Norway lobster (*Nephrops norvegicus*) in divisions 7.a, 7.g, and 7.j, Functional Unit 19 (Irish Sea, Celtic Sea, eastern part of southwest of Ireland)

ICES advice on fishing opportunities

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 2015–2017, catches in 2019 should be no more than 173 tonnes.

To ensure that the stock in Functional Unit 19 is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

The harvest rates have been below F_{MSY} since 2014. Stock abundance has shown a declining trend and is now below MSY $B_{trigger}$.
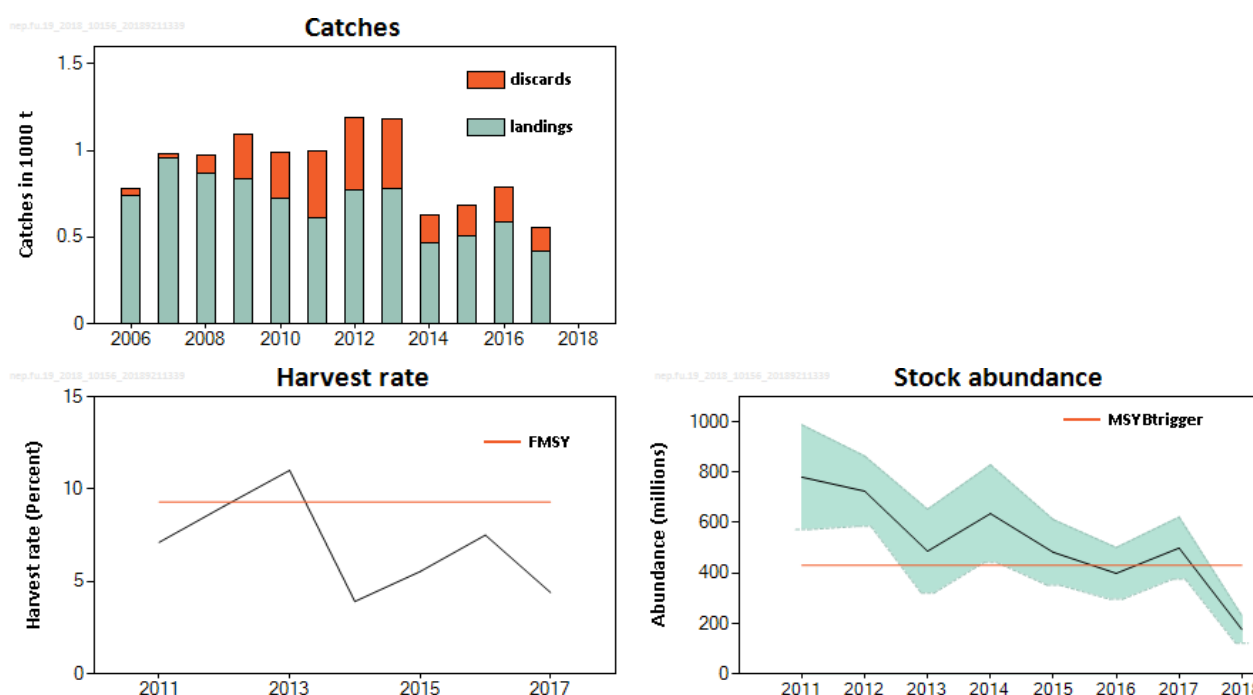

Figure 1   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Summary of the stock assessment. Catches, harvest rate (sum of landings and dead discards in numbers divided by total abundance), stock abundance (Underwater TV, millions; SSB proxy; 95% confidence intervals). Orange lines represent MSY $B_{trigger}$ and the F_{MSY} harvest rate.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below F_{MSY} and stock size is below MSY $B_{trigger}$.

Table 1   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. State of the stock and fishery relative to reference points.

Catch scenarios

The latest estimate of stock abundance is below MSY $B_{trigger}$ (430 million). The ICES MSY approach states that under such conditions the F_{MSY} harvest rate (9.3%) for Functional Unit (FU) 19 should be reduced by multiplying it by the ratio of current abundance to MSY $B_{trigger}$. This corresponds to a harvest rate of [9.3 × (176/430)] = 3.8% for the advice in 2019.

Table 2   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. The basis for the catch advice and scenarios.

