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Norway lobster (*Nephrops norvegicus*) in Division 4.b, Functional Unit 33 (central North Sea, Horn's Reef)

ICES advice on fishing opportunities

Please note: This advice was updated June 2019 (ICES, 2019)

ICES advises that when the precautionary approach (PA) is applied, wanted catches in each of the years 2019 and 2020 should not exceed 1154 tonnes. ICES cannot quantify the corresponding total catches.

To ensure that the stock in Functional Unit (FU) 33 is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

The state of this stock is unknown. Landings have been relatively stable since 2004, fluctuating without trend around 1000 tonnes.

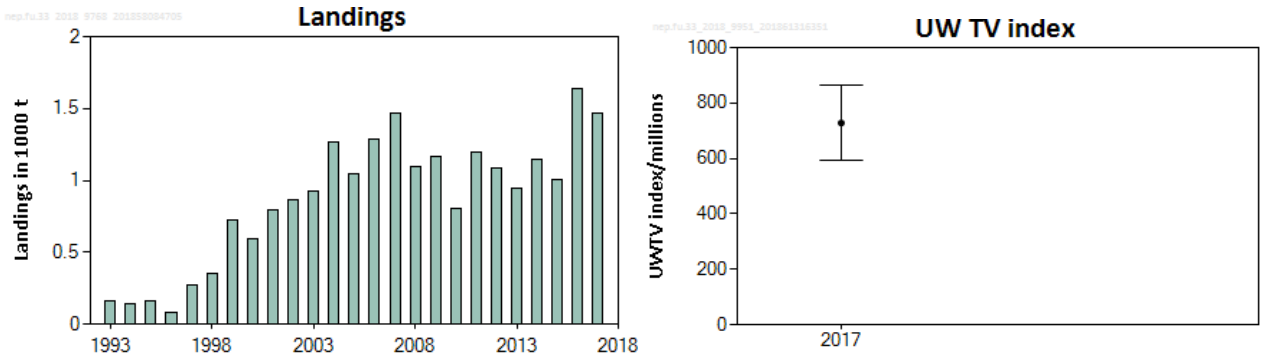

Figure 1 Norway lobster in Division 4.b, FU 33. Landings and stock density. Error bars represent 95% confidence intervals.

Stock and exploitation status

ICES cannot assess the stock and exploitation status relative to MSY and PA reference points because the reference points are undefined.

Table 1 Norway lobster in Division 4.b, FU 33. 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}	?	?	?	Unknown	MSY $B_{trigger}$	?	?	?	Undefined
Precautionary approach	F_{pa},F_{lim}	?	?	?	Unknown	B_{pa},B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	–	–	–	Not applicable	B_{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 category 4 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). The precautionary approach (PA) buffer was not applied because even with an assumed discard rate of 25%, as observed in the nearest comparable FU 6 and FU 8, the estimated harvest rate will be lower than 7.5% when advising on the last ten years' average landings.

Previously, the advice for this functional unit has been based on an assumed density of 0.1 *Nephrops* m^{-2}, corresponding to the lowest observed density in the North Sea (FU 7, Fladen Ground). In 2017, an underwater TV survey (UWTV) survey was conducted for the first time for this functional unit. The mean observed density (0.13 *Nephrops* m^{-2}) corresponds quite well with the density previous used.

Discards are known to take place for the entire fishery; however, estimates are only available from the Netherlands and Denmark, where large differences in discard rates are observed. These data are not believed to be representative for the entire fishery and have not been used to calculate the values in the catch scenario table (Table 2). Due to the lack of discard data from this functional unit the advice is based on landings only.

Table 2 Norway lobster in Division 4.b, FU 33. The basis for the catch scenarios.

Variable	Value	Notes
Mean observed density	0.13 *Nephrops* m^{-2}	Density in UWTV 2017
Mean weight in wanted catches	40.57 g	2015
Mean weight unwanted catches	Unknown	Assumed mean discard weight of 17.2g for the calculation of the harvest rate only
Surface area estimate	5737 km^2	WGNEPS (2017)
Discard survival	0	ICES (2016a)
Discard rate	Unknown	Assumed maximum 25% discard rate for the calculation of the harvest rate only

Table 3 Norway lobster in Division 4.b, FU 33. The catch scenarios for 2019 & 2020. All weights in tonnes.

Rationale	Basis	Wanted catches	Harvest rate*	% Advice change **
Precautionary approach	Average landings (2008–2017)	1154	5.1%	3.1%
Other options	0.5 × Average landings (2008–2017)	577	2.5%	−48%
	Maximum landings	1636	7.2%	46%
	MSY harvest rate	1702	7.5%	52%

* Based on an assumed maximum discard rate of 25% and mean discard weight of 17.2 g.
** Wanted catch 2019 & 2020 relative to advice value 2017 & 2018 (1119 t).

Basis of the advice

Table 4 Norway lobster in Division 4.b, FU 34. The basis of the advice.

