Published 31 October 2017
DOI: 10.17895/ices.pub.3396

Norway lobster (*Nephrops norvegicus*) in Division 7.b, Functional Unit 17 (west of Ireland, Aran grounds)

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 2014–2016, catches in 2018 should be no more than 551 tonnes.

To ensure that the stock in Functional Unit 17 is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

The abundance shows an overall decreasing trend over time and is currently below MSY $B_{trigger}$. The harvest rate has largely fluctuated around F_{MSY} in the last decade and is currently estimated at just above F_{MSY}.

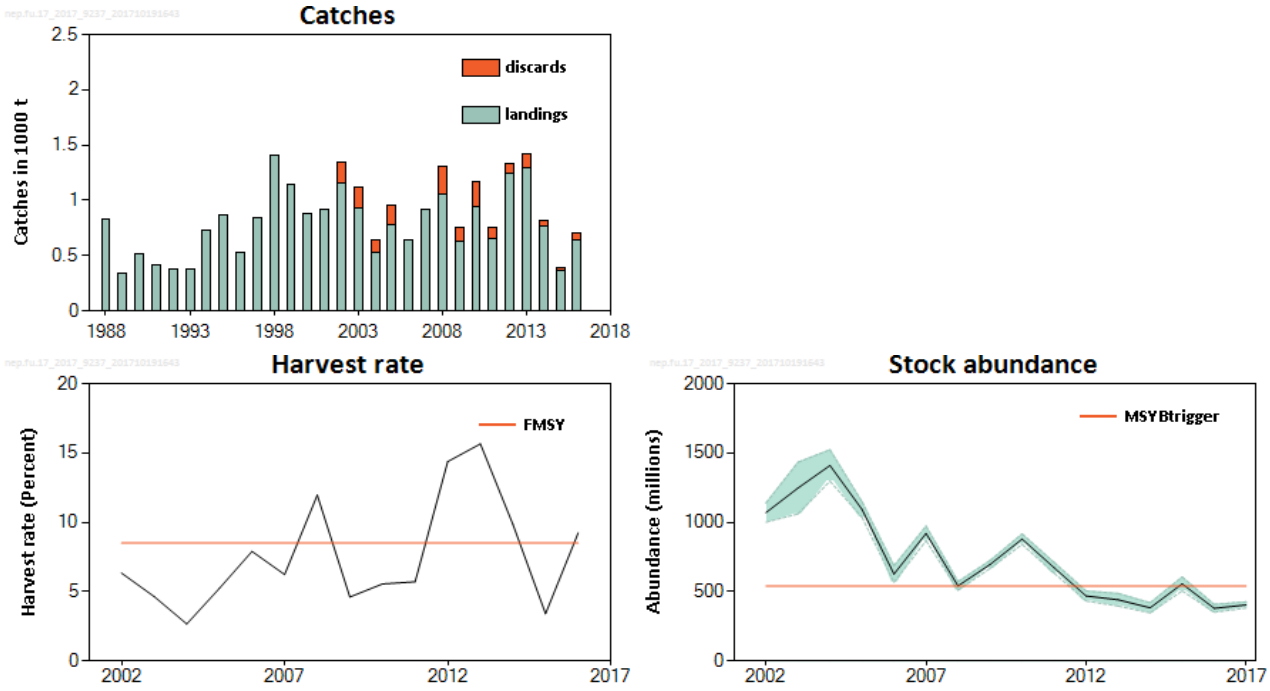

Figure 1 Norway lobster in Division 7.b, Functional Unit 17. Summary of the stock assessment. Catches (discard data only available from 2002), harvest rate (sum of landings and dead discards in numbers, divided by total abundance), survey abundance (Underwater TV, millions; SSB proxy; 95% confidence intervals). Orange lines represent MSY $B_{trigger}$ and the F_{MSY} harvest rate.

