6.3.28 Norway lobster (*Nephrops norvegicus*) in Division 4.b, Functional Unit 8 (central North Sea, Firth of Forth)

ICES stock advice

Please note: This advice was updated in November 2016 (ICES, 2016c).
ICES advises that when the MSY 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 2017 should not exceed 2123 tonnes. This would imply wanted catch of no more than 1825 tonnes.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level. Any substantial transfer of the current surplus fishing opportunities from other FUs to this FU could rapidly lead to over-exploitation.

Stock development over time

The stock size is above MSY $B_{trigger}$. The harvest rate is varying above F_{MSY}.

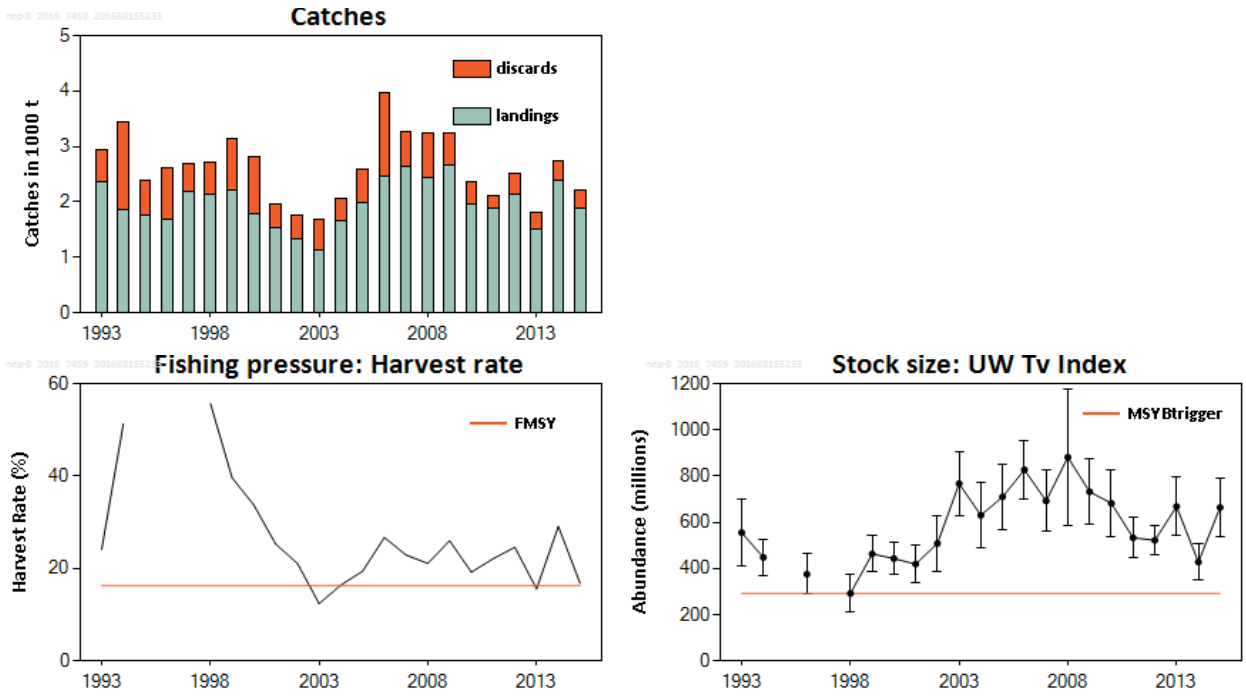

Figure 6.3.28.1 Norway lobster in Division 4.b, FU 8. Long-term trends in catches, harvest rate, and underwater TV survey (UWTV) abundance (used as F and SSB proxies). Orange lines show proxies for F_{MSY} and MSY $B_{trigger}$. Harvest rates before 2006 may be unreliable due to underreporting of landings.

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Stock and exploitation status

Table 6.3.28.1 Norway lobster in Division 4.b, FU 8. 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}	✓	✗	✗	Above	MSY $B_{trigger}$	✓	✓	✓	Above trigger
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Undefined	B_{pa}, B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{MGT}	-	-	-	Not applicable

Catch options

Table 6.3.28.2 Norway lobster in Division 4.b, FU 8. The basis for the catch options.