Variable	Value	Notes
Stock abundance (2019)	176 million	UWTV survey 2018 (number of individuals) estimate) for 2019).
Mean weight in wanted catch	29.5 g	Average 2015–2017.
Mean weight in unwanted catch	14.1 g	Average 2015–2017.
Unwanted catch	41.2%	Average 2015–2017 (proportion by number) number).
Discards survival	25%	Proportion by number.
Dead unwanted catch	34.4%	Average 2015–2017 (proportion by number).

Table 3   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Annual catch advice and scenarios; discarding is assumed to continue at recent average. All weights are in tonnes.

Basis	Total catch	Dead removals	Wanted catch	Dead unwanted catch	Surviving unwanted catch	Harvest rate* %	% advice change ***‡
	WC+DUC+SUC	WC+DUC	WC	DUC	SUC	for WC+DUC	
ICES advice basis							
MSY approach; F = F_{MSY} × (Stock Abundance 2019)/MSY $B_{trigger}$	173	162	130	33	11	3.8	−85.5
Other options							
F_{MSY}	423	397	317	80	27	9.3	−64.5
$F_{MSY\ lower}$	378	354	283	71	24	8.3	−68.3
$F_{MSY\ lower}$ × (Stock Abundance 2019)/MSY $B_{trigger}$	155	145	116	29	10	3.4	−87.0
$F_{MSY\ upper}$***	423	397	317	80	27	9.3	−64.5
$F_{MSY\ upper}$ × (Stock Abundance 2019)/MSY $B_{trigger}$	173	162	130	33	11	3.8	−85.5
F_{2017}	198	186	149	37	12	4.4	−83.2

* By number.

** Advice value for 2019 relative to advice value for 2018.

*** $F_{MSY\ upper}$ =F_{MSY} for this stock.

The reduction in total catch advice is the result of the decrease in observed stock abundance in 2018 and of the lower harvest rate to be applied because stock abundance is below MSY $B_{trigger}$.

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‡ Version 2: Percentage of advice change corrected for all options.

Basis of the advice

Table 4   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. The basis of the advice.

Advice basis	MSY approach.
Management plan	The EU has proposed a multiannual management plan for the Western Waters, which is not yet finalized (EU, 2018).

Quality of the assessment

An annual UWTV survey has been carried out since 2011, with full coverage of all the discrete patches since 2013. The survey gives estimates of burrow densities for the main patches of *Nephrops* habitat in Functional Unit (FU) 19 and an abundance estimate for the entire stock with acceptable precision.

The main quality concern relates to mean weight estimates and discard rates that are quite variable over the time-series, partially reflecting the difference in mean sizes of patches with different underlying densities. Adequate catch sampling remains difficult for such a heterogeneous area.

Issues relevant for the advice

From 2016 the EU landing obligation was applied to all catches of Norway lobster fisheries in ICES Subarea 7, with several exemptions. Observations from the 2016–2017 fishery indicate that discarding above the minimum conservation reference size (MCRS) continues and has not changed markedly (Figure 3). Consequently, ICES is providing advice for 2019 assuming average discard rates as observed over the last three years, which is considered to be a more realistic assumption.

The proportion of discarded *Nephrops* in FU 19 is high relative to other areas because the vessels tend to be small with limited space and crew; therefore, the on-board tailing of the catch is not as prevalent as in other FUs around Ireland.

The density of *Nephrops* in FU 19 is considered medium (average density 0.3 individuals m^{-2}). The knowledge of biological parameters is poor and the exploitation rate on males is usually higher than on females. For these reasons, a harvest ratio consistent with a combined sex $F_{0.1}$ is considered an appropriate proxy for F_{MSY}.

