

### 5.3.37 Norway lobster (*Nephrops norvegicus*) in Division 6.a – FU 11 (West of Scotland, North Minch)

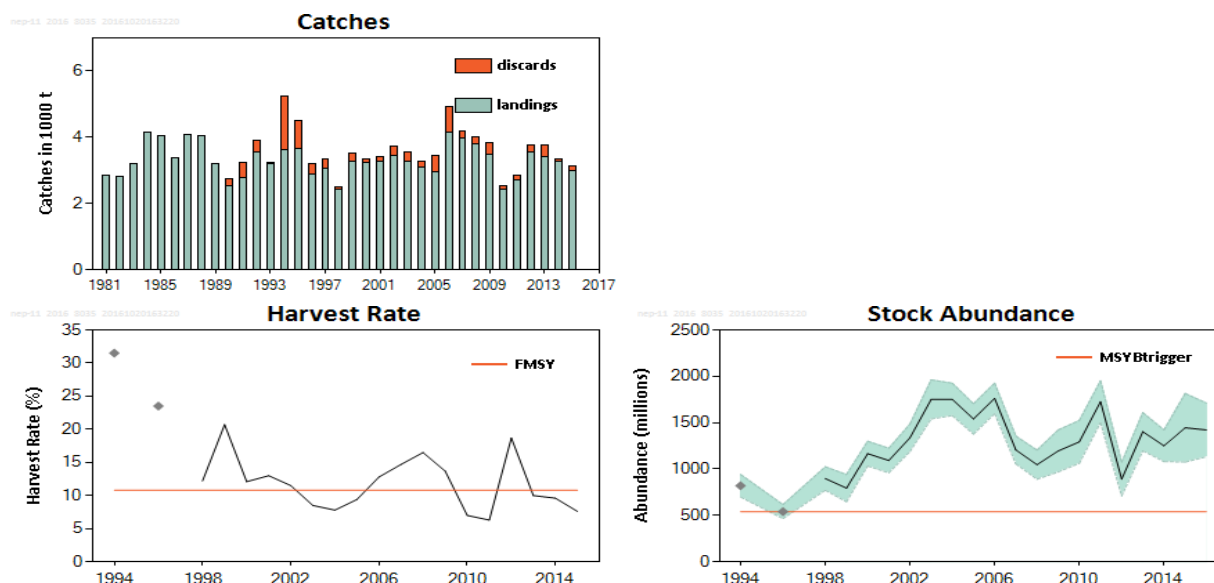
#### ICES stock advice

ICES advises that when the MSY approach is applied, and assuming that discard rates and fishery selection patterns do not change from the average of 2013–2015, catches in 2017 should be no more than 3814 tonnes. This implies landings of no more than 3610 tonnes.

To ensure that the stock in functional unit (FU) 11 is exploited sustainably, management should be implemented at the functional unit level.

#### Stock development over time

The historical harvest rate, calculated as (landings + dead discards) (abundance estimate)<sup>-1</sup>, has fluctuated around, and is now below,  $F_{MSY}$ . The stock has been above  $MSY B_{trigger}$  in the last 18 years.



**Figure 5.3.37.1** Norway lobster in Division 6.a – FU 11. Catches (thousand tonnes), harvest rate (fishing mortality proxy), survey abundance (Underwater TV, millions; SSB proxy; 95% confidence intervals). Harvest rates before 2006 may be unreliable due to underreporting of landings. Orange lines represent  $MSY B_{trigger}$  and  $F_{MSY}$  harvest rate proxy.