Variable	Value	Source	Notes
Stock abundance	664 million individuals	ICES (2016a)	UWTV 2015
Mean weight in landings	21.81g	ICES (2016a)	Average 2013–2015
Mean weight in discards	10.74g	ICES (2016a)	Average 2013–2015
Mean weight in unwanted catch >MCS	13.71g	ICES (2016a)	Average 2013–2015
Mean weight in unwanted catch <MCS	7.25g	ICES (2016a)	Average 2013–2015
Discard rate (total)	24.9%	ICES (2016a)	Average 2013–2015 (proportion by number)
Discard rate (>MCS)	13.5%	ICES (2016a)	Average 2013–2015 (proportion by number)
Discard rate (<MCS)	11.4%	ICES (2016a)	Average 2013–2015 (proportion by number)
Discard survival rate	25%	ICES (2016a)	Average 2013–2015 (proportion by number), only applies in scenarios when discarding is allowed.
Dead discard rate (<MCS)	8.8%	ICES (2016a)	Average (proportion by number) 2013–2015, only applies in scenarios when discarding is allowed below MCS.

Table 6.3.28.3 Norway lobster in Division 4.b, FU 8. The catch options. All weights are in tonnes.

Catch options assuming zero discards

Rationale	Basis	Total catches	Wanted catches*	Unwanted catches*	Harvest rate**
MSY approach	MSY approach	2062	1773	289	16.3%
Other options	$F_{0.1}$	1189	1022	167	9.4%
	F_{35SpR}	1607	1381	226	12.7%
	F_{2015}	2125	1827	298	16.8%
	$F_{2013\text{-}2015}$	2594	2230	364	20.5%

* 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 (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 >MCS**	Dead discards <MCS	Surviving discards	Harvest rate***
		L+U+DD+SD	L+U+DD	L	U	DD	SD	for L+U+DD
MSY approach	MSY approach	2123	2100	1825	206	69	23	16.3%
Other options	$F_{0.1}$	1224	1211	1052	119	40	13	9.4%
	F_{35SpR}	1655	1637	1422	161	54	18	12.7%
	F_{2015}	2189	2165	1881	213	71	24	16.8%
	$F_{2013\text{-}2015}$	2670	2641	2295	259	87	29	20.5%

* Assumed for all fleets

** Unwanted landings (U) are those animals >MCS but historically discarded

*** Calculated for dead removals

All harvest rates are calculated in numbers and refer to the dead removals. The difference in catch weights between catch options with the same harvest rates is related to the fact that, in the scenario allowing for discarding, a proportion of the discards are assumed to survive (25%).

Basis of the advice

Table 6.3.28.4 Norway lobster in Division 4.b, FU 8. 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 length and sex composition of the landings are considered to be well sampled. Discard sampling has been conducted on a quarterly basis for Scottish Norway lobster trawlers in this fishery since 1990 and is considered to represent the fishery adequately. The underwater TV (UWTV) surveys have been conducted for this stock since 1993, with a continual annual series available since 1998.

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 results of the 2016 UWTV survey are expected to be available by October 2016, and the advice will be updated before the end of 2016 if there is significant deviation from the 2015 UWTV survey.

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.

For 2016 the EU landing obligation is applied to traps and trawl gears (80–99 mm mesh) fishing for Norway lobster in ICES Subarea 4. A *de minimis* exemption was made for animals below the 25 mm minimum conservation size (MCS), up to a maximum of 6% of total landings. Other gears and mesh sizes are not under the landing obligation. The catch advice assumed discarding of all Norway lobster below the MCS for all fleets.

Mixed-fisheries considerations as part of this advice will be provided by ICES in November 2016.

