

6.3.21 Norway lobster (*Nephrops norvegicus*) in Division IVa, FU 7 (Northern North Sea, Fladen Ground)

ICES stock advice

Please note: The present advice replaces the advice given for this stock in June 2015.

ICES advises that when the MSY approach is applied, catches in 2016 (assuming zero discards) should be no more than 6856 tonnes. If instead discard rates continue at recent values (average of 2012–2014), and there is no change in assumed discard survival rate, this implies landings of no more than 6847 tonnes.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit (FU) level. Should the catch in this FU be lower than advised, the difference should not be transferred to other FUs.

Stock development over time

The stock size has declined from the highest observed value in 2008 and is just below the MSY $B_{trigger}$. The 2015 abundance estimate is the lowest of the time-series. The harvest rate has declined in recent years and remains well below F_{MSY} .

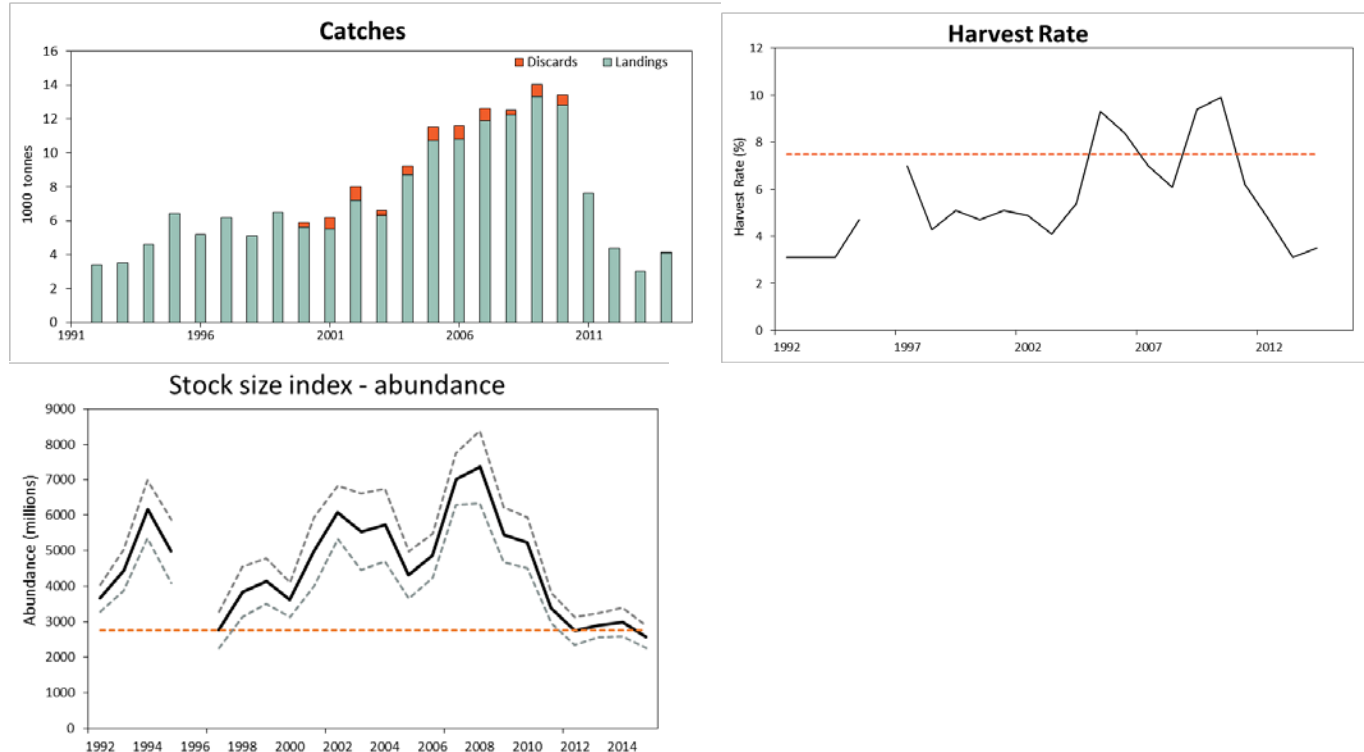


Figure 6.3.21.1 Norway lobster in Division IVa, FU 7. Long-term trends in catches (in tonnes), harvest rate, and UWTV abundance (used as F and SSB proxies). Orange lines show proxies for MSY $B_{trigger}$ and F_{MSY} . Harvest rates before 2006 may be unreliable due to underreporting of landings.

