulations and catch statistics (items *a*), *c*), and *e*) of the request) pertaining to the use of collecting bags was conducted. In addition, a data call relevant to the request for advice was issued by ICES on 28 June 2021. The data call pertained to the waters of the NEAFC Regulatory Areas in ICES subareas 1 and 2 for the period 2010–2020, and requested data on catches and length frequencies for selected species (shrimp, cod, haddock, Greenland halibut, and beaked and golden redfish) aggregated (in preferential order: by haul, by day, fishing trip, or by month) with an indication of the device in which they were caught (collecting bag or codend).

To provide information on the proportion and amount of juvenile fish by species caught in the collecting bags (item *b*) of the request), ICES analysed the haul data provided by Estonia to estimate the proportion of fish <MLS as observed at sea. In addition, theoretical analyses were conducted using the selectivity and efficiency of all the gear configurations, both through the traditional gear selectivity metrics (e.g. length of 50% retention L50, and Selection Range SR) and population-dependent exploitation pattern indicators. These indicators allowed an assessment and quantification for each species of both the undersized individuals (<MLS) and those of commercial size (≥MLS) caught in the collecting bag, in the main codend-only, and in the combination of the two (ICES, 2021a). The analyses were conducted using the specific selectivity parameters L50 and SR, and grid contact parameter for codend with diamond-mesh size of 35 mm, collecting bag with diamond-mesh size of 135 mm, and Nordmøre grid with bar spacing 22 mm. The analysis of the seasonal and distribution patterns (items *d*) and *f*) of the request) used only the dataset supplied by Estonia following the ICES data call, as it was the only set of information with data aggregated at haul level. The seasonal pattern was examined through a modelling exercise (GLM model) of the CPUE by quarter. Maps were produced by aggregating the Estonian total reported landings by ICES rectangle.

