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6.3.25 Norway lobster (*Nephrops norvegicus*) in Division 4.a, Functional Unit 10 (northern North Sea, Noup)

ICES stock advice

ICES advises that when the precautionary approach is applied, and under the assumptions that discarding would occur only below the minimum conservation size (MCS) and that fishery selection patterns do not change from the average (2013–2015), catches in each of the years 2017 and 2018 should not exceed 40 tonnes. This would imply wanted catch of no more than 38 tonnes.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

Underwater TV (UWTV) surveys in Funtional Unit (FU) 10 have been conducted sporadically and indicated that the density is relatively low (0.13 *Nephrops* m^{-2}). Landings are at a historical minimum.

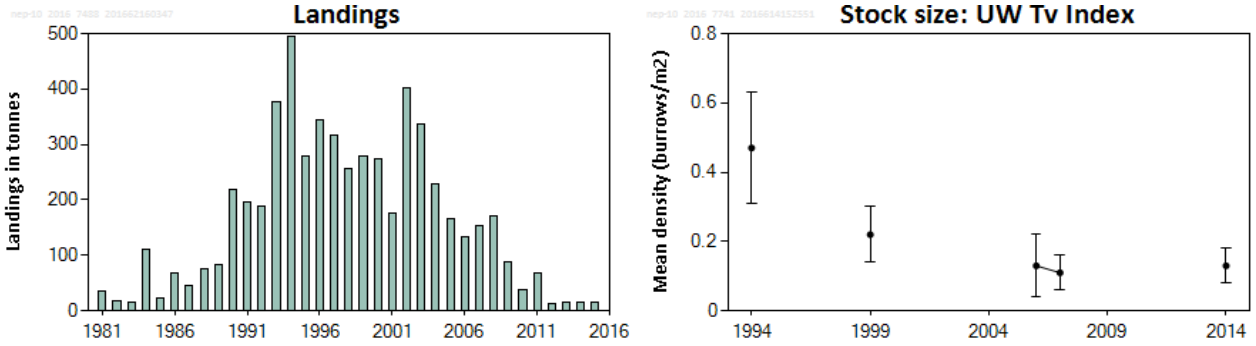

Figure 6.3.25.1 Norway lobster in Division 4.a, FU 10. Landings and stock density.

Stock and exploitation status

Table 6.3.25.1 Norway lobster in Division 4.a, FU 10. State of the stock and fishery relative to reference points.

	Fishing pressure					Stock size				
		2013	2014	2015			2013	2014	2015	
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	-	?	✓	✓	Below possible reference points	-	?	?	?	Unknown

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Catch options

The ICES framework for Category 4 Norway lobster stocks (ICES, 2012) was applied for this stock. As the first step, the same advice as given in 2014 corresponds to a potential harvest rate of 2.37%, based on the 2014 density estimate of 0.13 Norway lobster m^{-2}. As the stock appears to be very lightly exploited, the advice may be increased to a level corresponding to an acceptable harvest rate (HR), applying an uncertainty cap to restrict annual change to less than 20%. The same advice as given in 2014 + 20% corresponds to a potential HR of 2.90%. This is well below the range of maximum sustainable yield (MSY) harvest rates in the North Sea (between 7.5% and 16%), which is considered conservative. Considering that discard rates do not change from the assumed rate of 11% (by number estimate for FU 9) and that the discard mortality rate is 100%, this implies catches of no more than 40 tonnes.

Table 6.3.25.2 Norway lobster in Division 4.a, FU 10. The basis for the catch options.

Variable	Value	Source	Notes
Density in TV assessment	0.13 *Nephrops* m^{-2}	ICES (2016a)	UWTV 2014
Mean weight in landings	27.66 g	ICES (2016a)	Average 2013–2015 (from FU 9)
Mean weight in discards	11.45 g	ICES (2016a)	Average 2013–2015 (from FU 9)
Mean weight in unwanted catch >MCS	14.37 g	ICES (2016a)	Average 2013–2015 (from FU 9)
Mean weight in unwanted catch < MCS	6.63 g	ICES (2016a)	Average 2013–2015 (from FU 9)
Discard rate (total)	11.0%	ICES (2016a)	Average 2013–2015 (from FU 9, proportion by number)
Discard rate (>MCS)	6.9%	ICES (2016a)	Average 2013–2015 (from FU 9)
Discard rate (<MCS)	4.1%	ICES (2016a)	Average 2013–2015 (from FU 9)
Discard survival rate	0%	ICES (2016a)	Discard survival is assumed to be zero.
Surface area estimate	409 km^2	ICES (2007)	Benchmark estimate WKNEPH (2007)

Table 6.3.25.3 Norway lobster in Division 4.a, FU 10. The catch options. All weights are in tonnes.