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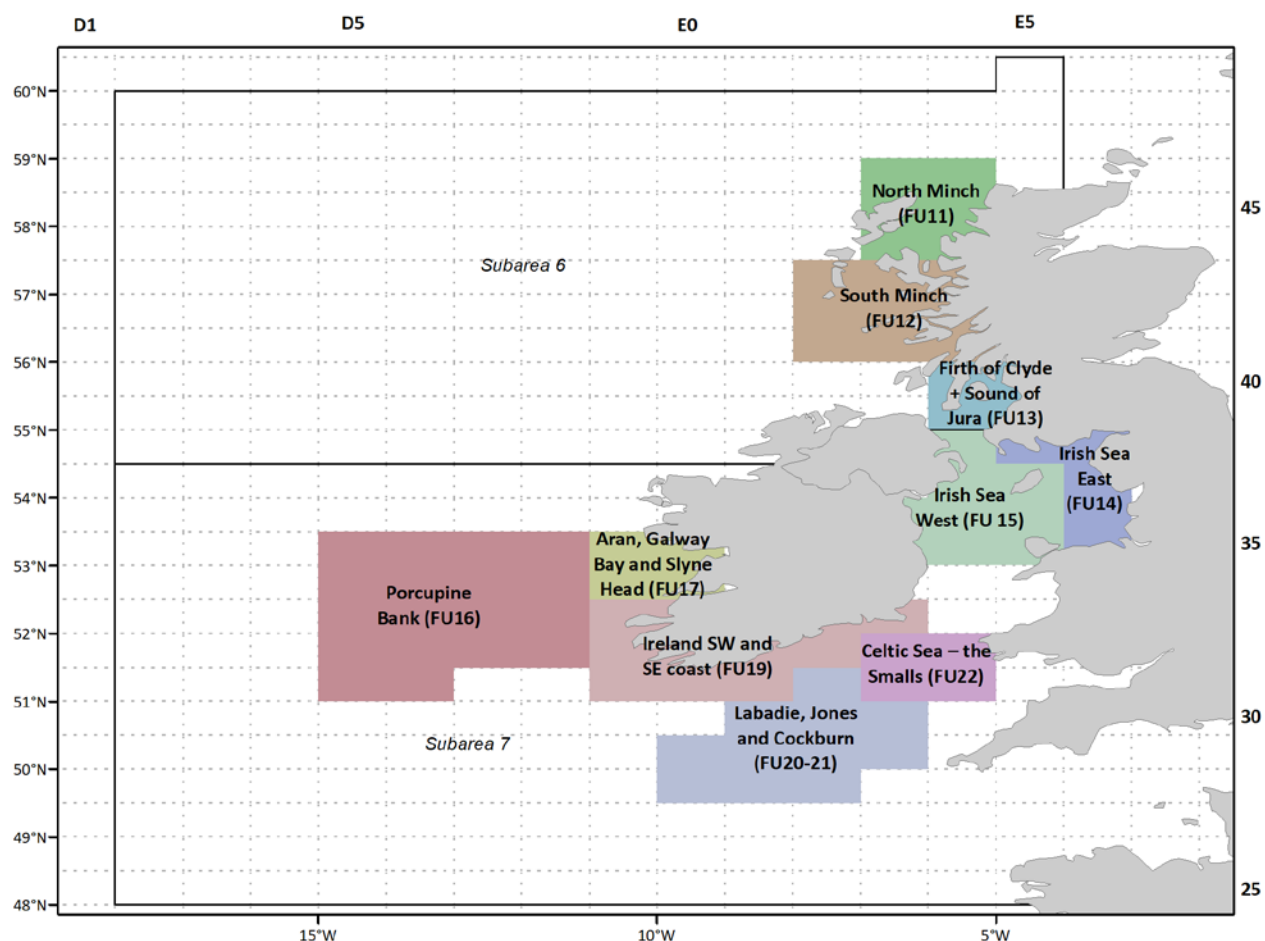
Figure 2   Norway lobster functional units in subareas 6 and 7.

Reference points

Table 5   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	430 million individuals	5% interval on the probability distribution of abundance for the time-series 2011–2015, assuming a normal distribution.	ICES (2016)
	F_{MSY}	9.3% harvest rate	F_{MSY} proxy equivalent to $F_{0.1}$ for combined sexes, derived from a length-based per recruit analysis.	ICES (2016)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan*	MAP MSY $B_{trigger}$	430 million individuals	MSY $B_{trigger}$	EU (2018)
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	9.3% harvest rate	F_{MSY}	EU (2018)
	MAP range F_{lower}	8.3–9.3% harvest rate	Consistent with ranges provided by ICES (2016), resulting in no more than 5% reduction in long-term yield compared with MSY.	EU (2018)
	MAP range F_{upper}	9.3–9.3% harvest rate	$F_{MSY\ upper}$ value capped at F_{MSY} because it has not been possible to evaluate the probability of SSB < B_{lim} (ICES, 2016).	EU (2018)

* Proposed EU multiannual plan (MAP) for the Western Waters (EU, 2018).