Advice basis	ICES 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

Catch sampling needs to be improved. Discard data exist but are not considered representative and are not used to formulate advice. It is currently not possible to update mean weight estimates for landings because current sampling levels are too low.

The advice is based on a calculation of potential landing options and harvest rates, given the known surface area of Norway lobster habitat and observed densities of the functional unit.

Issues relevant for the advice

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

Mixed-fisheries considerations[†]

Results from a North Sea mixed-fisheries analysis are presented in the ICES mixed-fisheries advice (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 33 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.

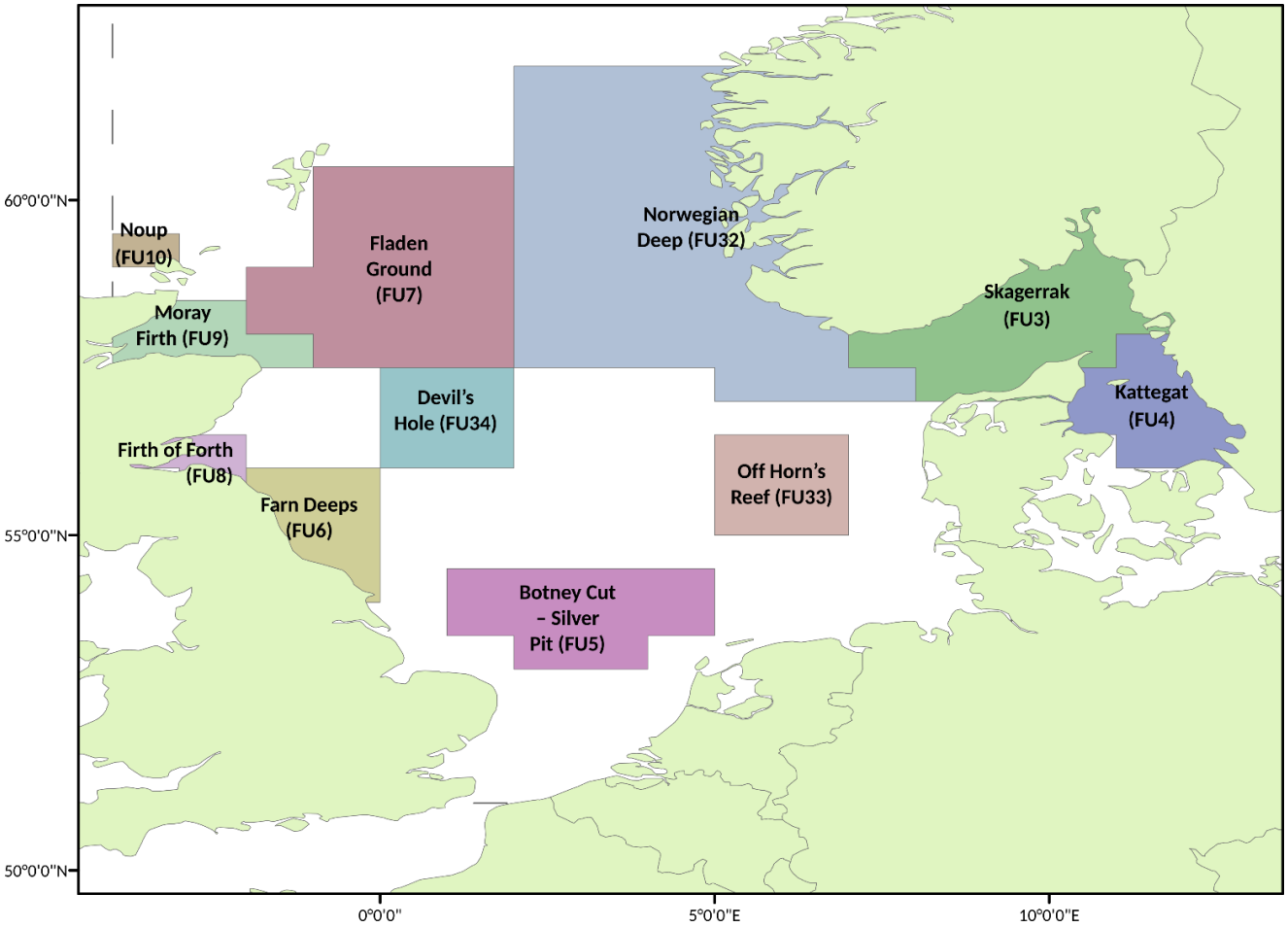

Figure 3 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

No reference points are defined for this stock.

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

Basis of the assessment

Table 5 Norway lobster in Division 4.b, FU 33. The basis of the assessment.

