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Norway lobster (Nephrops norvegicus) in divisions 4.b and 4.c, Functional Unit 5 (central and southern North Sea, Botney Cut-Silver Pit)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches in each of the years 2019 and 2020 should be no more than 1637 tonnes.

To protect the stock in this functional unit (FU) from continued overexploitation, management should be implemented at the functional unit level.

Stock development over time

The state of this stock is unknown. Exploratory stock surveys (2010 and 2012) indicate relatively high density compared to neighbouring FUs.

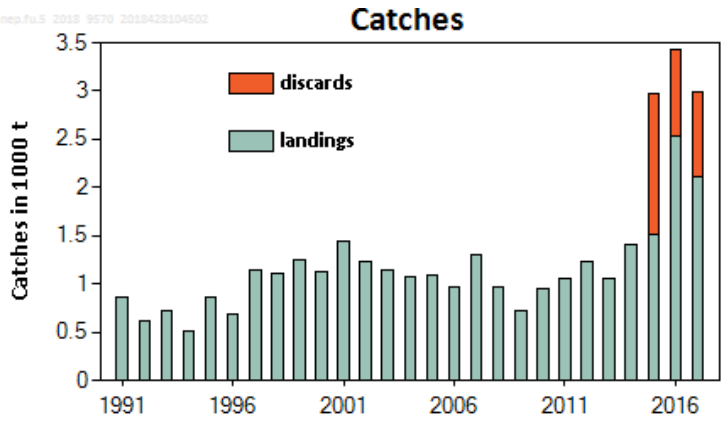

Figure 1 Norway lobster in divisions 4.b and 4.c, FU 5. ICES estimated catches (prior to 2015 only landings are available).

Stock and exploitation status

ICES cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined.

Table 1 Norway lobster in divisions 4.b and 4.c, FU 5. State of the stock and fishery, relative to reference points.

	Fishing pressure					Stock size				
		2015	2016	2017			2015	2016	2017	
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	MSY $B_{trigger}$	?	?	?	Undefined
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Undefined	B_{pa}, B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{MGT}	-	-	-	Not applicable
Qualitative evaluation	-	?	?	?	Unknown	-	?	?	?	Unknown

Catch scenarios

The ICES framework for category 4 Norway lobster stocks was applied (ICES, 2012). In the absence of a full analytical assessment, ICES bases its advice for Norway lobster on average landings, unless this is considered to be not precautionary. Maximum sustainable yield (MSY) harvest rates estimated for other FUs vary between 7.5% and 16%. ICES uses the lower boundary as an upper limit for advice for data limited Norway lobster stocks. If the harvest rate is less than 7.5%, the default basis for advice is the average catch of the last ten years (2008–2017) subject to the application of the 20% uncertainty cap in advice change. The precautionary buffer was last applied in 2016 and has not been reapplied for this advice.

Table 2 Norway lobster in divisions 4.b and 4.c, FU 5. Basis for catch options.

Variable	Value	Notes
Surface area estimate	1850 km^2	Benchmark estimate WKNEPH (ICES, 2013)
Density in TV assessment	0.7 *Nephrops* m^{-2}	UWTV 2012
Mean weight in wanted catch	31.5 g	Average 2015–2017
Mean weight in unwanted catch	18.7 g	Average 2015–2017
Discard rate (total)	46.8%	By number. Average 2015–2017
Discard survival rate	0%	Assumed to be zero

Table 3 Norway lobster in divisions 4.b and 4.c, FU 5. Catch scenarios for 2019 and 2020.

Rationale	Basis	Total catch	Wanted catch	Unwanted catch	Harvest rate	% Advice change *
Precautionary approach	Landings advice for 2017 & 2018 +20%	1 637	1 074	563	5.0%	+20%
F_{MSY}	F_{MSY}	2 475	1 624	851	7.5%	+81%
Other scenarios	Landings advice for 2017 & 2018	1 364	895	469	4.1%	0.0%
	Average landings (2008–2017)	2 068	1 357	711	6.3%	+52%
	Average landings (2015–2017)	3 130	2 054	1 076	9.5%	+130%
	Maximum landings	3 863	2 535	1 328	11.7%	+183%

* Wanted catch advice value for 2019 and 2020 relative to advice value for 2017 and 2018 (895 t).

Basis of the advice

Table 4 Norway lobster in divisions 4.b and 4.c, FU 5. The basis of the advice.

Advice basis	Precautionary approach
Management plan	The EU MAP for the North Sea is currently being finalized and is not yet adopted. For this stock it is not possible to estimate F_{MSY} ranges, therefore ICES continues to give advice based on the ICES precautionary approach.