Catch options assuming zero discards

Rationale	Basis	Total catch	Wanted catch *	Unwanted catch *	Harvest rate **
Precautionary approach	2014 Advice + 20%	40	38	2	2.90%
Other options	Recent average landings (2013–2015)	16	15	1	1.15%
	2014 Advice −20%	26	25	1	1.91%
	2014 Advice	33	31	2	2.37%
	Average landings(2006–2015)	75	71	4	5.42%
	Maximum landings	519	494	25	37.74%

* Wanted" and "unwanted" catch are used to described Norway lobster that would be landed and discarded in the absence of the EU landing obligation, based on discard rates estimates for the average of (2013–2015).

** Calculated for dead removals and applied to total catch.

Discarding assumed below MCS only*

Rationale	Basis	Total catch	Dead removals	Landings (Wanted catch)	Unwanted catch >MCS **	Dead discards < MCS	Surviving discards	Harvest rate ***
		L+U+DD+SD	L+U+DD	L	U	DD	SD	For L+U+DD
Precautionary approach	2014 Advice + 20%	40	40	38	2	0	0	2.90%
Other options	Recent average landings (2013–2015)	16	16	15	1	0	0	1.15%
	2014 Advice −20%	26	26	25	1	0	0	1.91%
	2014 Advice	32	32	31	1	0	0	2.37%
	Average landings (2006–2015)	75	75	71	3	1	0	5.42%
	Maximum landings	519	519	494	20	5	0	37.74%

* Assumed for all fleets.
** Unwanted landings are those animals >MCS that have been historically discarded.
*** Calculated for dead removals.

Basis of the advice

Table 6.3.25.3 Norway lobster in Division 4.a, FU 10. The basis of the advice.

Advice basis	Precautionary approach
Management plan	There is no management plan for Norway lobster in this area.

Quality of the assessment

The time-series of UWTV survey data is incomplete, and the last survey was conducted in 2014. There are no reliable effort data for this FU and therefore no resulting landings per unit of effort (LPUE).

There is no recent discard information for this fishery. Discard percentages and mean weights have been taken from the closest inshore functional unit (FU 9). The catch options are 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

MSY harvest rates estimated for other FUs vary between 7.5% and 16%. Because this is a data-limited stock, ICES uses the lower boundary of that range as an upper limit for advice.

The Norway lobster fishery at the Noup is fished by only a few vessels that visit the ground at times, and landings constituted less than 1% of the North Sea total. In recent years most Norway lobster landings from Noup were made by TR1 vessels targeting whitefish.

There is no discard information for this fishery.

Results from a North Sea mixed-fisheries analysis are presented in ICES (2016c). For 2017, assuming a strictly implemented discard ban (corresponding to the "Minimum" scenario), haddock would be the most limiting stock (assuming that the full advised catch is taken), constraining 36 out of 41 fleet segments (corresponding to 91% of the 2015 kW days of effort). Cod and eastern Channel sole would be limiting for fleets, corresponding to 5% and 4% of the 2015 effort, respectively. Conversely, in the "Maximum" scenario with *Nephrops* managed by separate TACs for the individual functional units (FUs), *Nephrops* would be considered the least limiting stocks in many FUs. *Nephrops* in FU 33, FU 5, FU 32, FU 7, and FU Others

would be the least limiting stocks for fleets in these FUs, representing 32%, 16%, 10%, 4%, and 17% of the 2015 effort, respectively. Eastern Channel plaice and saithe would be least limiting for other fleet segments, representing 12% and 9% of the 2015 effort, respectively.*