Basis of the assessment

Table 6   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018a).
Assessment type	Underwater TV survey.
Input data	Commercial catches (international landings from Ireland, France, and UK); length frequencies from catch and discard sampling (Ireland); one UWTV survey index (UWTV-FU 19); maturity data from commercial catch and survey sampling; fixed natural mortality. Discard survival rate.
Discards and bycatch	Included in the assessment since 2006.
Indicators	Commercial length frequencies by sex. Two bottom trawl surveys (IGFS-WIBTS-Q4 and EVHOE-WIBTS-Q4).
Other information	This stock was benchmarked in 2014 (WKCELT; ICES, 2014).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

Information from stakeholders

No additional information is available for this stock.

History of the advice, catch, and management

Table 7   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. ICES advice and estimated landings. All weights are in tonnes.

Year	ICES advice	Landings advice*	Catch advice	ICES landings	Total discards **
1992		3800		888	
1993		~4000		905	
1994		~4000		390	
1995		~4000		695	
1996		4000		888	
1997		4000		756	
1998		4000		827	
1999		4000		579	
2000		4000		696	
2001		4000		815	
2002		4440		1318	
2003		4440		1239	
2004	Restrict landings to 2000–2002 levels	3300		1074	
2005	Restrict landings to 2000–2002 levels	3300		711	
2006	Restrict landings to 2000–2002 levels	3300		741	37
2007	Constrain effort at recent levels	--		957	26
2008	Constrain effort at recent levels	--		866	107
2009	No increase in effort and landings (2007)	< 800	--	833	258
2010	No new advice, same as for 2009	< 800	--	722	269
2011	See scenarios	-		608	387
2012	Reduce catches	-		770	420
2013	MSY approach	< 820		781	404
2014	MSY approach	< 521		468	161
2015	MSY approach	< 715		507	177
2016	MSY approach		≤ 793***	591	194
2017	MSY approach		≤ 838^	420	138
2018	MSY approach		≤ 1192^		
2019	MSY approach		≤ 173^		

* Prior to 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 divisions 7.a, 7.g, and 7.j, Functional Unit 19. Catch distribution by fleet in 2017 as estimated by ICES.

Catch		Landings	Total discards	
93.8% dead	6.2% surviving	Almost 100% otter trawl	75% dead	25% surviving
558 t		420 t	138 t	

Table 9   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. History of ICES estimates of landings by country and total discards. All weights are in tonnes.

Year	France	Rep. of Ireland	UK	Total landings	Total discards*
1989	245	652	2	899	
1990	181	569	4	754	
1991	212	860	5	1077	
1992	233	640	15	888	
1993	229	672	4	905	
1994	216	153	21	390	
1995	175	507	12	695	
1996	145	736	7	888	
1997	93	656	7	756	
1998	92	733	2	827	
1999	77	499	3	579	
2000	144	541	11	696	
2001	111	702	2	815	
2002	188	1130	0	1318	
2003	165	1075	0	1239	
2004	76	997	1	1074	
2005	62	648	2	711	
2006	65	675	1	741	37
2007	63	894	0	957	26
2008	46	805	15	866	107
2009	55	764	15	834	258
2010	14	694	13	721	269
2011	23	585	1	608	387
2012	11	758	1	770	420
2013	4	771	6	781	404
2014	6	459	3	468	161
2015	5	502	0	507	177
2016	4	583	3	590	194
2017	4	412	4	420	138

* Dead + surviving discards.

Summary of the assessment

Table 10   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Assessment summary.

Year	Landings (in numbers)	Total discards (in numbers)*	Removals (in numbers)	UWTV abundance estimates	Landings	Discards	95% conf. intervals	Harvest rate	Mean weight in landings	Mean weight in discards	Discard proportion (by number)	Dead discard proportion (by number)
	millions				tonnes		millions	%	grammes		%	
2006	26	3	28		741	37			28.3	14.4	8.9	6.8
2007	31	2	32		957	26			31.1	17.0	4.8	3.6
2008	26	6	30		866	107			33.8	19.3	17.7	13.9
2009	27	18	41		834	258			30.5	14.5	39.5	32.8
2010	24	20	39		721	269			29.6	13.5	45.1	38.1
2011	24	31	47	665	608	387	171	7.1	25.0	12.6	55.8	48.7
2012	29	33	54	594	770	420	111	9.1	26.4	12.7	53.0	45.9
2013	29	33	54	487	781	404	161	11.0	27.4	12.1	53.9	46.8
2014	16	11	25	636	468	161	188	3.9	28.6	14.1	41.1	34.4
2015	17	13	27	482	507	177	126	5.5	29.8	13.8	43.0	36.2
2016	20	14	30	399	590	194	100	7.5	29.9	14.2	40.8	34.1
2017	15	10	22	499	420	138	120	4.4	28.8	14.4	39.7	33.1
2018				176			53					