Stock and exploitation status

Table 6.3.21.1 Norway lobster in Division IVa, FU 7. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size				
		2012	2013	2014		2013	2014	2015		
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY	✓	✓	✗	Below trigger
Precautionary approach	F_{pa}, F_{iim}	✓	✓	✓	Below possible reference points	B_{pa}, B_{iim}	✓	✓	?	Undefined
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{MGT}	-	-	-	Not applicable

Catch options

Table 6.3.21.2 Norway lobster in Division IVa, FU 7. The basis for the catch options.

Variable	Value	Source	Notes
Abundance in TV assessment	2569 million	ICES (2015a)	UWTV 2015
Mean weight in landings	38.31 g	ICES (2015a)	Average 2012–2014
Mean weight in discards	15.3 g	ICES (2015a)	Average 2012–2014
Discard proportion	0.8%	ICES (2015a)	Average 2012–2014 (proportion by number)
Discard survival rate	25%	ICES (2015a)	Average 2012–2014 (proportion by number); only applies in scenarios where discarding is allowed.
Dead discard rate	0.6%	ICES (2015a)	Average 2012–2014 (proportion by number); only applies in scenarios where discarding is allowed.

Table 6.3.21.3 Norway lobster in Division IVa, FU 7. The catch options. All weights are in tonnes.

Catch options assuming zero discards

	Total catch	Wanted catch*	Unwanted catch*	Harvest rate**
MSY approach	6856	6834	22	7.0%
F_{msy}	7346	7322	24	7.5%
F_{2014}	3428	3417	11	3.5%
$F_{2012-2014}$	3722	3710	12	3.8%
$F_{35\%SpR}$	10969	10934	35	11.2%
F_{max}	16062	16010	52	16.4%

* “Wanted” and “unwanted” catch are used to described *Nephrops* that would be landed and discarded in the absence of the EU landing obligation based on discard rates estimates for average (2012–2014).

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

Catch options assuming discarding is allowed

Basis	Total catch	Dead removals	Landings	Dead discards	Surviving discards	Harvest rate*
	L+DD+SD	L+DD	L	DD	SD	for L+DD
MSY approach	6870	6864	6847	17	6	7.0%
F_{MSY}	7360	7354	7336	18	6	7.5%

* Calculated for dead removals.

Basis of the advice

Table 6.3.21.4 Norway lobster in Division IVa, FU 7. The basis of the advice.

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

Quality of the assessment

The underwater TV (UWTV) survey in this area is conducted over an area of around 28 200 km² of suitable mud substrate. The Fladen Ground functional unit contains several patches of mud to the north of the grounds which are fished, bringing the overall area of substrate to 30 633 km². This northern area is not surveyed but would add to the abundance estimate. The abundance for the total ground is likely to be higher than currently estimated.

Length–frequency data in the Fladen Ground area have clearly shifted towards larger animals since 2010 (Figure 6.3.21.4), suggesting a different selection pattern in the fishery. In addition, the discard rate has declined, potentially due to a shift to larger meshes (TR1) and highly selective gear. The larger size of *Nephrops* in catches in recent years implies that the L₅₀ for both male and female selection is higher than previously estimated. The F_{MSY} reference point for FU 7 was updated this year and takes new selection patterns and growth information into account. The new selection pattern and growth information have also led to updated values of F_{35%SpR} and F_{max}.

Data from the latest UWTV survey (June 2015) have been used as the most up-to-date indicator of stock abundance.