Stock and exploitation status

Table 1 Norway lobster in Division 7.b, Functional Unit 17. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✗	✓	✗	Above	MSY $B_{trigger}$	✓	✗	✗ Below trigger
Precautionary approach	F_{pa},F_{lim}	?	✓	?	Undefined	B_{pa},B_{lim}	✓	?	? Undefined
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

Catch options

The latest estimate of stock abundance (value from the June 2017 survey, 404 million) is below the MSY $B_{trigger}$ value (540 million). The ICES MSY approach states that under such conditions the F_{MSY} harvest rate (8.5% for Functional Unit (FU) 17 Norway lobster) should be reduced by multiplying it by the ratio of current abundance to MSY $B_{trigger}$. This corresponds to a harvest rate of 8.5 × 404 ÷ 540 = 6.4% for the advice in 2018.

Table 2 Norway lobster in Division 7.b, Functional Unit 17. The basis for the catch options.

Variable	Value	Source	Notes
Stock abundance (2018)	404 million individuals	ICES (2017)	UWTV survey 2017 (used as abundance estimate for 2018).
Mean weight in landings	22.17 g	ICES (2017)	Average 2008–2016.
Mean weight in discards	11.22 g	ICES (2017)	Average 2008–2016.
Discard rate	12.90%	ICES (2017)	Average 2014–2016 (by number). Calculated as total discards divided by landings + total discards.
Discard survival rate	25%	ICES (2017)	Only applies in scenarios where discarding is assumed to continue.
Dead discard rate	10%	ICES (2017)	Average 2014–2016 (by number). Calculated as dead discards divided by removals (landings + dead discards). Only applies in scenarios where discarding is assumed to continue.

Table 3 Norway lobster in Division 7.b, Functional Unit 17. The catch options. All weights are in tonnes.

a) Catch options for 2018 assuming zero discards.

Basis	Total catch	Wanted catch*	Unwanted catch*	Harvest rate**
ICES advice basis				
MSY approach; F = F_{MSY}*(Stock Abundance 2018)/MSY $B_{trigger}$	533	496	37	6.4%
Other options				
F_{MSY}	713	663	50	8.5%
F_{2016}	772	718	54	9.2%

* "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 2014–2016.
** Calculated for dead removals and applied to total catch.

b) Catch options for 2018 assuming discarding continues at the recent average rate.

Basis	Total catch	Dead removals	Landings	Dead discards	Surviving discards	Harvest rate*
	L+DD+SD	L+DD	L	DD	SD	for L+DD
ICES advice basis						
MSY approach; F = F_{MSY} × (Stock Abundance 2018)/MSY $B_{trigger}$	551	541	513	29	10	6.4%
Other options						
F_{MSY}	737	724	685	39	13	8.5%
F_{2016}	797	783	741	42	14	9.2%

* Calculated for dead removals and applied to total catch.

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 is assumed to survive (25%).

Basis of the advice

Table 4 Norway lobster in Division 7.b, Functional Unit 17. The basis of the advice.

Advice basis	MSY approach.
Management plan	ICES is not aware of any agreed precautionary management plan for Norway lobster in this area.

Quality of the assessment

Biological sampling for this stock is adequate. Since 2002 a dedicated annual UWTV survey has provided abundance estimates for the Aran Grounds with high precision.

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

Issues relevant for the advice

From 2016, fisheries catching *Nephrops* in Subarea 7 are covered by the EU landings obligation (EC, 2015). Creel fisheries are exempted from the landings obligation, with a *de minimis* exemption consisting of a 6% discard rate by weight for the trawl fishery in 2018 (reduced from 7% in 2016 and 2017). The average discard rate by weight in the trawl fishery for FU 17 over the last three years is 6.5%. The discard rate by number used in the calculation of the catch advice implies that the discard rate by weight will be 7% in 2018 for the entire fishery.

The observed burrow density has declined, from high (> 0.8 individuals m^{-2}) at the start of the series to medium density (~0.3 individuals m^{-2}) towards the end of the time-series. The nature of the fishery has also changed, from a continuous fishery throughout the year to a fishery more concentrated on periods of high catch rates. For these reasons a harvest rate consistent with a combined sex $F_{0.1}$ is considered an appropriate proxy for F_{MSY} (ICES, 2015).

