



NAFO/ICES PANDALUS ASSESSMENT GROUP MEETING

Estimated bycatch of haddock (*Melanogrammus aeglefinus*) and Greenland halibut (*Reinhardtius hippoglossoides*) in the Barents Sea shrimp fishery during 2000-2005

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Abstract

This working document presents estimated bycatch of haddock and Greenland halibut in the Norwegian Barents Sea shrimp fishery for the period 2000-2005, as well as these estimates raised to the total international shrimp catch in the Barents Sea. The highest estimated bycatch (0-25 cm) of haddock and Greenland halibut were found in 2002-2003 and 2000-2001, respectively, whereas, for both species, the lowest bycatch was found in the most recent years.

Materials and methods

The estimation method, which combines several data sources (official shrimp landing statistics, logbooks from shrimp trawlers, shrimp surveys, IMR surveys using shrimp trawl, and fishery surveillances data), has been described by Ajiad et al. (2004, 2006). This method is based on Hysten and Jakobsen (1987). The coverage of the data sources as compared to the Norwegian commercial shrimp catches (concerning time and area) is shown in **Table 1**. For the period 2000-2005 the coverage is very good (i.e. N/C close to 1) as compared to some of the earlier years (see Ajiad et al., 2006).

Results and discussion

The estimated bycatch numbers of haddock and Greenland halibut (in millions) for the period 2000-2005 are shown in **Table 2** and **Figure 1**. The estimated bycatch numbers by length group from the Norwegian shrimp catches are shown in **Table 3**.

The size of the bycatches depends upon the fishing intensity, the gear selectivity and the behaviour (where and when to fish) of the shrimp fleet, as well as the strength of the different year classes of the bycatch species.

Haddock bycatches in the Barents Sea shrimp fishery

In the period 2000-2005, the estimated total bycatch of haddock in the Barents Sea shrimp fishery range between 1.2 and 9.2 million individuals (**Table 2, Figure 1**). The highest bycatch was taken in 2002-2003, whereas the most recent years show fairly low estimates. Haddock of a length of 12-20 cm dominate in the bycatches (**Table 3**).

Greenland halibut bycatches in the Barents Sea shrimp fishery

In the period 2000-2005, the estimated total bycatch of Greenland halibut in the Barents Sea shrimp fishery range between 0.2 and 13.9 million individuals (**Table 2, Figure 1**). The highest bycatch was taken in 2000-2001, whereas the most recent years show fairly low estimates. Greenland halibut of a length of 9-22 cm dominate in the bycatches (**Table 3**).

References

- Ajiad A., Aglen, A. and Nedreaas, K. 2004. Cod bycatch mortality from the Barents Sea shrimp fishery 1983-2002. WD: 24, Arctic Fisheries Working Group, Copenhagen.
- Ajiad A., Aglen, A., Nedreaas, K. and Kvamme, C. 2006. Cod bycatches in the Barents Sea shrimp fishery during 1983-2005. WD: 1, Arctic Fisheries Working Group, Copenhagen.
- Hyllen, A and Jakobsen J. E. 1987. Estimation of cod taken as by-catch in the Norwegian fishery for shrimp north of 69°N. ICES CM 1987/G:34
- ICES 2006. *Pandalus* assessment working group report, 26 October-3 November 2005, Halifax, Canada. ICES CM 2006/ACFM:10.

Table 1 The total Norwegian shrimp landings north of 69° N in tonnes (= total), the commercial catches from main areas and quarters where there exist data for estimating by-catches (= covered), the commercial catches from main areas and quarters where there do not exist data for estimating by-catches (= uncovered), and the ratio between the total Norwegian catches and the covered catches (= N/C) used to raise the estimated Norwegian shrimp bycatches from the covered catches to the total Norwegian shrimp bycatches.

Norwegian shrimp catches				
Year	Total	Covered	Uncovered	N/C
2000	57 861	55 178	2 683	1.049
2001	46 699	45 872	827	1.018
2002	44 442	42 576	1 866	1.044
2003	37 851	37 764	86	1.002
2004	25 124	24 987	137	1.005
2005	29 573	27 163	2 409	1.089

Table 2 Nominal Norwegian and total shrimp catches, as well as estimated bycatches of haddock and Greenland halibut in the shrimp fisheries (Norwegian and total). The ratio between the total international shrimp catches and the Norwegian catches (= T/N) was used to raise the estimated total Norwegian shrimp bycatches to the total international shrimp bycatches.