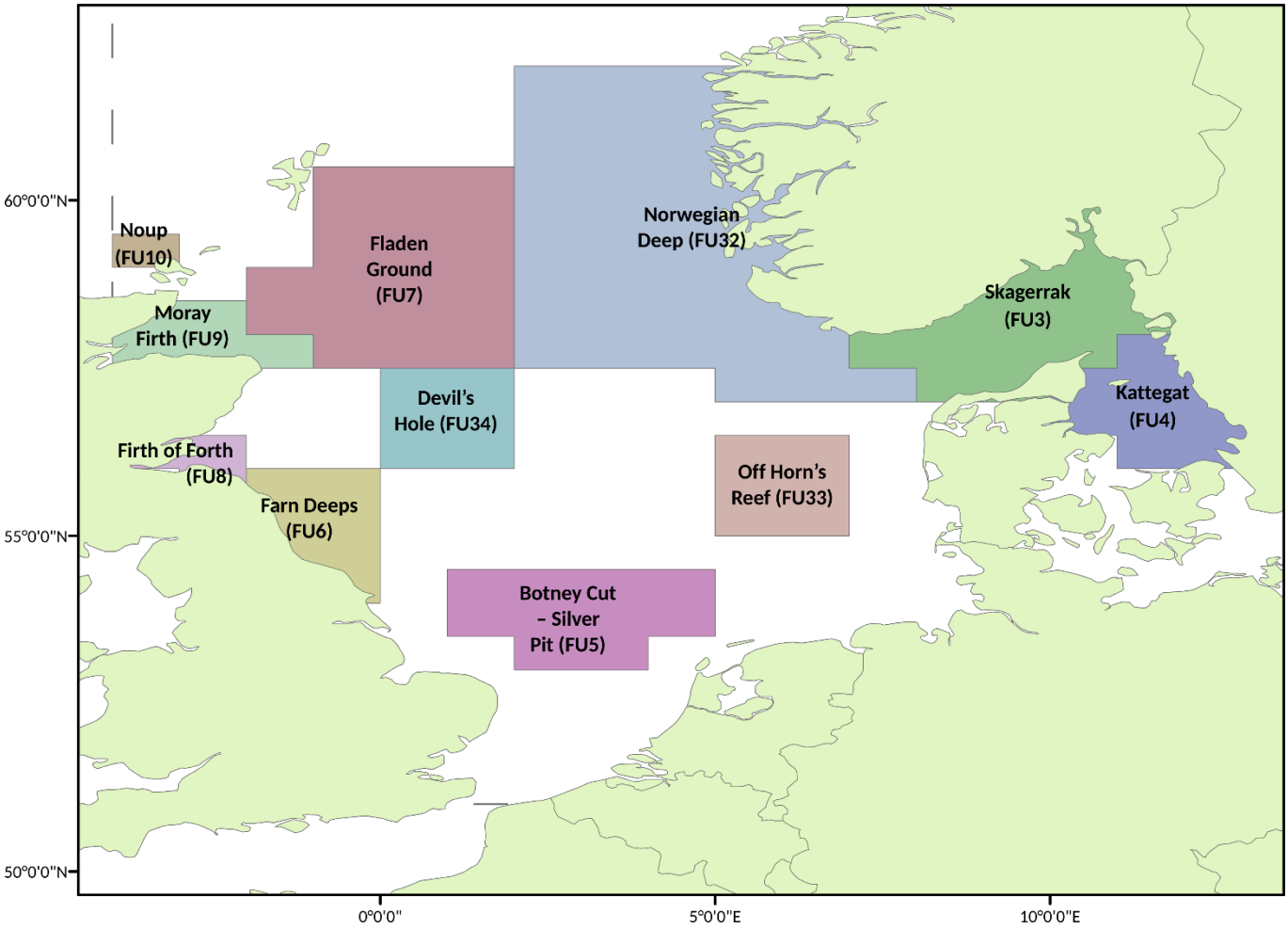

Figure 6.3.28.2 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 6.3.28.5 Norway lobster in Division 4.b, FU 8. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	292 million individuals.	Lowest observed UWTV survey estimate of abundance (1993–2010).	ICES (2010)
	F_{MSY}	Harvest rate 16.3%.	Equivalent to F_{max} for combined sexes.	ICES (2012)
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 6.3.28.6 Norway lobster in Division 4.b, FU 8. The basis of the assessment.

ICES stock data category	1 (ICES, 2016b)
Assessment type	Underwater TV survey linked to yield-per-recruit analysis from length data (ICES, 2016a).
Input data	Commercial catches (international landings, length frequencies from Scottish catch sampling), one survey index (FU 8 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 fleet/ main fleets (covering 92% of the landings). 88% of the discards were imported (12% raised discards).
Indicators	Sex ratio, length frequencies, mean size, lpue
Other information	The latest benchmark (on use of 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-ADVICE)

Information from stakeholders

Results for Norway lobster exist in the fishers' survey for Area 3, which covers multiple FUs (including FU 8), showing trends somewhat similar to the ones in the assessment (Napier, 2014). No new information is available for 2015.