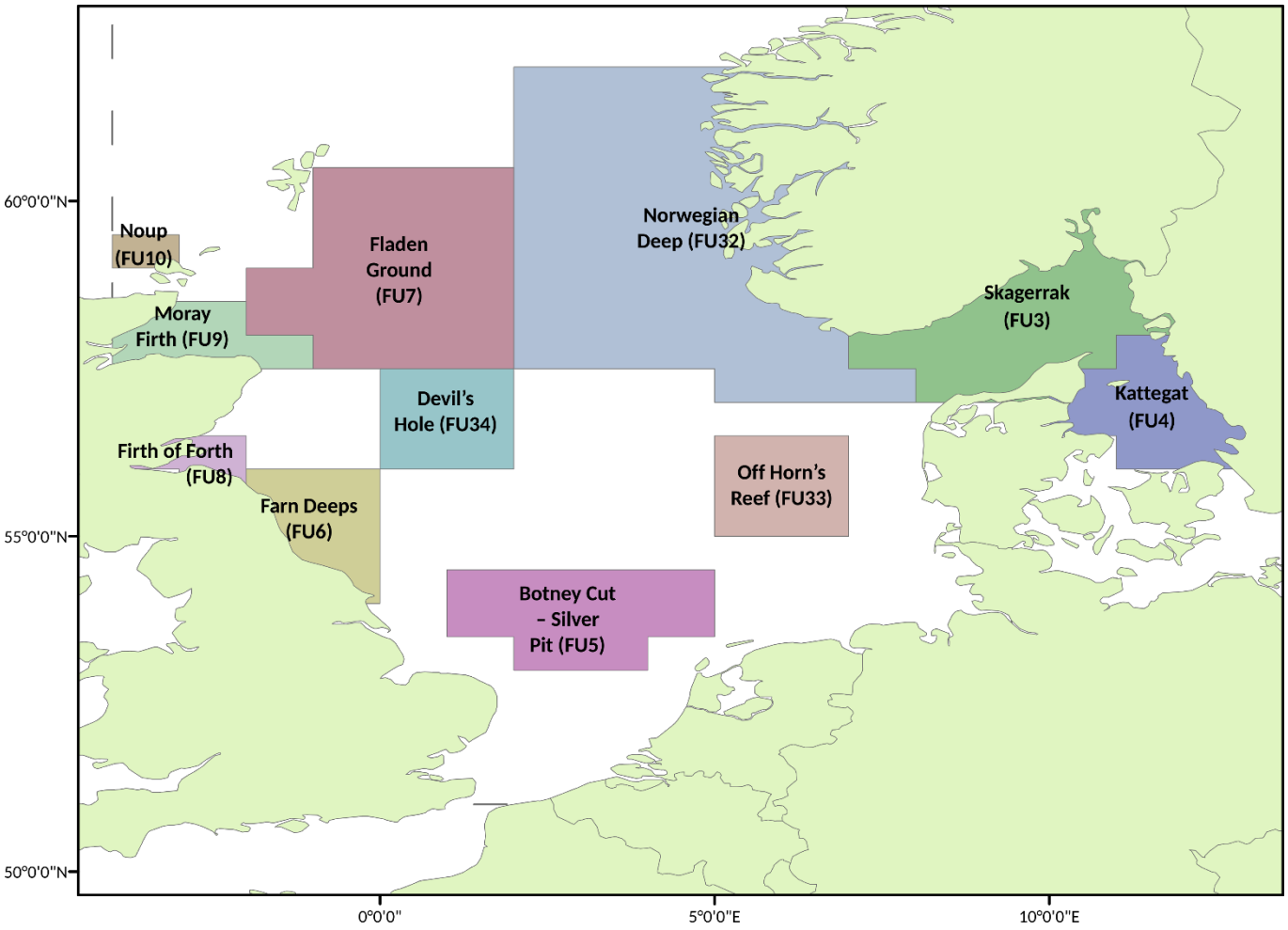

Figure 6.3.25.2. Norway lobster in Division 4.a, FU 10. Functional units in the North Sea.

Reference points

No reference points are defined for this stock.

* Version 2: Paragraph on mixed fisheries considerations added

Basis of the assessment

Table 6.3.25.4 Norway lobster in Division 4.a, FU 10. The basis of the assessment.

ICES stock data category	4.1.4 (ICES, 2016b)
Assessment type	Data-limited approach for Norway lobster
Input data	Habitat extent, mean size, occasional UWTV surveys (incomplete time-series 1994, 1999, 2006, 2007, 2014). Commercial catches not included in the assessment but available for monitoring (international landings, length frequencies from Scottish catch sampling).One survey index (UWTV survey – limited time-series).
Discards and bycatch	Used to provide advice, but not included in the assessment. Discard rates and individual weights for this stock are unknown. Values from neighbouring Norway lobster stocks (FU 9) were applied to generate the total catch advice.
Indicators	None
Other information	None
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

Information from stakeholders

Results for Norway lobster exist in the fishers' survey for Area 3, which covers FU 10, show trends somewhat similar to the ones in the assessment (Napier, 2014). No new information is available for 2015.