ICES stock data category	4.1.4 (ICES, 2018c).
Assessment type	Data-limited approach for Norway lobster (ICES, 2018d).
Input data	Commercial catches (international landings, and length frequencies from catch sampling); UWTV survey (2017 only).
Discards and bycatch	Discards are known to take place. The available data are not believed to be representative and have not been used to calculate the values in the catch options table.
Indicators	None.
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 Division 4.b, FU 33. History of ICES advice, and ICES estimates of landings and discards. All weights in tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	ICES landings	ICES discards
1992		8700			
1993		8700		160	
1994		8700		137	
1995		8700		164	
1996		8700		77	
1997		8700		276	
1998		1000		350	
1999		1000		724	
2000		1600		597	
2001		1600		791	
2002		2100		861	
2003		2100		929	
2004		2380		1268	
2005		2380		1050	
2006		2380		1288	
2007	No increase in effort	-		1467	
2008	No new advice, same as for 2007	-		1096	
2009	No increase in effort	-		1163	
2010	No new advice, same as for 2009	-		806	
2011	See scenarios	-		1191	
2012	Reduce catches	-		1084	
2013	Average landings (last 10 years)	< 1100		946	
2014	No new advice, same as 2013	< 1100		1146	
2015	Average landings (last 10 years)	< 1136		1003	
2016	Average catches (last 10 years)	< 1136		1636	
2017	Precautionary approach	≤ 1119 *		1472	
2018	Precautionary approach	≤ 1119 *			
2019	Precautionary approach	≤ 1154 *			
2020	Precautionary approach	≤ 1154 *			

* Wanted catches.

History of the catch and landings

Table 7 Norway lobster in Division 4.b, FU 33. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2017)	Wanted catch	Unwanted catch
Unknown	100% trawls	Unknown
	1472 t	

Table 8 Norway lobster in Division 4.b, FU 34. History of commercial landings; ICES estimated values are presented by country. All weights are in tonnes.

Year	Belgium	Denmark	Germany	Netherlands	UK	Total
1993	0	159		na	1	160
1994	0	137		na	0	137
1995	3	158		3	1	164
1996	1	74		2	0	77
1997	0	274		2	0	276
1998	4	333	8	12	1	350
1999	22	683	14	12	6	724
2000	13	537	12	39	9	597
2001	52	667	11	61	+	791
2002	21	772	13	51	4	861
2003	15	842	4	67	1	929
2004	37	1097	24	109	1	1268
2005	16	803	31	191	9	1050
2006	97	710	151	314	15	1288
2007	118	610	201	496	42	1467
2008	130	362	160	386	58	1096
2009	121	231	150	491	170	1163
2010	56	180	206	295	69	806
2011	163	396	202	403	28	1191
2012	181	394	132	376	2	1084
2013	156	310	174	304	2	946
2014	229	387	161	360	9	1146
2015	299	371	142	187	4	1003
2016	430	642	201	320	43	1636
2017	423	511	197	336	5	1472

+ < 0.5 tonnes.
na = not available.

Summary of the assessment

Table 9 Norway lobster in Division 4.b, FU 33. Sensitivity analysis of harvest rates for a range of potential densities for wanted catch only (assuming discard rate of 0%). All weights in tonnes.

Basis	Wanted Catch	Density (*Nephrops* m^{-2})									
		0.05	0.1	0.13*	0.2	0.3	0.4	0.5	0.6	0.7	0.8
		Harvest rate in %									
0.5 × Average landings (2008–2017)	577	5	2.5	1.9	1.2	0.8	0.6	0.5	0.4	0.4	0.3
Average landings (2008−2017)	1154	9.9	5.0	3.8	2.5	1.7	1.2	1.0	0.8	0.7	0.6
Maximum landings	1636	14.1	7.0	5.4	3.5	2.3	1.8	1.4	1.2	1.0	0.9
MSY harvest rate	2269	19.5	9.8	7.5	4.9	3.3	2.4	2.0	1.6	1.4	1.2

* A density of 0.13 *Nephrops* m^{-2} is the observed density on the UWTV survey 2017 for this functional unit.

Table 10 Norway lobster in Division 4.b, FU 33. Sensitivity analysis of harvest rates for a range of potential densities and assuming a discard rate of 25% by number and a mean discard weight of 17.2 g (mean weight in the Danish discards in 2015). Shaded cells indicate harvest ratios above the F_{MSY} proxy for this stock of 7.5%. All weights are in tonnes.

Basis	Total catch	Wanted catch	Unwanted catch	Density (*Nephrops* m^{-2})									
				0.05	0.1	0.13*	0.2	0.3	0.4	0.5	0.6	0.7	0.8
				Harvest rate in %									
0.5 × Average landings (2008–2017)	659	577	82	6.6	3.3	2.5	1.7	1.1	0.8	0.7	0.6	0.5	0.4
Average landings (2008–2017)	1317	1154	163	13.2	6.6	5.1	3.3	2.2	1.7	1.3	1.1	0.9	0.8
Maximum landings	1867	1636	231	18.7	9.4	7.2	4.7	3.1	2.3	1.9	1.6	1.3	1.2
MSY harvest rate	1943	1702	241	19.5	9.8	7.5	4.9	3.3	2.4	2.0	1.6	1.4	1.2

* A density of 0.13 *Nephrops* m^{-2} is the observed density on the UWTV survey 2017 for this functional unit.

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