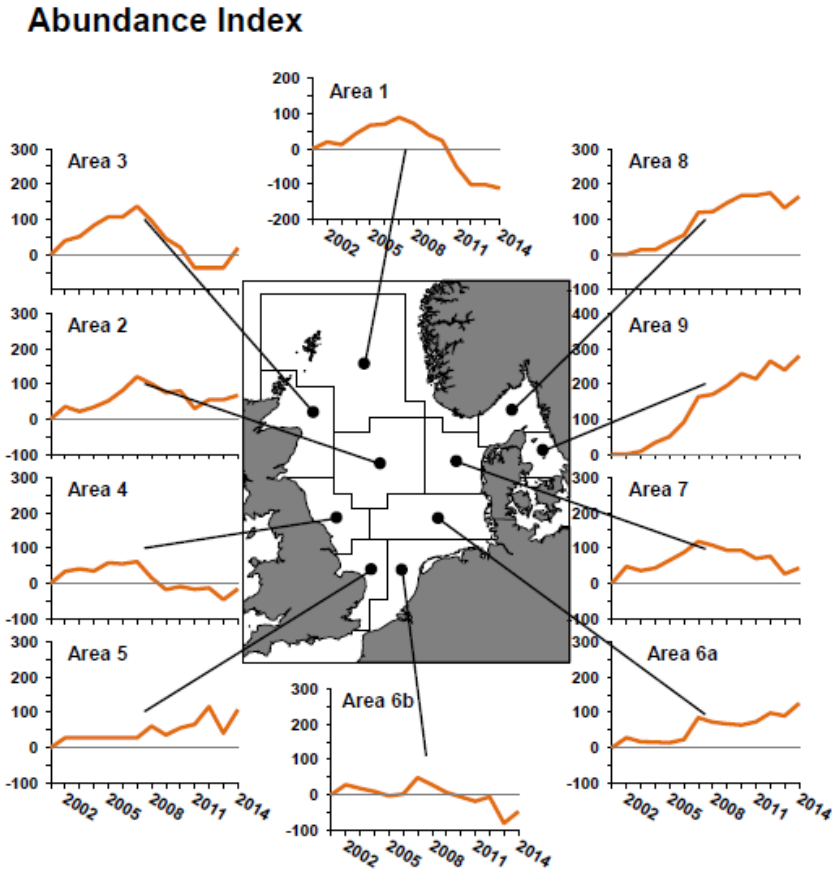

Figure 6.3.28.3 Cumulative time-series of index of perceptions of abundance of Norway lobster by roundfish sampling area from the Fishers' North Sea Stock Survey (Napier (2014); see page 14 for explanation of the index).

History of advice, catch, and management

Table 6.3.28.7 Norway lobster in Division 4.b, FU 8. 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 Total discards *
1992				1.8	
1993				2.4	0.6
1994				1.9	1.6
1995				1.8	0.6
1996				1.7	0.9
1997				2.2	0.5
1998				2.1	0.6
1999				2.2	0.9
2000				1.8	1.0
2001				1.5	0.4
2002				1.3	0.4
2003				1.1	0.5
2004				1.7	0.4
2005				2.0	0.6
2006	No increase in effort			2.4	1.5
2007	No increase in effort, harvest rate < 15%	1.5		2.6	0.6
2008	No new advice, same as for 2007	1.5		2.5	0.8
2009	No increase in effort and recent average landings	< 2.5		2.7	0.6
2010	Harvest rate no greater than that equivalent to fishing at F_{max}	< 1.6		1.9	0.4
2011	MSY transition	< 2.0		1.9	0.2
2012	MSY transition	< 1.7		2.1	0.4
2013	MSY transition	< 1.4		1.5	0.3
2014	MSY transition	< 1.417		2.4	0.4
2015	MSY approach	< 1.769		1.9	0.3
2016	MSY approach	< 1.866	≤ 2.040**		
2017	MSY approach		≤ 2.123***		

* Dead + surviving discards

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

*** Assuming discarding below MCS only**.**

History of catch and landings

Table 6.3.28.8 Norway lobster in Division 4.b, FU 8. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2015)		Landings			Discards	
96% dead	4% surviving	directed *Nephrops* fishery 93% TR2	mixed *Nephrops*/demersal fishery 5% TR1	2% creel	75% dead	25 % surviving
2203 t		1892 t			311 t	

Table 6.3.28.9 Norway lobster in Division 4.b, FU 8. History of commercial catch and landings. Both official and ICES estimated values are presented by area for each country participating in the fishery.