#### Stock and exploitation status

**Table 5.3.37.1** Norway lobster in Division 6.a – FU 11. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size				
		2013	2014	2015		2014	2015	2016		
Maximum sustainable yield	F <sub>MSY</sub>	✓	✓	✓	Below	MSY	✓	✓	✓	Above trigger
Precautionary approach	F <sub>pa</sub> , F <sub>lim</sub>	✓	✓	✓	Below possible reference points	B <sub>pa</sub> , B <sub>lim</sub>	✓	✓	✓	Above possible reference points
Management plan	F <sub>MGT</sub>	-	-	-	Not applicable	SSB <sub>MGT</sub>	-	-	-	Not applicable

## Catch options

**Table 5.3.37.2** Norway lobster in Division 6.a – FU 11. The basis for the catch options.

Variable	Value	Source	Notes
Stock abundance	1422 million individuals	ICES (2016a)	UWTV survey 2016
Mean weight in landings	25.90 g	ICES (2016a)	Average 1999–2015
Mean weight in discards	10.81 g	ICES (2016a)	Average 1999–2015
Discard rate	11.93%	ICES (2016a)	Average 2013–2015 (by number). Calculated as discards divided by landings + discards.
Discard survival rate	25%	ICES (2016a)	Only applies in scenarios where discarding is allowed.
Dead discard rate	9.23%	ICES (2016a)	Average 2013–2015 (by number). Calculated as dead discards divided by dead removals (landings + dead discards). Only applies in scenarios where discarding is allowed.

**Table 5.3.37.3** Norway lobster in Division 6.a – FU 11. The catch options. All weights in tonnes.

Catch options assuming zero discards

Rationale	Basis	Total catches	Wanted catches*	Unwanted catches*	Harvest rate**
MSY approach	MSY approach	3700	3502	198	10.8%
Other option	F <sub>2015</sub>	2604	2465	139	7.6%

\* “Wanted” and “unwanted” catch are used to describe *Nephrops* that would be landed and discarded in the absence of the EU landing obligation, based on the average estimated discard rates for 2013–2015.

\*\* Applied to total catch.

Catch options assuming discarding is allowed

Rationale	Basis	Total catches	Dead removals	Landings	Dead discards	Surviving discards	Harvest rate*
		L+DD+SD	L+DD	L	DD	SD	for L+DD
MSY approach	MSY approach (F <sub>MSY</sub> proxy) assuming recent discard rates	3814	3763	3610	153	51	10.8%

\* Applied to 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.

## Basis of the advice

**Table 5.3.37.4** Norway lobster in Division 6.a – FU 11. 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

Since 1994 the underwater TV survey (UWTV) has provided abundance estimates for the FU with adequate precision. Biological sampling for this stock is considered sufficient.

The UWTV survey for FU 11 does not cover *Nephrops* grounds in the inshore waters and sea lochs, waters that are typically fished by smaller vessels. The total area of these grounds is estimated to be less than 5% of the total stock areas and therefore the exclusion of these inshore areas from the survey is not considered to impact the quality of the assessment.

The long-term average (rather than a three-year average) was considered more appropriate as input for the mean weight in landings and discards in the calculation of catch options. This is due to interannual variation.

### Issues relevant for the advice

From 2016, fisheries catching *Nephrops* in Division 6.a are covered by the EU landings obligation (EU, 2015). Creel fisheries are exempted from the landings obligation, with a *de minimis* exemption consisting of a 7% discard rate by weight for the trawl fishery in 2016 and 2017. The average discard rate by weight in the trawl fishery for FU 11 over the last three years is 6.4%. The catch advice is based on the assumption that the discard rate will be 5.3% by weight in 2017 for the entire fishery.

For FU 11, the absolute density observed in the UWTV survey is intermediate compared to other *Nephrops* FUs, with an average density of around 0.6 individuals  $m^{-2}$ . This suggests the stock may have a medium productivity capability. Historical harvest ratios in this FU have been around  $F_{35\%SPR}$  and landings have been relatively stable in the last thirty years. For these reasons,  $F_{35\%SPR}$  (combined between sexes) is considered to deliver high long-term yield with a low probability of recruitment overfishing and is therefore chosen as a proxy for  $F_{MSY}$ .

MSY reference points were recalculated at WKMSYREF4 (ICES, 2016b). Previous reference points ( $F_{0.1}$  and  $F_{max}$ ) were not recalculated and hence not included in the catch options table.