A single TAC covers the entire ICES Subarea 7. 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.

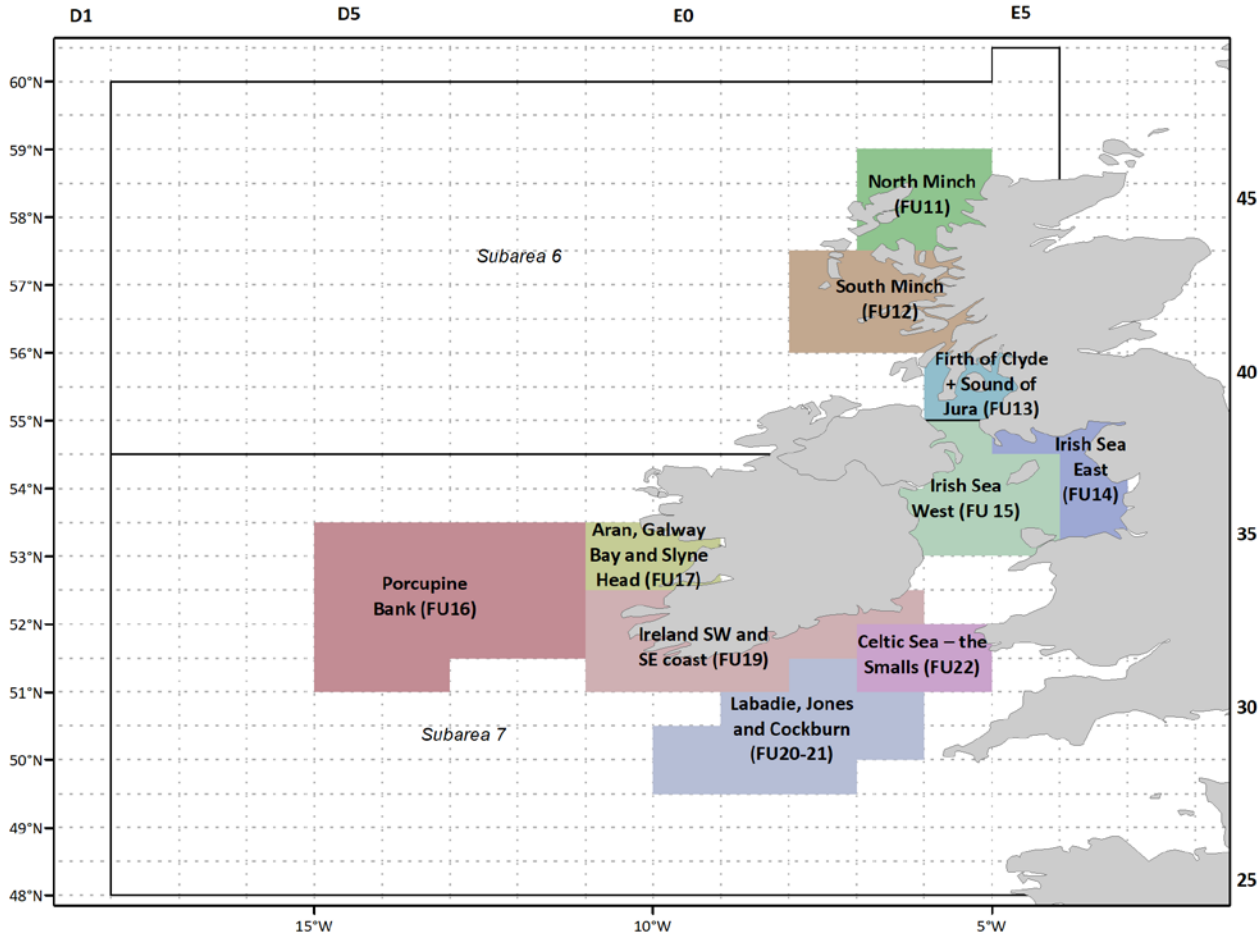

Figure 2 Norway lobster functional units in subareas 6 and 7.