Issues relevant for the advice

The latest estimate of stock abundance (value from the survey conducted in June 2015, 2569 million) is below the MSY B_{trigger} value (2767 million). The ICES MSY approach states that under such conditions the F_{MSY} harvest rate (7.5% for the FU 7 *Nephrops*) should be reduced by multiplying it by the ratio of current abundance to MSY B_{trigger}. This corresponds to a harvest rate of $7.5 \times 2569 / 2767 = 7.0\%$ for the advice for 2016.

Over 99% of the landings are taken by Scottish vessels. Most landings are from vessels fishing for *Nephrops* using a 80–99 mm mesh (TR2), although there is increasing use of meshes larger than 100 mm (TR1). From 2010, an increasing number of TR2 vessels are adapting gears to avoid cod bycatch when fishing for *Nephrops* in ICES Division IVa. Since 2011, discard rates in this FU have been close to zero and mean sizes of landed *Nephrops* show a clear increase, suggesting a selectivity change. The reduction in the discard rate could be caused partly by lower retention of small individuals by the gear or by an increase in mesh size. Reduced recruitment could also contribute to lower discards.

Catches have been declining since 2010 and are well below the advice for this area. In order to ensure other FUs do not suffer from displacement from unused catch options from this FU, management should be implemented at the functional unit level.

There is a single TAC for the entire ICES Subarea IV. Management should ensure that fishing opportunities are in line with the scale of the resource in each of the stocks.

In June 2015, ICES provided a mixed-fisheries analysis (projections) for North Sea demersal stocks in 2016 (ICES, 2015c). The mixed-fisheries projections have not been updated in November. The revised advice for the *Nephrops* stocks in FUs 7 and 8, plaice in Subarea IV and Division IIIa, sole in Subarea IV, and whiting in Subarea IV and Division VIId, based on the new survey information, does not change the general perception of which stocks are more likely to limit the North Sea fisheries in 2016.