Quality of the assessment

The scientific information for this stock has improved. However, catch sampling and discard estimates are available for the last three years for the Dutch fleet only, and there is no underwater TV (UWTV) survey since 2012 providing up-to-date information on the stock density.

Issues relevant for the advice

Discard data are only available from the Netherlands and for 2015–2017. A substantial part of the Dutch discards are above minimum conservation reference size (MCRS) and, based on information from the Dutch industry, were most likely due to a combination of quota restrictions and market prices. This discarding practice has continued despite the introduction of the landing obligation in 2016. Consequently, ICES is providing advice for 2019 assuming average discard rates observed over the last three years, which is considered to be a realistic assumption.

The 2012 survey estimate considered in this advice (0.7 *Nephrops* m^{-2}) is relatively high compared with most Norway lobster stocks in the North Sea. Landings per unit of effort (LPUE) from English directed fisheries shows no trend in abundance over the period 2006–2017, which may suggest that density has remained stable (Figure 4).

There is a single total allowable catch (TAC) for all of ICES Subarea 4, except the Norway Deep. Management should ensure that fishing opportunities are in line with the scale of the resource in each of the stocks.

In 2016 and 2017, no Norway lobster were reported as landed below MCRS (BMS category) in FU 5.

Mixed-fisheries considerations[†]

Results from a North Sea mixed-fisheries analysis are presented in ICES (2018a). The analysis has been updated taking into account latest changes made to the assessments and forecasts for stocks with reopened advice.

After years of positive development, North Sea cod is again estimated to be the most limiting stock in the Greater North Sea mixed-fisheries model. For 2019, assuming a strictly implemented discard ban (corresponding to the "Minimum" scenario), cod is estimated to constrain 24 out of 40 fleet segments. Whiting is the second most limiting stock, constraining twelve fleet segments. Conversely, in the "Maximum" scenario, saithe and both plaice stocks (North Sea and eastern English Channel) plaice would be the least limiting for 17, 9, and 3 fleet segments, respectively. Finally, if Norway lobster were managed by separate TACs, Norway lobster in FU 7 would be the least limiting for seven fleet segments (ICES, 2018b). Norway lobster in FU 5 is not limiting in mixed-fisheries scenarios (ICES, 2018a).

For those demersal fish stocks for which the F_{MSY} range is available, a "range" scenario is presented that minimizes the potential for TAC mismatches in 2019 within the F_{MSY} range. Currently, these range scenarios do not take into account Norway lobster stocks.