Reference points

Table 5 Norway lobster in Division 7.b, Functional Unit 17. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	540 million individuals	Based on abundance in 2008 from the UWTV survey time-series.	ICES (2016a)
	F_{MSY}	8.5% harvest rate	F_{MSY} proxy equivalent to $F_{0.1}$ for combined sexes in 2015, derived from a length-based per recruit analysis.	ICES (2016a)
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 Norway lobster in Division 7.b, Functional Unit 17. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2016b).
Assessment type	Underwater TV survey.
Input data	One survey index (UWTV-FU 17); commercial catches (international landings, length frequencies from Irish catch sampling); maturity data (commercial catch and discard sampling, survey sampling); fixed natural mortality. Discard survival rate.
Discards and bycatch	Included in the assessment since 2001.
Indicators	Length distributions by sex of the catches.
Other information	This stock was benchmarked in 2015 (IBPNeph; ICES, 2015).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

Information from stakeholders

There is no additional available information for this stock.

History of the advice, catch, and management

Table 7 Norway lobster in Division 7.b, Functional Unit 17. ICES advice, landings and discards. All weights are in tonnes.

Year	ICES advice	Landings advice	Catch advice	Recommended landings in divisions 7.b, 7.c, 7.j, and 7.k*	ICES landings	Total discards **
1988					828	
1989					347	
1990					519	
1991					410	
1992				3800	374	
1993				~4000	372	
1994				~4000	729	
1995				~4000	867	
1996				4000	528	
1997				4000	841	
1998				4000	1410	
1999				4000	1140	
2000				4000	880	
2001				4000	913	
2002				4440	1154	192
2003				4440	933	183
2004	Restrict landings to 2000–2002 levels			3300	525	112
2005	Restrict landings to 2000–2002 levels			3300	778	182
2006	Restrict landings to 2000–2002 levels			3300	637	
2007	Constrain effort at recent levels			--	913	
2008	Constrain effort at recent levels			--	1057	248
2009	No increase in effort and landings (2007)	< 900			626	129

Year	ICES advice	Landings advice	Catch advice	Recommended landings in divisions 7.b, 7.c, 7.j, and 7.k*	ICES landings	Total discards **
2010	Harvest ratio no greater than the lower bound of the range of $F_{0.1}$ for similar stocks	< 500			939	224
2011	MSY approach	< 950			659	92
2012	MSY approach	< 1100			1246	86
2013	MSY approach (updated November 2012)	< 590			1295	129
2014	MSY approach	< 590			766	48
2015	MSY approach	< 524			370	15
2016	MSY approach		≤ 991***		641	69
2017	MSY approach		≤ 489^			
2018	MSY approach		≤ 551^			

* Before 2007 ICES gave combined advice for FUs 16, 17, 18, and 19, and other rectangles in this area.
** Dead + surviving discards.
*** Assuming all catches are landed.
^ Assuming recent discard rates.

History of the catch and landings

Table 8 Norway lobster in Division 7.b, Functional Unit 17. Catch distribution by fleet in 2016 as estimated by ICES.

Catch		Estimated landings	Total discards	
99% dead	1% surviving	Almost 100% otter trawl (70–99 mm)	75% dead	25% surviving
710 t		641 t	69 t	

Table 9 Norway lobster in Division 7.b, Functional Unit 17. History of landings and discards; ICES estimates of landings and total discards. All weights are in tonnes.