A single TAC covers the entire ICES Subarea 6. Management should be implemented at the functional unit level to ensure that fishing opportunities are in line with the scale of the resource for each of the stocks and the corresponding MSY approach.

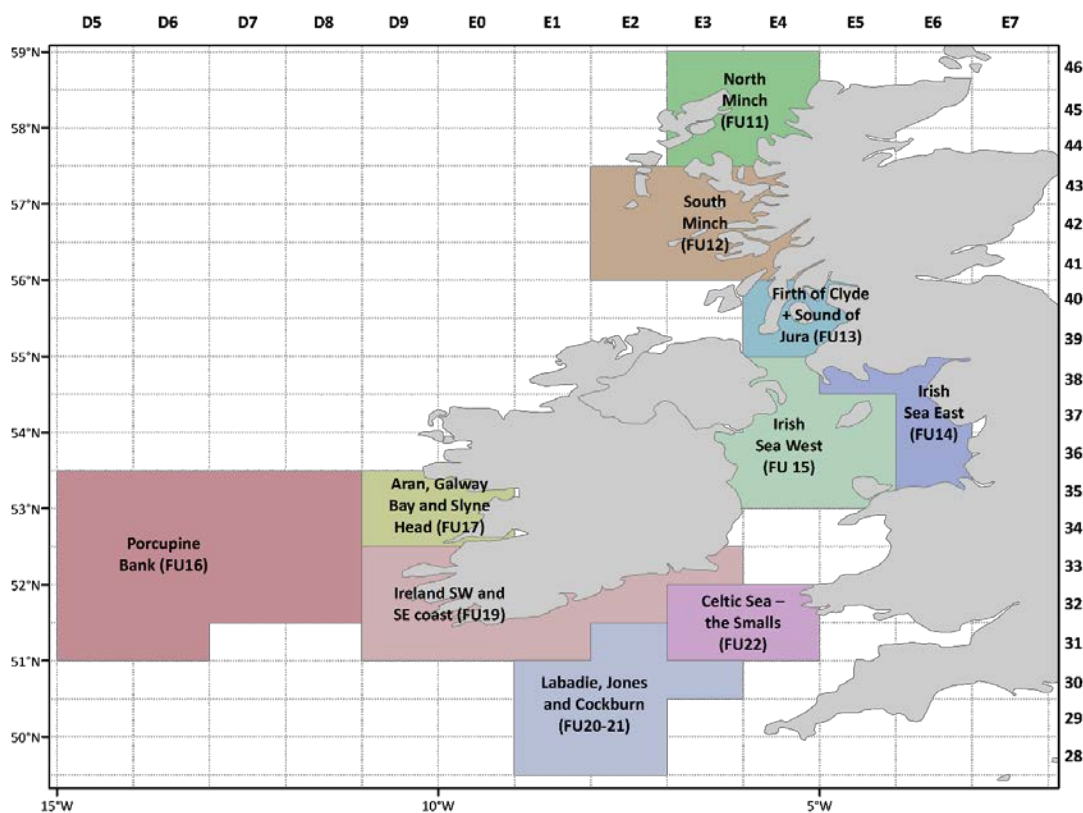


Figure 5.3.37.2 *Nephrops* functional units in Division 6.a and Subarea 7.

## Reference points

**Table 5.3.37.5** Norway lobster in Division 6.a – FU 11. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	540 million individuals	Lowest observed abundance estimate from UWTV survey time-series.	ICES (2016c)
	$F_{MSY}$	10.8% harvest rate	$F_{MSY}$ proxy equivalent to $F_{35\%SPR}$ combined sexes.	ICES (2016c)
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 5.3.37.6** Norway lobster in Division 6.a – FU 11. The basis of the assessment.