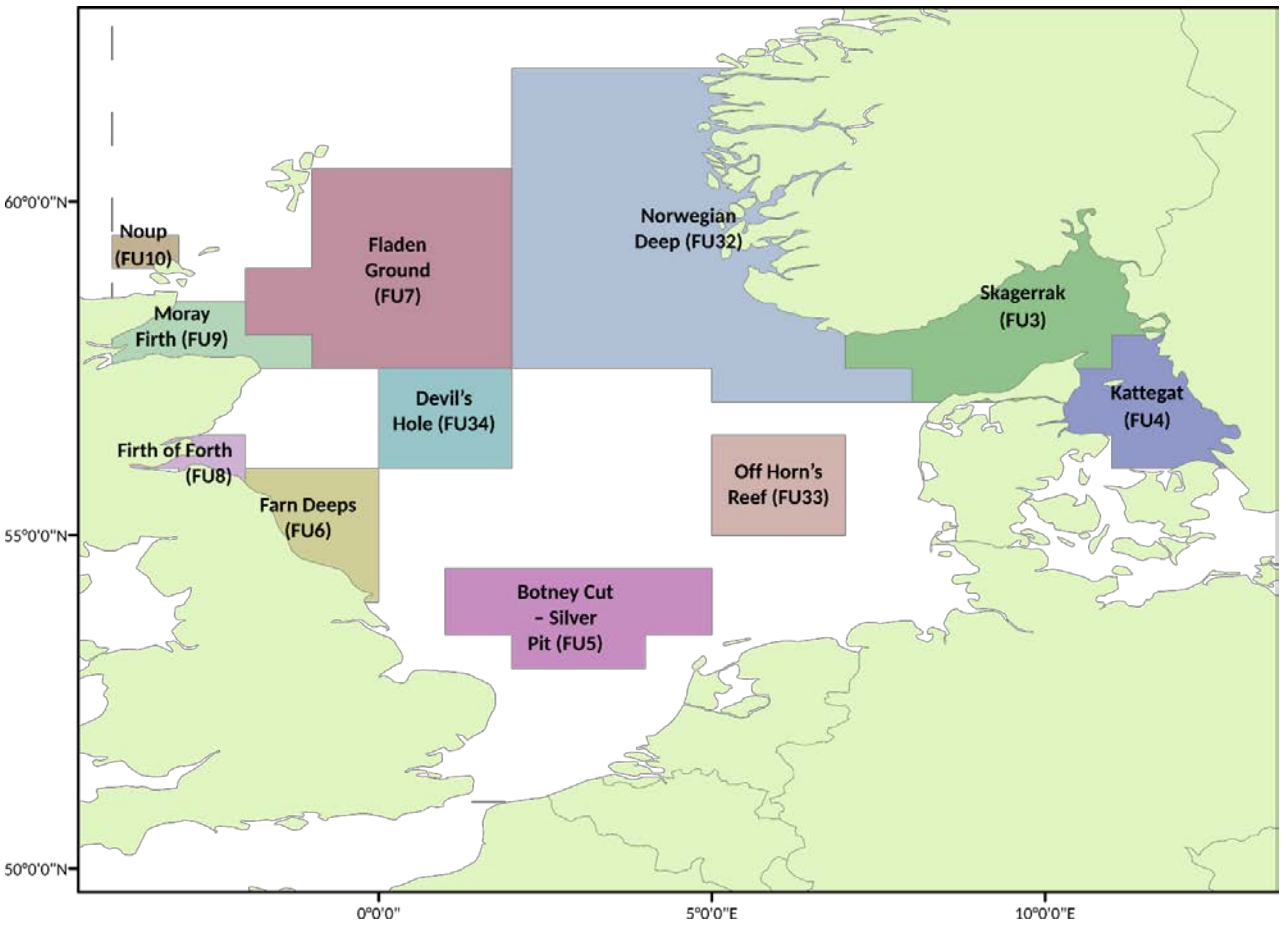

Figure 2 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

[†] Version 2: mixed-fisheries text updated.

Reference points

No reference points are defined for this stock.

Basis of the assessment

Table 5 Norway lobster in divisions 4.b and 4.c, FU 5. The basis of the assessment.

ICES stock data category	4.1.4 (ICES, 2018c).
Assessment type	Data-limited method for *Nephrops* (ICES, 2018d).
Input data	Commercial catches (international landings and length frequencies from Dutch catch sampling); one survey index (UWTV estimates of density per m^2 in 2010, and 2012); habitat extent from VMS analysis and sediment maps.
Discards and bycatch	Discard data are available from Dutch self-sampling, covering ~30% of the landings. These are not, however, considered to be representative of non-Dutch fleets, so non-Dutch discards have been estimated with a borrowed retention ogive from FU 6 and applied to the Dutch total catch length distributions.
Indicators	LPUE from English directed fishery.
Other information	None.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), Working Group on Mixed Fisheries Advice (WGMIXFISH-ADVICE)

Information from stakeholders

A Dutch Science–Industry project to improve catch information (including discards) of Norway lobster by means of a fully catch monitored reference fleet has started in 2018. The objective is to develop time-series for future use in the stock assessments for nep.fu.5, nep.fu.33, and nep.27.4.outFU.

History of the advice, catch, and management

Table 6 Norway lobster in divisions 4.b and 4.c, FU 5. History of ICES advice and ICES estimates of catches. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	ICES landings	ICES discards
1991				862	
1992		870		612	
1993		870		721	
1994		870		503	
1995		870		869	
1996		870		679	
1997		870		1 149	
1998		1 000		1 111	
1999		1 000		1 244	
2000		1 600		1 121	
2001		1 600		1 443	
2002		2 100		1 231	
2003		2 100		1 144	
2004		2 380		1 070	
2005		2 380		1099	
2006		2 380		974	
2007	No increase in effort	-		1 294	
2008	No new advice, same as for 2007	-		963	
2009	No increase in effort	-		728	
2010	No new advice, same as for 2009	-		959	
2011	See scenarios	-		1 053	
2012	Reduce catches	-		1 240	
2013	Average landings (last 10 years)	< 1 000		1 050	
2014	Same catch advice as for 2013	< 1 000		1 416	
2015	Average landings (last 10 years)		<1 159	1 516	1 450

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	ICES landings	ICES discards
2016	No new advice, same as for 2015		< 1 159	2 535	887 ^
2017	Precautionary approach	< 895		2 111	885 ^
2018	Precautionary approach	< 895			
2019	Precautionary approach		< 1 637		
2020	Precautionary approach		< 1 637		

^ Since 2016 discards correspond to unwanted catch (including BMS landings).

