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Norway lobster (*Nephrops norvegicus*) in Division 7.a, Functional Unit 14 (Irish Sea, East)

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 2016–2017, catches in 2019 should be no more than 922 tonnes.

To ensure that the stock in Functional Unit 14 is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

The harvest rates are well below the F_{MSY}. The stock abundance has been above MSY $B_{trigger}$ since 2010.

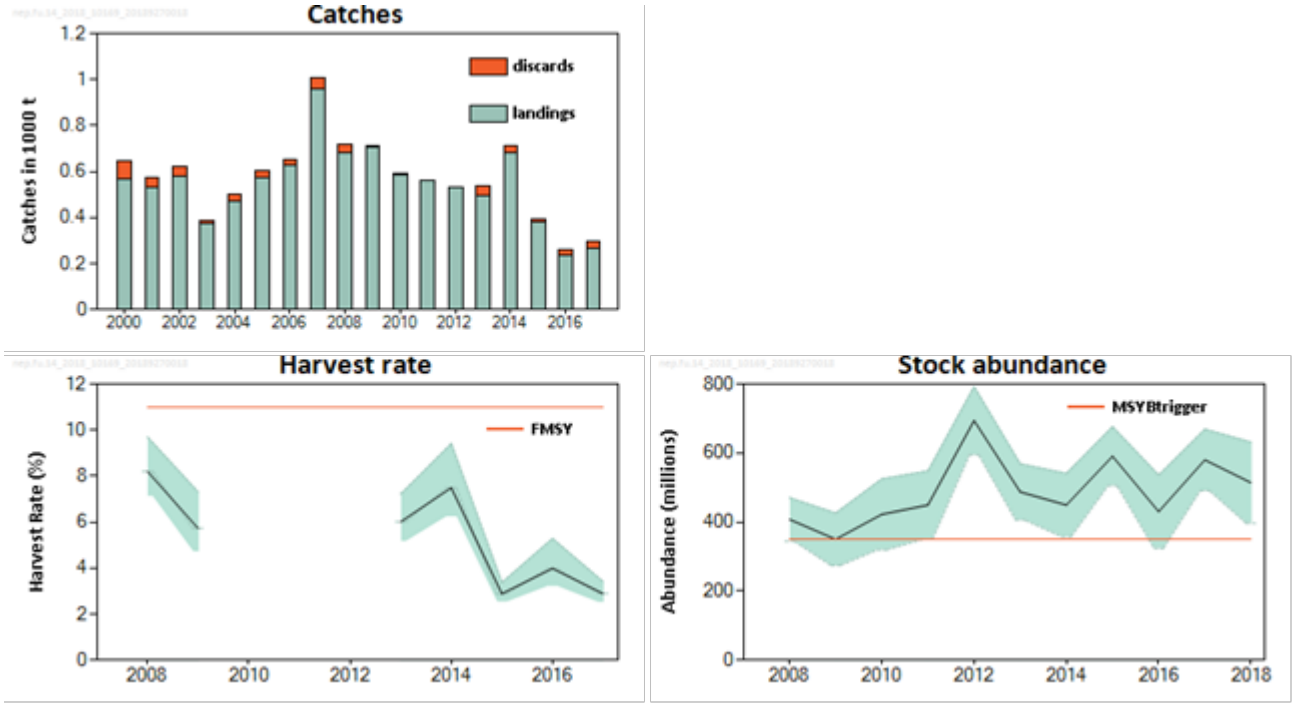

Figure 1 Norway lobster in Division 7.a, Functional Unit 14. Summary of the stock assessment. Catches, harvest rate (sum of landings and dead discards in numbers, divided by total abundance), survey abundance (Underwater TV, millions; SSB proxy; 95% confidence intervals). No reliable harvest rate estimates exist for the period 2010–2012 because of insufficient sampling. 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 spawning stock size is above MSY $B_{trigger}$.

Table 1 Norway lobster in Division 7.a, Functional Unit 14. State of the stock and fishery relative to reference points.

	Fishing pressure					Stock size				
		2015	2016	2017			2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$	✓	✓	✓	Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Below potential Reference points	B_{pa},B_{lim}	✓	✓	✓	Above potential reference points
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	–	Not applicable

Catch scenarios

Table 2 Norway lobster in Division 7.a, Functional Unit 14. The basis for the catch scenarios.

Variable	Value	Notes
Stock abundance (2019)	514 million	UWTV survey 2018 (number of individuals)
Mean weight in wanted catch	17.39 g	Average 2016–2017
Mean weight in unwanted catch	8.94 g	Average 2016–2017
Unwanted catch	15.80%	Average 2016–2017 (proportion by number)
Discards survival	10%	Proportion by number
Dead unwanted catch	14.45%	Average 2016–2017 (proportion by number)

Table 3 Norway lobster in Division 7.a, Functional Unit 14. Annual catch advice and scenarios for 2019 assuming discarding continues at recent average rate. 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_{MSY}	922	914	841	73	8	11.0	−28.0
Other options							
F_{2017}	242	240	221	19	2	2.9	−81.1
MSY F_{lower}	763	756	696	60	7	9.1	−40.5
MSY F_{upper}***	922	914	841	73	8	11.0	−28.0

* By number.
** Advice value for 2019 relative to the advice value for 2018.
*** $F_{MSY\ upper} = F_{MSY}$ for this stock.