Year	France	Rep. of Ireland	UK	Total landings	Total discards*
1974	477	n/a	n/a	477	n/a
1975	822	n/a	n/a	822	n/a
1976	131	n/a	n/a	131	n/a
1977	272	n/a	n/a	272	n/a
1978	481	n/a	n/a	481	n/a
1979	452	n/a	n/a	452	n/a
1980	442	n/a	n/a	442	n/a
1981	414	n/a	n/a	414	n/a
1982	210	n/a	n/a	210	n/a
1983	131	n/a	n/a	131	n/a
1984	324	n/a	n/a	324	n/a
1985	207	n/a	n/a	207	n/a
1986	147	n/a	1	148	n/a
1987	62	n/a	0	62	n/a
1988	14	814	n/a	828	n/a
1989	27	317	3	347	n/a
1990	30	489	n/a	519	n/a
1991	11	399	n/a	410	n/a
1992	11	361	2	374	n/a
1993	11	361	0	372	n/a
1994	18	707	4	729	n/a
1995	91	774	2	867	n/a

Year	France	Rep. of Ireland	UK	Total landings	Total discards*
1996	2	519	7	528	n/a
1997	2	839	0	841	n/a
1998	9	1401	0	1410	n/a
1999	0	1140	0	1140	n/a
2000	1	879	0	880	n/a
2001	1	912	0	913	n/a
2002	2	1152	0	1154	192
2003	0	933	0	933	183
2004	0	525	0	525	112
2005	0	778	0	778	182
2006	0	637	0	637	n/a
2007	0	913	0	913	n/a
2008	0	1050	7	1057	248
2009	0	626	0	625	129
2010	0	930	9	939	224
2011	0	659	0	659	92
2012	0	1246	0	1246	86
2013	0	1295	0	1295	129
2014	0	766	0	766	48
2015	0	370	0	370	15
2016**	0	641	0	641	69

* Dead + surviving discards**.**

** Preliminary.

n/a = not available.

Summary of the assessment

Table 10 Norway lobster in Division 7.b, Functional Unit 17. Assessment summary.

Year	Landings in number	Total discards in number *	Removals in number	UWTV abundance estimates	95% conf. intervals	Harvest rate	Mean weight in landings	Mean weight in discards	Discard rate	Dead discard rate
	millions					%	grammes		%	
2002	55	18	68	1070	69	6.3	21.2	10.8	24.5%	19.6%
2003	44	18	58	1246	186	4.6	21.2	10.0	29.3	23.7
2004	29	11	38	1410	113	2.7	18.1	9.9	28.2	22.9
2005	42	20	57	1092	56	5.2	18.4	9.2	31.7	25.9
2006	n/a	n/a	50	627	60	7.9	n/a	n/a	n/a	n/a
2007	n/a	n/a	57	920	52	6.2	n/a	n/a	n/a	n/a
2008	48	22	65	541	31	12.0	21.94	11.23	31.4	25.6
2009	25	9	32	696	29	4.6	25.12	13.63	27.6	22.2
2010	37	15	49	879	38	5.6	25.16	14.70	29.0	23.4
2011	32	9	38	672	39	5.7	20.62	10.75	21.1	16.7
2012	60	8	66	468	36	14.4	20.40	10.39	12.0	9.2
2013	60	12	69	441	46	15.7	21.59	10.73	16.7	13.1
2014	34	5	38	383	37	9.8	22.62	9.56	12.9	10.0
2015	18	2	19	556	50	3.4	20.91	9.13	8.4	6.4
2016	30	6	35	379	28	9.2	21.21	10.85	17.4	13.7
2017				404	23					

* Dead + surviving discards.

n/a = not available.

Sources and references

EU. 2015. COMMISSION DELEGATED REGULATION (EU) 2015/2438 of 12 October 2015 establishing a discard plan for certain demersal fisheries in north-western waters. Official Journal of the European Union, L 336: 29–35. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2438&from=EN.

ICES. 2015. Report of the Inter-Benchmark Protocol of *Nephrops* in FU 17 and 14 (IBPNeph), from June to September 2015, by correspondence. ICES CM 2015/ACOM:38. 86 pp.

ICES. 2016a. EU request to ICES to provide F_{MSY} ranges for selected stocks in ICES subareas 5 to 10. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 5, Section 5.4.1. 13 pp.

ICES. 2016b. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

ICES. 2017. Report of the Working Group for the Celtic Seas Ecoregion (WGCSE), 9–18 May 2017, ICES Headquarters, Copenhagen, Denmark. ICES CM 2016/ACOM:13. 1464 pp.