History of the catch and landings

Table 7 Norway lobster in divisions 4.b and 4.c, FU 5. Catch distribution by fleet in 2017 as estimated by ICES.

Catch (2017)	Wanted catch		Unwanted catch
100% dead	Directed *Nephrops* fishery 77% TR2	Mixed *Nephrops*/demersal fishery 22% TR1 & BT2	100% dead
2996 tonnes	2111 tonnes		885 tonnes

Table 8 Norway lobster in divisions 4.b and 4.c, FU 5. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights in tonnes. Na = not available.

Year	Belgium	Denmark	Netherlands	Germany	UK	Total landings **	Discards	Catch
1991	682	176	na		4	862		
1992	571	22	na		19	612		
1993	694	20	na		7	721		
1994	494	0	na		9	503		
1995	641	77	148		3	869		
1996	266	41	317		55	679		
1997	486	67	540		56	1149		
1998	372	88	584	39	28	1111		
1999	436	53	538	59	158	1244		
2000	366	83	402	52	218	1121		
2001	353	145	553	114	278	1443		
2002	281	94	617	88	151	1231		
2003	265	36	661	24	158	1144		
2004	171	39	646	16	198	1070		
2005	109	87	654	51	198	1099		
2006	77	24	444	99	330	974		
2007	75	3	464	201	551	1294		
2008	49	29	268	108	509	963		
2009	52	3	288	98	287	728		
2010	48	5	354	140	411	959		
2011	60	18	480	145	350	1053		
2012	129	0	497	121	493	1240		
2013	142	1	447	168	292	1050		
2014	131	41	645	139	460	1416		
2015	146	0	681	184	505	1516	1450	2966
2016	233	0	801	442	1059	2535	887^	3422
2017*	416	<1	745	374	575	2111	885^	2996

* Provisional.

** Totals for 1991–1994, excluding landings by the Netherlands.

^ Since 2016 discards correspond to unwanted catch (including BMS landings).

Summary of the assessment

Table 9 Norway lobster in divisions 4.b and 4.c, FU 5. Sensitivity analysis of harvest rates for a range of densities. Shaded cells indicate harvest ratios above the F_{MSY} proxy for this stock of 7.5%.

Basis	Total catch	Wanted catch	Unwanted catch	Range of potential densities (*Nephrops* m^{-2})								
				0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7*	0.8
0.5 × average landings (2008–2017)	1034	679	356	43.9%	21.9%	11.0%	7.3%	5.5%	4.4%	3.7%	3.1%	2.7%
Advice 2016	1364	895	469	57.9%	28.9%	14.5%	9.6%	7.2%	5.8%	4.8%	4.1%	3.6%
0.5 × average landings (2015–2017)	1565	1027	538	66.4%	33.2%	16.6%	11.1%	8.3%	6.6%	5.5%	4.7%	4.1%
Advice 2016 +20%	1637	1074	563	69.4%	34.7%	17.4%	11.6%	8.7%	6.9%	5.8%	5.0%	4.3%
Average landings (2008–2017)	2068	1357	711	87.7%	43.9%	21.9%	14.6%	11.0%	8.8%	7.3%	6.3%	5.5%
F_{MSY}	2475	1624	851		52.5%	26.3%	17.5%	13.1%	10.5%	8.8%	7.5%	6.6%
Average landings (2008–2017) +20%	2482	1628	853		52.6%	26.3%	17.5%	13.2%	10.5%	8.8%	7.52%	6.6%
Average landings (2015–2017)	3130	2054	1076		66.4%	33.2%	22.1%	16.6%	13.3%	11.1%	9.5%	8.3%
Maximum landings	3863	2535	1328		81.9%	41.0%	27.3%	20.5%	16.4%	13.7%	11.7%	10.2%

*Density assumed for this stock.