Advice for 2019 is lower than for 2018 because of lower mean weights and lower observed stock abundance.

Basis of the advice

Table 4 Norway lobster in Division 7.a, Functional Unit 14. The basis of the advice.

Advice basis	ICES 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

Since 2008 the underwater TV survey (UWTV) has provided abundance estimates for Functional Unit (FU) 14 with acceptable precision. Catch sampling was poor during 2010–2012 and harvest rates and mean weight estimates are unreliable in that period. From 2013 onwards sampling information is of improved quality and used in the calculation of catch scenarios.

Improved sampling from the fleets targeting the stock in this functional unit in 2016–2017 indicated a substantial change in the mean weight. Hence, a two-year average (rather than a three-year average) of mean weights was used in the calculation of catch scenarios.

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 two years, which is considered to be a more realistic assumption.

The density of *Nephrops* in FU 14 is considered medium (~0.48 burrow m^{-2}, average 2011–2018) compared with other FUs. Some biological parameters are poorly known and the sampling levels in the recent past have been low and variable. Harvest rate estimates have been below the $F_{0.1}$ for combined sexes. Based on these considerations ICES considers that $F_{0.1}$ is a suitable F_{MSY} proxy for this stock (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 in each of the stocks and the corresponding MSY approach.

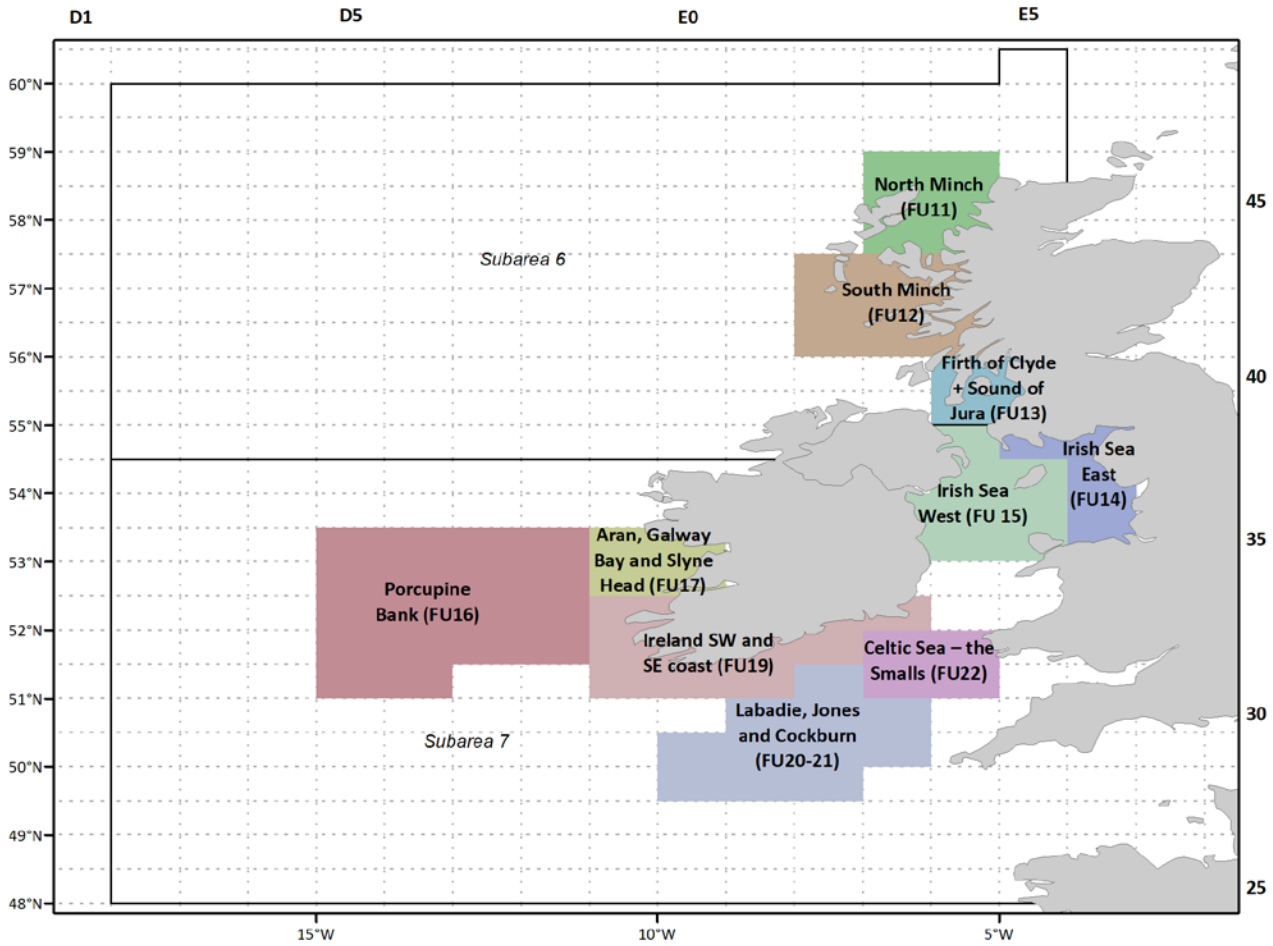

Figure 2 Norway lobster functional units in subareas 6 and 7.

Reference points

Table 5 Norway lobster in Division 7.a, Functional Unit 14. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	350 million individuals	The lowest observed abundance estimate from the UWTV survey time-series.	ICES (2015)
	F_{MSY}	11.0% harvest rate	F_{MSY} proxy equivalent to $F_{0.1}$ for combined sexes, derived from a length-based per recruit analysis.	ICES (2015)
Precautionary approach	B_{lim}			
	B_{pa}			
	F_{lim}			
	F_{pa}			
Management plan*	MAP MSY $B_{trigger}$	350 million individuals	MSY $B_{trigger}$	EU (2018)
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	11.0% harvest rate	F_{MSY}	EU (2018)
	MAP range F_{lower}	9.1–11.0% 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}	11.0–11.0% 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 Division 7.a, Functional Unit 14. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018a).
Assessment type	Underwater TV survey.
Input data	One survey index (FU14 UWTV); Commercial catches (international landings); length frequencies from the fishery; maturity data; natural mortalities from Brander and Bennett (1986, 1989); discard survival rate.