ICES stock data category	1 ( <a href="#">ICES, 2016d</a> ).
Assessment type	Underwater TV survey combined with yield-per-recruit analysis from length data.
Input data	One survey index (UWTV-FU11); commercial catches (international landings, length frequencies from Scottish catch sampling); fixed maturity parameters from survey data; fixed natural mortalities. Discard survival rate.
Discards and bycatch	Included in the assessment since 1990, data series from the majority of the main fleets covering all landings.
Indicators	Size structure, mean size, and sex ratio of catches.
Other information	The latest benchmark (based on the UWTV survey) was performed in 2013 ( <a href="#">ICES, 2013</a> ).
Working group	Working Group for the Celtic Seas Ecoregion ( <a href="#">WGCSE</a> ).

## Information from stakeholders

There is no available information.

### History of the advice, catch, and management

**Table 5.3.37.7** Norway lobster in Division 6.a – FU 11. History of ICES advice and ICES estimates of landings. All weights are in thousand tonnes.

Year	ICES advice	Landings advice	Catch advice	ICES landings	Total discards**
1989				3.2	
1990				2.5	0.2
1991				2.8	0.4
1992	Maintain current effort			3.6	0.4
1993	Maintain current effort			3.2	0.0
1994	Maintain current effort			3.6	1.6
1995	Maintain current effort			3.7	0.9
1996	Maintain current effort			2.9	0.3
1997	As for 1996			3.0	0.3
1998	Maintain current effort			2.4	0.1
1999	As for 1998			3.3	0.3
2000	Maintain current effort			3.2	0.1
2001	As for 2000			3.3	0.2
2002	Maintain current effort			3.4	0.3
2003	As for 2002			3.3	0.3
2004	Maintain current effort			3.1	0.2
2005	As for 2004			2.9	0.5
2006	No increase in effort			4.2	0.8
2007	No increase in effort and harvest rate of 15%	3.2		4.0	0.2
2008	As for 2007	3.2		3.8	0.2
2009	No increase in effort and recent average catch	< 4.1		3.5	0.3
2010	Harvest rate no greater than that equivalent to fishing at $F_{0.1}$	< 1.0		2.4	0.1
2011	MSY transition scheme	< 3.1		2.7	0.2
2012	MSY approach	< 3.2		3.5	0.2
2013	MSY approach	< 4.2		3.4	0.4
2014	MSY approach	< 3.5		3.2	0.1
2015	MSY approach	< 3.1		3.0	0.1
2016	MSY approach		$\leq 3.770^*$		
2017	MSY approach		$\leq 3.814^{**}$		

\* Assuming all catches are landed.

\*\* Assuming discarding at average rates (2013–2015).

### History of catch and landings

**Table 5.3.37.8** Norway lobster in Division 6.a – FU 11. Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)		Landings			Total discards	
98.6% dead	1.4% surviving	Directed <i>Nephrops</i> fishery		Mixed <i>Nephrops</i> /demersal fishery	75% dead	25% surviving
		62% TR2 (trawls 70–99 mm)	14% creels	24% TR1 (trawls >100 mm)		
3138 t		2995 t			143 t	

**Table 5.3.37.9** Norway lobster in Division 6.a – FU 11. History of commercial catch and landings; ICES estimated values are presented by country participating in the fishery. All weights are in tonnes.