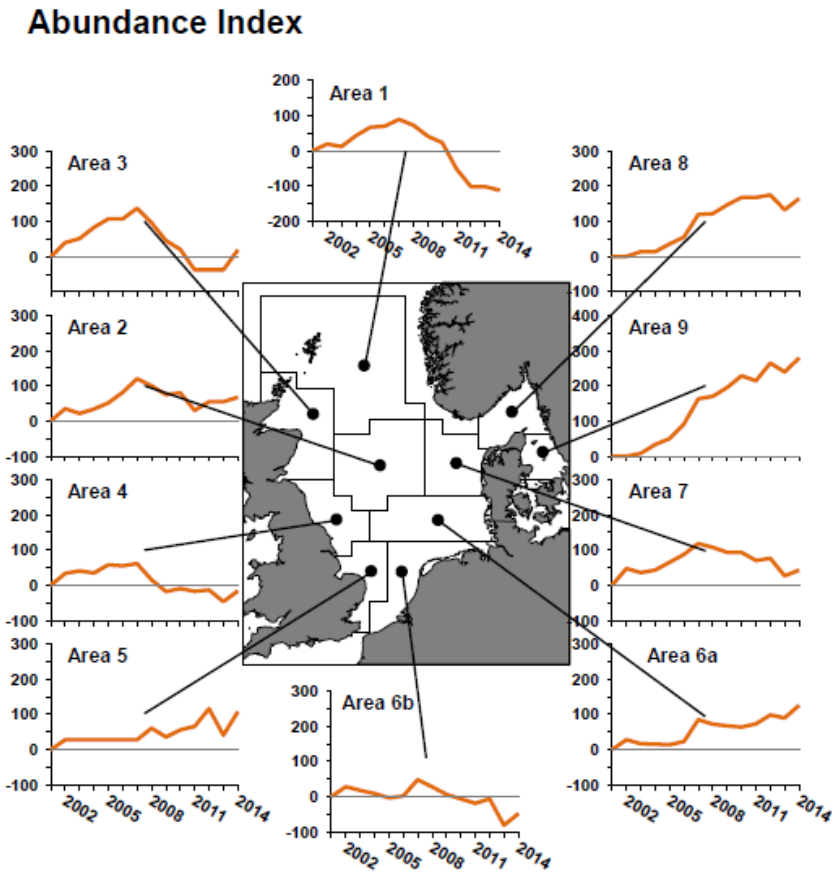

Table 6.3.25.5 Cumulative time-series of index of perceptions of abundance of Norway lobster by roundfish sampling area from the Fishers' North Sea Stock Survey (Napier, 2014; see page 14 for an explanation of the index).

History of advice, catch, and management

Table 6.3.25.6 Norway lobster in Division 4.a, FU 10. History of ICES advice and ICES estimates of landings. All weights are in thousand tonnes.

Year	ICES advice	Predicted landings corresp. to advice	Predicted catches corresp. to advice	Recommended landings FUs 9 and 10	ICES landings *
1992				~2.4	0.188
1993				2.4	0.376
1994				2.4	0.494
1995				2.4	0.279
1996	*Status quo* TAC			2.4	0.345
1997	*Status quo* TAC			2.4	0.317
1998				2.4	0.256
1999				2.4	0.278
2000				1.85	0.274
2001				1.85	0.177
2002	Catches to be maintained at the 2000 level			2.0	0.403
2003	Catches to be maintained at the 2000 level			2.0	0.336
2004	Catches to be maintained at the 2000 level			2.0	0.228
2005	Catches to be maintained at the 2000 level			2.0	0.165
2006	No increase in effort			-	0.133
2007	No increase in effort, and recent average landings	0.24		2.64	0.153
2008	No new advice, same as for 2007	0.24		2.64 **	0.172
2009	No increase in effort, average landings 2003–2005	< 0.24			0.087
2010	No new advice, same as for 2009	< 0.24			0.039
2011	No advice	-			0.068
2012	Reduce catch	-			0.013
2013	20% Reduction in landings (last 3 years' average)	< 0.05			0.016
2014	No new advice, same as 2013	< 0.05			0.015
2015	No increase in landings (last 3 years' average)	< 0.032	< 0.033		0.015
2016	No new advice, same as for 2015	< 0.032	< 0.033		
2017	Precautionary approach	≤ 0.038	≤ 0.040		
2018	Precautionary approach	≤ 0.038	≤ 0.040		

* Does not include discards.