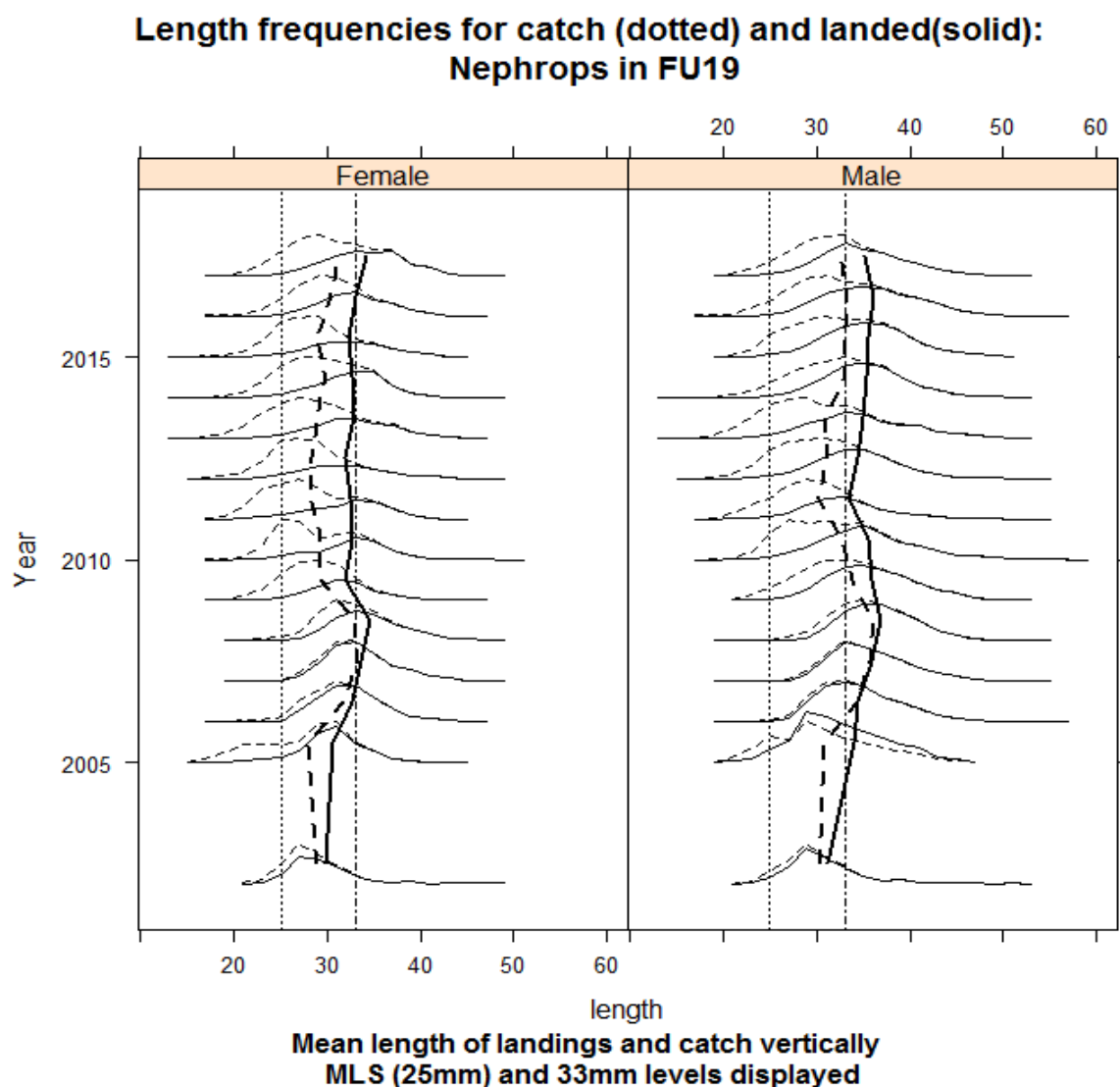*Dead + surviving discards.

Figure 3   Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Catch length–frequency distribution and mean size in catches and landings. Vertical lines are minimum landing size (25 mm) and 33 mm.

Sources and references

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