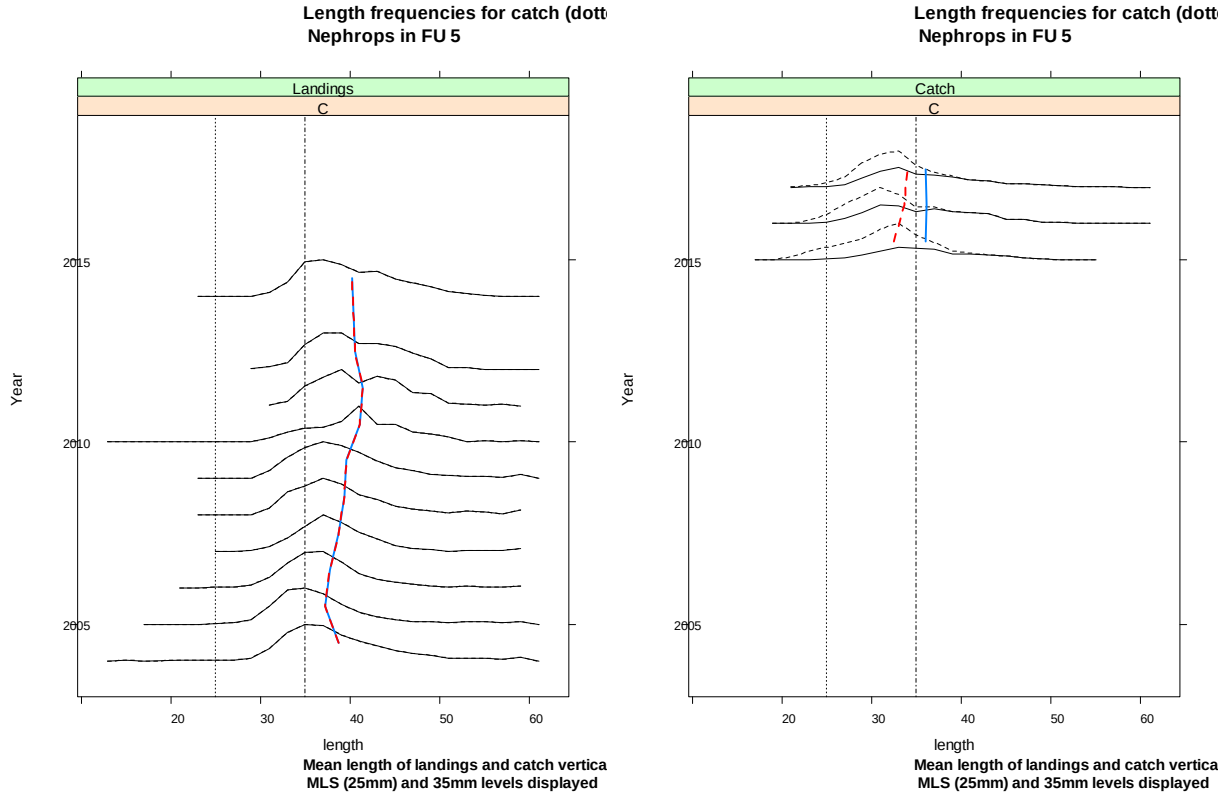

Figure 3 Norway lobster in Botney Cut–Silver Pit (FU 5). Length composition of catch for combined sex sampling from 2004 (bottom) to 2015 (top). Mean sizes of catch and landings (using same line types) is shown in relation to minimum landing size (MLS).

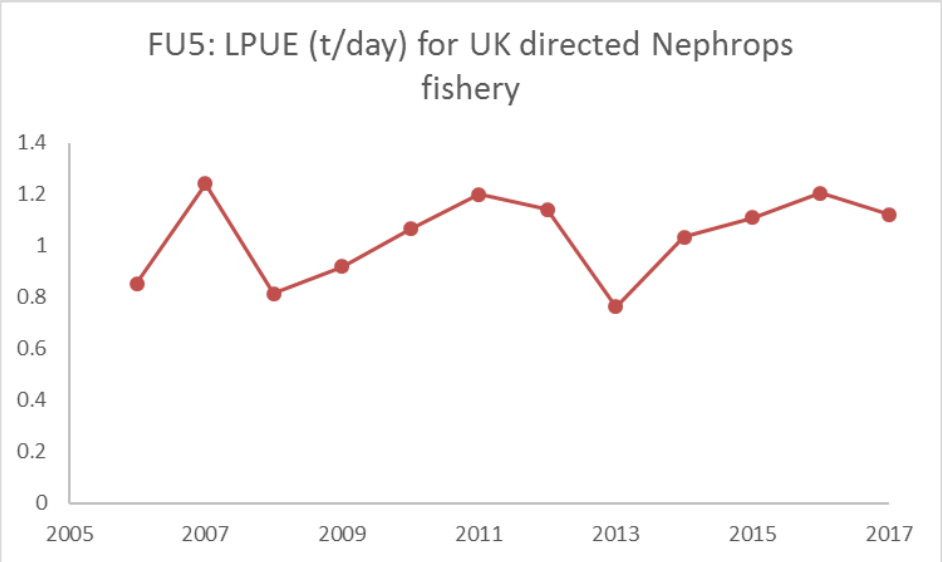

Figure 4 Nephrops in Botney Cut–Silver Pit (FU 5). Landings per unit of effort, LPUE (tonnes per boat day).

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