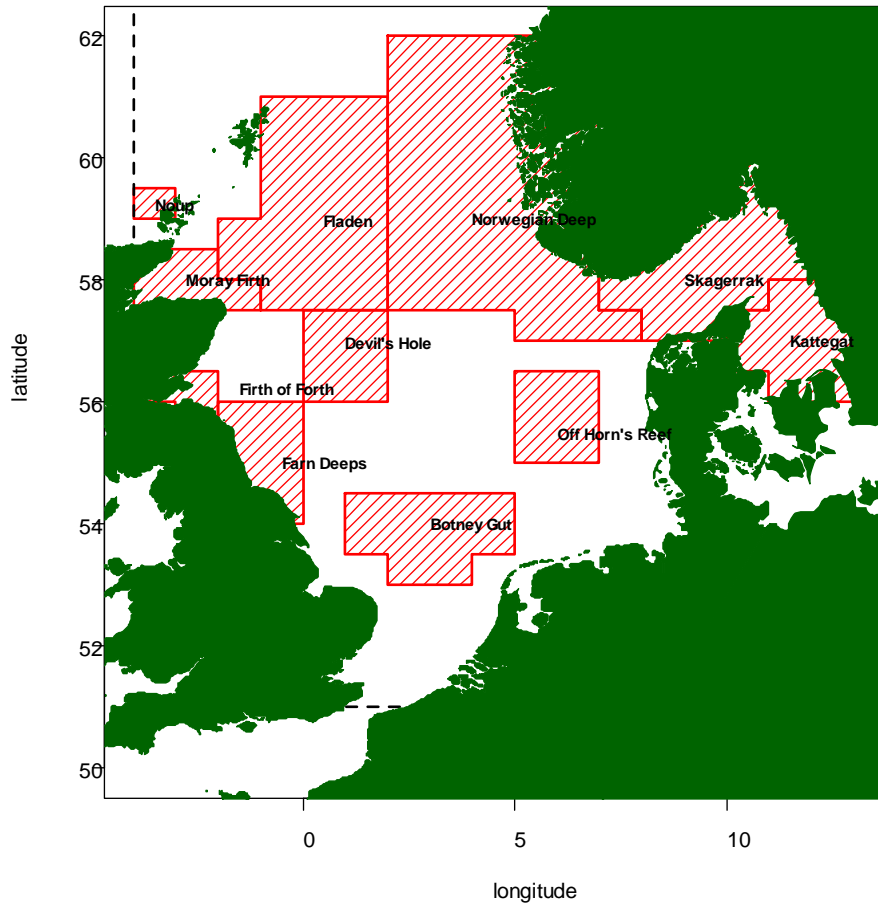


Figure 6.3.21.2 *Nephrops* functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 6.3.21.5 Norway lobster in Division IVa, FU 7. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	2767 million individuals.	Lowest observed UWTV survey estimate of abundance (1992–2010).	ICES (2010)
	F_{MSY}	Harvest rate 7.5%.	Equivalent to the $F_{0.1}$ for combined sexes.	ICES (2015a)
Precautionary approach	B_{lim}	Not defined.		
	B_{pa}	Not defined.		
	F_{lim}	Not defined.		
	F_{pa}	Not defined.		
Management plan	SSB_{MGT}	Not defined.		
	F_{MGT}	Not defined.		

Basis of the assessment

Table 6.3.21.6 Norway lobster in Division IVa, FU 7. The basis of the assessment.

ICES stock data category	1 (ICES, 2015b).
Assessment type	Underwater TV survey linked to yield-per-recruit analysis from length data (ICES, 2015a).
Input data	Commercial catches (international landings, length frequencies from Scottish catch sampling), one survey index (FU 7 UWTV). Maturity data from commercial catch sampling. Natural mortalities from Morizur (1982).
Discards and bycatch	Included in the assessment, data series from the majority of the fleets/ main fleets, but not from all quarters (covering 44% of the landings in 2014).
Indicators	Sex ratio, length frequencies, mean size, l_{pue} .
Other information	The latest benchmark (based on the UWTV survey) was performed in 2009 (ICES, 2009).
Working groups	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK). Working Group on Mixed-Fisheries Advice (WGMIXFISH-NS).

Information from stakeholders

Results for *Nephrops* exist in the fishers' survey for Area 1, which is larger than FU 7. These results indicate similar trends to the assessment (Napier, 2014).

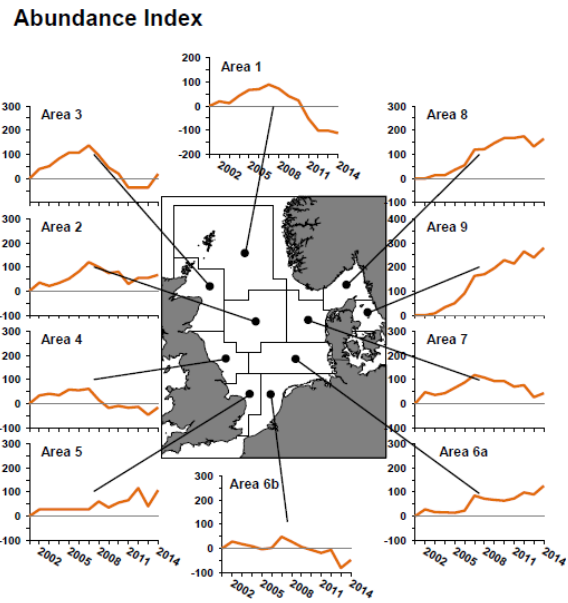


Figure 6.3.21.3 Cumulative time-series of index of perceptions of abundance of *Nephrops*, by area (see page 14 of Napier (2014) for an explanation of the index).

History of advice, catch, and management

Table 6.3.21.7 Norway lobster in Division IVa, FU 7. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in thousand tonnes.