Year	UK Scotland				Other UK & Ireland	Total	Total discards**
	<i>Nephrops</i> trawl	Other trawl	Creel	Subtotal			
1981	2320	171	370	2861	0	2861	
1982	2323	105	371	2799	0	2799	
1983	2784	96	317	3197	0	3197	
1984	3449	160	534	4143	0	4143	
1985	3235	117	708	4060	0	4060	
1986	2641	203	537	3381	0	3381	
1987	3459	143	482	4084	0	4084	
1988	3450	148	437	4035	0	4035	
1989	2603	112	490	3205	0	3205	
1990	1941	134	471	2546	0	2546	199
1991	2229	126	438	2793	0	2793	441
1992	2978	149	432	3559	0	3559	353
1993	2699	86	408	3193	0	3193	29
1994	2916	246	453	3614	0	3614	1637
1995	2940	183	532	3655	0	3655	856
1996	2354	148	370	2872	0	2872	323
1997	2553	102	391	3046	0	3046	286
1998	2023	68	350	2441	0	2441	67
1999	2792	56	409	3257	0	3257	273
2000	2695	28	524	3247	0	3247	100
2001	2649	42	568	3259	0	3259	160
2002	2775	79	586	3440	0	3440	277
2003	2606	45	618	3269	0	3269	299
2004	2391	30	661	3082	0	3082	202
2005	2270	23	656	2949	0	2949	507
2006	3446	23	697	4166	0	4166	757
2007	3361	26	591	3978	0	3978	214
2008	3229	13	557	3799	0	3799	194
2009	2849	34	613	3496	0	3496	327
2010	1783	9	621	2413	0	2413	128
2011	2109	17	571	2697	0	2697	154
2012	2963	12	565	3540	2	3542	213
2013	2356	480	575	3411	2	3413	364
2014	2168	587	478	3233	2	3255	77
2015*	1858	720	417	2995	0	2995	143

\* Preliminary.

\*\*Dead + surviving discards.

## Summary of the assessment

**Table 5.3.37.10** Norway lobster in Division 6.a – FU 11. Assessment summary.

Year	UWTV abundance estimate	95% CI	Harvest ratio**	Landings numbers	Total discards in numbers*	Removals numbers	Landings	Total discards*	Discard rate	Mean weight in landings	Mean weight in discards	Dead discard rate
	millions	millions	%	millions	millions	millions	tonnes	tonnes	%	grammes	grammes	%
1994	820	121	31.5	154	139	258	3614	1637	47.4	23.45	11.8	40.3
1995	No survey			164	80	225	3655	856	32.8	22.24	10.65	26.8
1996	541	77	23.5	108	26	127	2872	323	19.4	26.68	12.49	15.3
1997	No survey			140	26	159	3046	286	15.4	21.71	11.18	12
1998	898	126	12.2	103	8	110	2441	67	7.5	23.65	8.04	5.7
1999	794	147	20.7	144	28	165	3257	273	16.4	22.7	9.69	12.8
2000	1166	134	12.1	134	10	142	3247	100	6.9	24.19	10.08	5.2
2001	1092	133	13	129	17	141	3259	160	11.7	25.33	9.32	9.1
2002	1337	149	11.5	133	28	154	3440	277	17.6	25.93	9.78	13.8
2003	1751	211	8.5	126	30	148	3269	299	19.2	26.03	10	15.2
2004	1751	175	7.8	122	18	136	3082	202	13	25.16	11.02	10.1
2005	1540	164	9.4	107	50	144	2949	507	32	27.65	10.09	26.1
2006	1762	165	12.8	170	74	225	4166	757	30.3	24.52	10.27	24.6
2007	1206	150	14.7	168	12	177	3978	214	6.5	23.61	18.1	5
2008	1047	157	16.5	159	19	173	3799	194	10.5	23.9	10.36	8.1
2009	1195	227	13.7	138	35	164	3496	327	20.3	25.42	9.34	16
2010	1293	231	7	82	12	91	2413	128	12.4	29.39	10.98	9.6
2011	1726	226	6.3	96	16	108	2697	154	14.2	27.56	9.66	11
2012	891	181	18.7	151	21	167	3542	213	12.6	23.43	10.33	9.3
2013	1403	206	10	122	24	140	3413	364	16.4	27.52	15.18	12.8
2014	1251	171	9.6	115	8	121	3255	77	6.3	27.96	9.99	4.8
2015	1445	370	7.6	99	15	110	2995	143	13.1	29.93	9.66	10.1
2016	1422	290										

\* Dead + surviving discards.

\*\* Harvest ratios prior to 2006 may be underestimates because of underreporting of landings.

## Sources and references

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