** Based on a 15% harvest rate applied to TV survey abundance data. Includes Moray Firth (FU 9).

History of catch and landings

Table 6.3.25.7 Norway lobster in Division 4.a, FU 10. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2015)	Landings		Discards
Unknown	directed *Nephrops* fishery 31% TR2	mixed *Nephrops*/demersal fishery 69% TR1	Unknown
	15 t		

Table 6.3.25.8 Norway lobster in Division 4.a, FU 10. 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 are in tonnes. Na = not available.

Year	UK Scotland				Other UK	Total landings
	Nephrops trawl	Other trawl	Creel	Sub-total		
1981	12	23	0	35	0	35
1982	12	7	0	19	0	19
1983	10	6	0	16	0	16
1984	76	35	0	111	0	111
1985	1	21	0	22	0	22
1986	45	22	0	67	0	67
1987	13	32	0	45	0	45
1988	23	53	0	76	0	76
1989	24	60	0	84	0	84
1990	101	117	0	218	0	218
1991	111	86	0	197	0	197
1992	58	130	0	188	0	188
1993	200	176	0	376	0	376
1994	307	187	0	494	0	494
1995	163	116	0	279	0	279
1996	181	164	0	345	0	345
1997	185	131	1	317	0	317
1998	184	72	0	256	0	256
1999	211	67	0	278	0	278
2000	196	78	0	274	0	274
2001	88	89	0	177	0	177
2002	246	157	0	403	0	403
2003	258	78	0	336	0	336
2004	174	54	0	228	0	228
2005	81	84	0	165	0	165
2006	44	89	0	133	0	133
2007	46	107	0	153	0	153
2008	74	98	0	172	0	172
2009	24	63	0	87	0	87
2010	4	35	0	39	0	39
2011	27	41	0	68	0	68
2012	2	11	0	13	0	13
2013	4	12	0	16	0	16
2014	5	9	1	15	0	15
2015*	5	10	0	15	0	15

*provisional

Summary of the assessment

Table 6.3.25.9 Norway lobster in Division 4.a, FU 10. Sensitivity analysis of harvest rates for a range of potential densities, assuming zero discards.

Basis	Total catch	Wanted catch	Unwanted catch	Range of potential densities (*Nephrops* m^{-2})								
				0.05	0.1	0.13	0.15	0.2	0.3	0.4	0.6	0.8
				Harvest rate in %								
Recent average landings (2013–2015)	16	15	1	3.0	1.5	1.1	1.0	0.7	0.5	0.4	0.2	0.2
2014 Advice −20%	26	25	1	5.0	2.5	1.9	1.7	1.2	0.8	0.6	0.4	0.3
2014 Advice	33	31	2	6.2	3.1	2.4	2.1	1.5	1.0	0.8	0.5	0.4
2014 Advice + 20%	40	38	2	7.5	3.8	2.9	2.5	1.9	1.3	0.9	0.6	0.5
Average landings (2006–2015)	75	71	4	14.1	7.1	5.4	4.7	3.5	2.4	1.8	1.2	0.9
Maximum landings	519	494	25	98.1	49.1	37.7	32.7	24.5	16.4	12.3	8.2	6.1

Table 6.3.25.10 Norway lobster in Division 4.a, FU 10. Sensitivity analysis of harvest rates for a range of potential densities, assuming discarding is allowed for *de minimis* exemptions.

Basis	Total catch	Wanted catch	Unwanted catch > MCS	*de minimis* discards < MCS	Surviving discards	Range of potential densities (*Nephrops* m^{-2})								
						0.05	0.1	0.13	0.15	0.2	0.3	0.4	0.6	0.8
						Harvest rate in %								
Recent average landings(2013–2015)	16	15	1	0	0	3.0	1.5	1.1	1.0	0.7	0.5	0.4	0.2	0.2
2014 Advice −20%	26	25	1	0	0	5.0	2.5	1.9	1.7	1.2	0.8	0.6	0.4	0.3
2014 Advice	32	31	1	0	0	6.2	3.1	2.4	2.1	1.5	1.0	0.8	0.5	0.4
2014 Advice + 20%	40	38	2	0	0	7.5	3.8	2.9	2.5	1.9	1.3	0.9	0.6	0.5
Average landings (2006–2015)	75	71	3	1	0	14.1	7.1	5.4	4.7	3.5	2.4	1.8	1.2	0.9
Maximum landings	519	494	20	5	0	98.1	49.1	37.7	32.7	24.5	16.4	12.3	8.2	6.1

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