Year	ICES advice	Landings advice	Catch advice	ICES landings	ICES discards
1992		~2.7		3.4	
1993		2.7		3.5	
1994		5.0		4.6	
1995		5.0		6.4	
1996		5.0		5.2	
1997		5.0		6.2	
1998		7.0		5.1	
1999		7.0		6.5	
2000		9.0		5.6	0.3
2001		9.0		5.5	0.7
2002		9.0		7.2	0.8
2003		9.0		6.3	0.3
2004		12.8		8.7	0.5
2005		< 12.8		10.7	0.8
2006	No increase of effort	-		10.8	0.8
2007	No increase in effort and harvest rate below 7.5%	< 10.9		11.9	0.7
2008	No new advice, same as for 2007	< 10.9		12.24	0.3
2009	No increase in effort and recent average landings	< 11.3		13.33	0.7
2010	Harvest rate no greater than that equivalent to fishing at $F_{0.1}$	< 16.4		12.82	0.6
2011	MSY approach	< 13.3		7.6	0
2012	MSY approach	< 14.1		4.4	0
2013	MSY approach	< 10		3.0	0
2014	MSY approach	< 8.959		4.1	0.04
2015	MSY approach	< 10.759			
2016	MSY approach		≤ 6.856*		

* Assuming all catches are landed and selection patterns do not change.

History of catch and landings

Table 6.3.21.8 Norway lobster in Division IVa, FU 7. Catch distribution by fleet in 2014 as estimated by ICES.

Dead removals (2014)	Landings		Discards
4183 t	directed <i>Nephrops</i> fishery	mixed <i>Nephrops</i> /demersal fishery	37 t dead discards in weight
	52% TR2	48% TR1	
	4146 t		

Table 6.3.21.9 Norway lobster in Division IVa, FU 7. 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.

Year	UK Scotland				Denmark	Other countries*	Total	Discards
	<i>Nephrops</i> trawl	Other trawl	Creel	Sub-total				
1981	304	68	0	372	0	0	372	
1982	381	40	0	421	0	0	421	
1983	588	105	0	693	0	0	693	
1984	552	94	0	646	0	0	646	
1985	1020	120	0	1140	7	0	1147	
1986	1401	92	0	1493	50	0	1543	
1987	1023	349	0	1372	323	0	1695	
1988	1309	185	0	1494	81	0	1575	
1989	1724	410	0	2134	165	0	2299	
1990	1703	598	0	2301	236	3	2540	
1991	3021	772	0	3793	424	6	4223	
1992	1809	1164	0	2973	359	31	3363	
1993	2031	1234	0	3265	224	3	3492	
1994	1816	2356	0	4172	390	6	4568	
1995	3568	2389	19	5976	439	4	6419	
1996	2338	2578	7	4923	286	1	5210	
1997	2712	3221	0	5933	235	2	6170	
1998	2290	2673	0	4963	173	0	5136	
1999	2860	3546	0	6406	96	16	6518	
2000	2916	2546	0	5462	103	5	5570	340
2001	3540	1936	0	5476	64	2	5542	687
2002	4511	2546	0	7057	173	15	7245	820
2003	4175	2033	0	6208	82	4	6294	349
2004	7274	1319	1	8594	136	0	8730	506
2005	8849	1508	5	10362	321	1	10684	823
2006	9470	1026	1	10497	283	11	10791	798
2007	11055	734	0	11789	119	3	11911	747
2008	11432	666	0	12098	133	8	12239	257
2009	12688	499	0	13187	130	10	13327	707
2010	12544	288	0	12832	124	12	12968	560
2011	7367	128	0	7495	64	< 0.5	7559	0
2012	4257	81	0	4338	75	2	4415	0
2013	2275	663	0	2938	5	8	2951	0
2014**	2164	1969	0	4133	10	3	4146	37

*Other countries includes Belgium, Norway, and UK (England).

**Provisional.

Summary of the assessment

Table 6.3.21.10 Norway lobster in Division IVa, FU 7. Assessment summary with weights (in tonnes).