Sources and references

- Einarsson, H. A., Haney, G., Jónsdóttir, I. G., and Hjörleifsson, E. 2018. Bycatch in Icelandic offshore shrimp fishery. Haf- og Vatnarannsóknir, Report HV 2018-45, ISSN 2298-9137, Reykjavík, . 24 pp. <https://www.hafogvatn.is/is/midlun/utgafa/haf-og-vatnarannsoknir/bycatch-in-icelandic-offshore-shrimp-fishery-hv-2018-45>
- Fisheries Act 2020, c. 22. Schedule 2, Part 1. <https://www.legislation.gov.uk/ukpga/2020/22/schedule/2/part/1/crossheading/shrimp-fishing-nets-order-2002>
- Forskrift om utforming og innmontering av sorteringsrist i reketrål. 2012. FOR-2012-11-26-1104. [Regulations on the design and installation of sorting grids in shrimp trawls]. In Norwegian. <https://lovdata.no/dokument/SF/forskrift/2012-11-26-1104?q=FOR-2012-11-26-1104>
- Forskrift om utøvelse av fisket i sjøen. 2005. FOR-2004-12-22-1878. [Regulations on the practice of fishing in the sea]. In Norwegian. <https://lovdata.no/dokument/SFO/forskrift/2004-12-22-1878>
- High Commissioner of the Faroe Islands. 2021. Beretning 2021 [Report, 2021]. 256 pp. In Danish. <https://www.rigsombudsmanden.fo/publikationer/beretning/>
- Hubel, K. 2020. Fish length distribution in commercial Combination Fishing effort for shrimp and groundfish, and selectivity of different designs of upper cod-ends for groundfish in NEAFC zone 1a. PECMAS 2020-02-03 Annex 2. Estonian Marine Institute, University of Tartu Project Report, 23 pp.
- ICES. 2020. Arctic Fisheries Working Group (AFWG). ICES Scientific Reports, 2:52, 577 pp. <http://doi.org/10.17895/ices.pub.6050>
- ICES. 2021a. Workshop on the use of collecting bags in shrimp fisheries (WKCB). ICES Scientific Reports. In preparation.
- ICES. 2021b. Arctic Fisheries Working Group (AFWG). ICES Scientific Reports, 3:58, 817 pp. <https://doi.org/10.17895/ices.pub.8196>
- ICES. 2022. Workshop on the use of Collecting bags in shrimp fisheries (WKCB). ICES Scientific Reports. 4:1. 127 pp. <https://doi.org/10.17895/ices.pub.9709>
- JRNFC. 2021. Den 51. sesjon i den blandete norsk-russiske, Vedlegg 7: Tekniske regulerings tiltak og felles omregningsfaktorer for fiskeprodukter [The 51st Session of the Joint Russian-Norwegian Fisheries Commission, Annex 7: Technical regulations and uniform conversion factors for fish products]. Paragraph 8.1. In Norwegian. <https://www.regjeringen.no/no/aktuelt/enighet-om-norsk-russisk-fiskeriavtale-for-2022/id2877748/>
- Ministry of Agriculture of the Russian Federation. 2021. Приказ Министерства сельского хозяйства Российской Федерации от 13.05.2021 № 292 "Об утверждении правил рыболовства для Северного рыбохозяйственного бассейна" [Order of the Ministry of Agriculture of the Russian Federation of 13 May 2021 No. 292, 2021 "On Approval of the Fisheries Regulations for the Northern Fisheries Basin"]. Paragraph 20. In Russian. <http://publication.pravo.gov.ru/Document/View/0001202105310014>
- NAFO/ICES. 2021. Report of the NAFO/ICES Pandalus Assessment Group Meeting, 26-30 October 2020. WebEx, NAFO SCS Doc. 20/21, 89 pp.
- NEAFC. 2015. Recommendation on Shrimp Fisheries in the NEAFC Regulatory Area – Sorting Grids. Rec 11 2015. Adopted at NEAFC Annual Meeting, 14 November 2014. <https://www.neafc.org/rec/2015/11>
- Regulation (EU) 2019/1241 of the European Parliament and of the Council of 20 June 2019 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures, amending Council Regulations (EC) No 1967/2006, (EC) No 1224/2009 and Regulations (EU) No 1380/2013, (EU) 2016/1139, (EU) 2018/973, (EU) 2019/472 and (EU) 2019/1022 of the European Parliament and of the Council, and repealing Council Regulations (EC) No 894/97, (EC) No 850/98, (EC) No 2549/2000, (EC) No 254/2002, (EC) No 812/2004 and (EC) No 2187/2005. Official Journal of the European Union L 198, 25.7.2019: p.105–201. <http://data.europa.eu/eli/reg/2019/1241/oj>

STECF. 2018. 58th plenary meeting report of the Scientific, Technical and Economic Committee for Fisheries (PLEN-18-02): plenary meeting, 2–6 July 2018, Brussels. H. Doerner and C. Ulrich (Eds.). <https://data.europa.eu/doi/10.2760/74942>

The Shrimp Fishing Nets Order 2002 (SI 2002/2870). <https://www.legislation.gov.uk/ukSI/2002/2870/article/3/made>

Recommended citation: ICES. 2022. NEAFC advice request to ICES to define the fisheries that use collection bags in the NEAFC Regulatory Area (ICES subareas 1 and 2) and to assess their impact on species caught and bycaught. *In* Report of the ICES Advisory Committee, 2022. ICES Advice 2022, sr.2022.01. <https://doi.org/10.17895/ices.advice.9753>

Annexes

Annex A Norwegian and Russian Minimum landing sizes in NEAFC Subarea 1 and 2 north of 62° N for selected species (Forskrift om utøvelse av fisket i sjøen, 2005).

Note that the regulations provide some allowances for catches below the Minimum Landing Size. For example, it is permitted to have a total of 15% cod, haddock and saithe below the minimum size in individual catches when fishing for these species north of 62° North.

Species	Minimum landing size (cm)
Atlantic Cod	44
Greenland halibut	45
Redfish	30
Haddock	40
American plaice (long rough dab)	NA