Year	UK Scotland				UK (E, W & NI)	Total*	Total Discards ***
	Nephrops trawl	Other trawl	Creel	Subtotal			
1981	947	60	0	1007	0	1007	
1982	1138	57	0	1195	0	1195	
1983	1681	43	0	1724	0	1724	
1984	2078	56	0	2134	0	2134	
1985	1907	61	0	1968	0	1968	
1986	2204	59	0	2263	0	2263	
1987	1583	90	2	1675	0	1675	
1988	2455	74	0	2529	0	2529	
1989	1834	53	0	1887	1	1888	
1990	1900	30	0	1930	1	1931	
1991	1362	43	0	1405	0	1405	
1992	1715	41	0	1756	0	1756	
1993	2349	17	0	2366	2	2368	567
1994	1827	17	0	1844	6	1850	1584
1995	1707	53	0	1760	2	1762	620
1996	1621	66	0	1687	0	1687	930
1997	2136	55	0	2191	2	2193	494
1998	2105	37	0	2142	2	2144	578
1999	2193	10	1	2204	3	2207	938
2000	1775	9	0	1784	1	1785	1032
2001	1484	34	0	1518	9	1527	436
2002	1302	31	1	1334	6	1340	421
2003	1116	8	0	1124	3	1127	546
2004	1650	4	0	1654	3	1657	406
2005	1974	0	4	1978	11	1989	602
2006	2438	3	12	2453	5	2458	1510
2007	2627	10	7	2644	7	2651	614
2008	2435	2	8	2445	5	2450	796
2009	2620	8	26	2654	9	2663	573
2010	1923	5	13	1941	9	1950	407
2011	1789	6	89	1884	5	1889	231
2012	1944	17	126	2087	42	2129	379
2013	1409	24	58	1491	12	1503	301
2014	2313	33	14	2360	22	2382	353
2015**	1677	104	43	1824	68	1892	311

*There are no landings by other countries from this FU.

**Provisional.

*** Dead + surviving discards

Summary of the assessment

Table 6.3.28.10 Norway lobster in Division 4.b, FU 8. Assessment summary with weights in tonnes.

Year	Adjusted abundance (millions)	95% CI	Harvest rate (%)	Landings numbers (millions)	Discards numbers (millions)	Removals numbers (millions)	Landings (tonnes)	Discards (tonnes)	Dead discards (tonnes)	Discard rate (%)	Mean weight in landings (g)	Mean weight in discards (g)	Dead discard rate (%)
1993	555	142	24.1	97	49	134	2368	567	426	33.3	24.3	11.64	27.3
1994	448	78	51.3	95	180	230	1850	1584	1188	65.5	19.51	8.79	58.8
1995	NA	NA	NA	90	59	134	1762	620	465	39.5	19.55	10.54	32.9
1996	375	88	37.3	81	78	140	1687	930	697	49.2	20.81	11.85	42.1
1997	NA	0	NA	116	56	158	2193	494	371	32.6	18.87	8.79	26.6
1998	292	81	55.7	118	60	163	2144	578	434	33.9	18.23	9.6	27.8
1999	463	78	39.6	110	97	183	2207	938	704	47	20.05	9.63	39.9
2000	443	70	33.7	82	90	150	1785	1032	774	52.5	21.83	11.42	45.3
2001	419	79	25.3	72	45	106	1527	436	327	38.7	21.22	9.59	32.1
2002	508	119	21.1	68	52	107	1340	421	316	43.1	19.62	8.16	36.2
1993	555	142	24.1	97	49	134	2368	567	426	33.3	24.3	11.64	27.3
2003	767	138	12.4	51	59	95	1127	546	410	53.9	22.31	9.25	46.7
2004	630	140	16.4	74	40	103	1657	406	304	34.9	22.45	10.25	28.7
2005	710	143	19.4	89	65	138	1989	602	452	42.1	22.33	9.28	35.3
2006	827	126	26.7	115	142	221	2458	1510	1133	55.2	21.43	10.67	48.1
2007	692	132	22.9	126	43	159	2651	614	461	25.3	20.97	14.34	20.3
2008	881	297	21.1	142	58	186	2450	796	597	29.1	17.23	13.65	23.5
2009	732	142	26	137	71	190	2663	573	430	34.1	19.41	8.09	27.9
2010	682	147	19.2	99	43	131	1950	407	305	30.2	19.76	9.55	24.5
2011	533	87	22.1	100	24	118	1889	231	173	19.5	19.75	9.56	15.3
2012	522	64	24.6	100	38	129	2129	379	284	27.2	21.66	10.10	21.9
2013	668	126	15.6	81	31	104	1503	301	226	27.4	19.30	9.82	22.0
2014	428	80	29.1	102	30	124	2382	353	265	22.9	24.30	11.66	18.3
2015	664	127	16.8	90	29	112	1892	311	234	24.4	21.84	10.74	19.5

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