Year	Adjusted abundance (millions)	95 % CI	Harvest ratio (%)	Landings numbers (millions)	Discards numbers (millions)	Removals numbers (millions)	Landings (tonnes)	Discards (tonnes)	Discard rate (%)	Mean weight in landings (g)	Mean weight in discards (g)	Dead discard rate (%)
2003	5547	1076	4.1	209	24	226	6294	349	10.1	30.15	14.83	7.8
2004	5725	1030	5.4	282	34	307	8730	506	10.6	30.98	15.06	8.2
2005	4325	662	9.3	368	46	403	10684	823	11.2	29.05	17.74	8.6
2006	4862	619	8.4	369	54	409	10791	798	12.7	29.25	14.87	9.8
2007	7017	730	7	447	55	488	11911	747	10.9	26.63	13.67	8.4
2008	7360	1019	6.1	434	18	448	12239	257	3.9	28.18	14.54	3.0
2009	5457	772	9.4	473	51	511	13327	707	9.7	28.20	13.85	7.5
2010	5224	711	9.9	492	34	517	12968	560	6.5	26.38	16.44	4.9
2011	3382	435	6.2	209	0	209	7559	0	0	36.17	NA	0
2012	2748	392	4.7	128	0	128	4415	0	0	36.91	NA	0
2013	2902	335	3.1	89	0	89	2951	0	0	34.90	NA	0
2014	2990	412	3.5	102	3	104	4146	37	2.5	43.11	13.9	1.9
2015	2569	320										

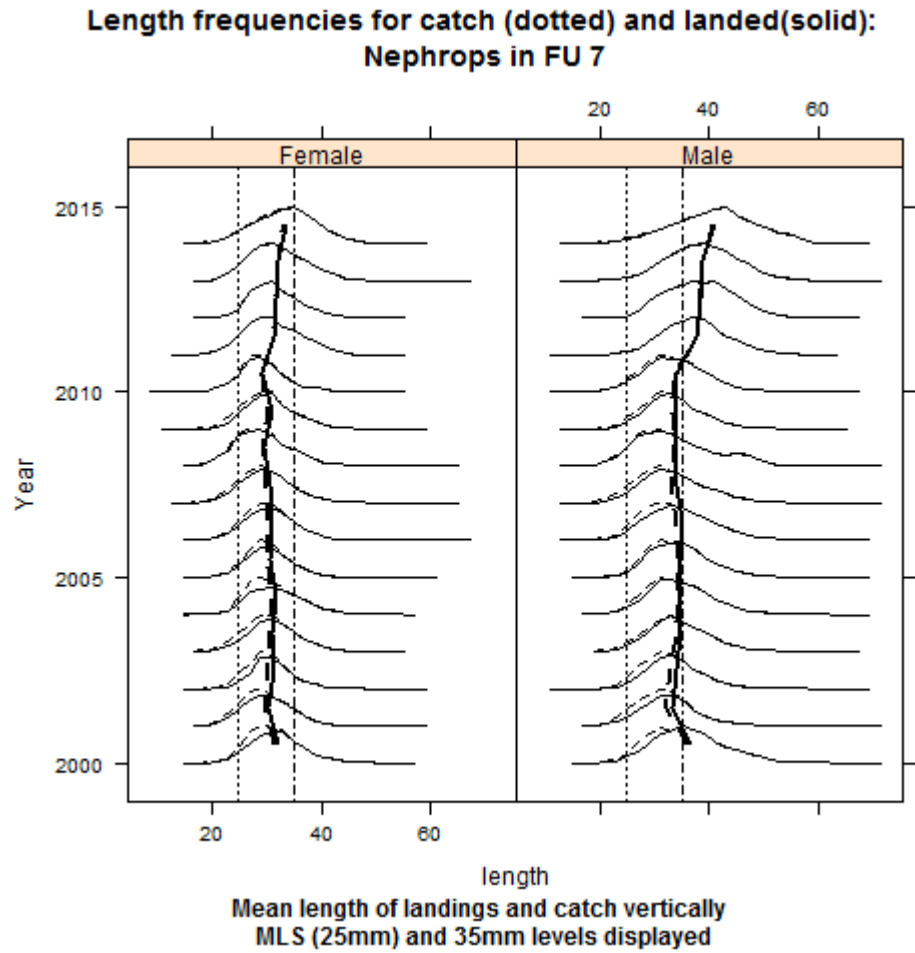


Figure 6.3.21.4 *Nephrops* in Fladen Ground (FU 7). Catch length–frequency distribution and mean size in catches and landings. Vertical lines are minimum landing size (25 mm) and 35 mm.

Sources and references

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