Year	Estimated bycatches (mill)						
	Shrimp catches (tonnes)			Haddock		Greenland halibut	
	Norway	Total	T/N	Norway	Total	Norway	Total
2000	57 861	85 698	1.481	2.51	3.72	9.41	13.94
2001	46 699	60 710	1.300	1.35	1.75	5.82	7.57
2002	44 442	56 349	1.268	7.25	9.19	0.15	0.19
2003	37 851	42 967	1.135	4.87	5.52	0.52	0.59
2004	25 124	32 526	1.295	0.94	1.22	0.26	0.33
2005	29 573			0.77		0.22	

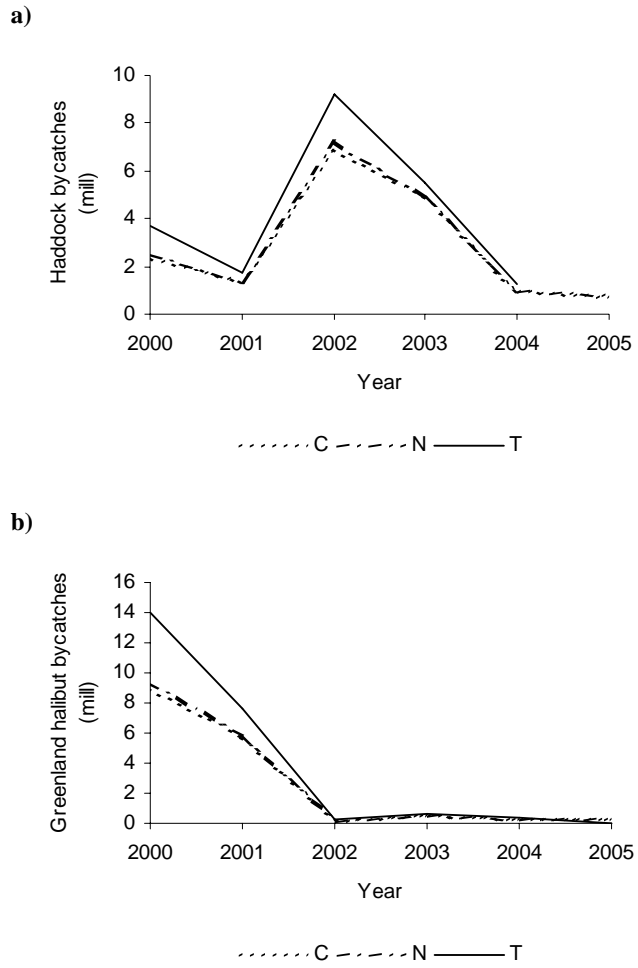


Figure 1 Estimated bycatches in 2000-2005 of **a)** haddock and **b)** Greenland halibut <26 cm (in millions) in **C**: the Norwegian shrimp catches covered by survey data, **N**: raised to total Norwegian catch north of 69°, and **T**: raised to total international shrimp catches in the Barents Sea.

Table 3 Total numbers (in thousands) and numbers by length groups (cm) of haddock and Greenland halibut taken as bycatches in the **Norwegian** Barents Sea shrimp fishery during 2000-2005.

Fish length	Haddock						Greenland halibut					
	2000	2001	2002	2003	2004	2005	2000	2001	2002	2003	2004	2005
4	0	0	0	0	0	0	5	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	2	0	0	6	5	0	0	3	0
7	1	0	0	3	0	0	56	23	0	0	4	1
8	1	2	0	6	0	0	101	94	3	2	12	5
9	7	10	1	15	1	0	80	54	7	9	13	6
10	12	45	27	20	1	0	114	17	35	12	18	10
11	8	47	57	34	12	3	830	111	17	34	27	21
12	19	62	184	43	67	11	1 296	246	6	76	18	22
13	64	129	989	69	256	43	1 784	467	7	176	17	26
14	247	240	2 540	197	231	141	1 758	792	2	104	12	30
15	476	316	2 079	823	163	233	1 172	831	4	24	12	32
16	652	259	1 121	1 217	77	179	628	1 058	6	10	17	19
17	468	134	202	1 055	32	90	160	373	9	7	12	12
18	333	64	31	759	11	44	147	387	9	13	20	11
19	116	30	7	312	16	16	219	264	7	10	18	4
20	56	2	5	207	26	4	280	314	8	23	20	3
21	39	3	4	59	14	0	273	244	10	4	9	3
22	14	2	2	33	2	1	251	209	6	4	9	3
23	1	1	0	2	10	0	127	137	6	3	7	3
24	0	1	0	1	16	1	90	123	4	2	7	1
25	0	0	0	7	8	1	36	73	3	11	5	2
Total	2 514	1 346	7 249	4 865	945	769	9 412	5 821	149	521	258	215