Discards and bycatch	Included in the assessment, dataseries from the majority of the fleet/main fleets.
Indicators	Sex ratio, length frequencies.
Other information	The latest benchmark was performed in 2015 (IBPNeph; ICES, 2015).
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 Division 7.a, Functional Unit 14. ICES advice, landings and discards. All weights are in tonnes.

Year	ICES advice	Landings advice	Catch advice	Recommended landings (FUs 14 + 15)	ICES landings	Total discards *
1989					400	
1990					560	
1991					750	
1992				8900	430	
1993				9400	520	
1994				9400	450	
1995				9400	580	
1996				9400	480	
1997				9400	570	
1998				9400	390	
1999				9400	620	
2000				9400	567	80
2001				9400	532	42
2002	Set TAC in line with 1995–99 landings			9550	577	42
2003	Set TAC in line with 1995–99 landings			9550	377	11
2004	Set TAC in line with 1995–99 landings			9550	472	28
2005	Set TAC in line with 1995–99 landings			9550	570	33
2006	No increase in effort			9550	628	22
2007	No increase in effort			-	959	47
2008	As for 2007			-	681	37
2009	No increase in effort and landings (2007)	< 1000		-	708	6
2010	No new advice, same as for 2009	< 1000		-	582	NA
2011	Transition towards the ICES MSY	< 680		-	561	NA
2012	MSY approach	< 960		-	530	NA
2013	MSY approach	< 880		-	495	39
2014	MSY approach	< 951		-	679	32
2015	MSY approach	< 662		-	378	18
2016	MSY approach		≤ 1272**	-	237	20
2017	MSY approach		≤ 995***	-	265	29
2018	MSY approach		≤ 1281***			
2019	MSY approach		≤ 922***			

* Dead + surviving discards.
** Assuming all catches are landed.
*** Assuming recent discarding rates.
NA = not available.

History of the catch and landings

Table 8 Norway lobster in Division 7.a, Functional Unit 14. Catch distribution by fleet in 2017 as estimated by ICES.

Catch		Landings	Discards	
99% dead	1% surviving	Taken almost entirely in the *Nephrops* directed trawl fisheries (70–99 mm)	90% dead	10% surviving
294 t		265 t	29 t	

Table 9 Norway lobster in Division 7.a, Functional Unit 14. History of catch and landings; ICES estimated values are presented for each country. All weights are in tonnes. There was insufficient sampling for 2010–2012, with no reliable discard estimates for these years.

Year	Republic of Ireland	UK	Other countries	Total	Total discards*
2000	114	451	2	567	80
2001	26	506	0	532	42
2002	203	373	1	577	42
2003	69	306	1	377	11
2004	62	409	1	472	28
2005	34	536	0	570	33
2006	34	594	0	628	22
2007	86	873	0	959	47
2008	29	652	0	681	37
2009	16	692	0	708	6
2010	45	538	0	582	NA
2011	31	530	0	561	NA
2012	53	478	0	530	NA
2013	35	460	0	495	39
2014	31	648	0	679	32
2015	88	290	0	378	18
2016	21	216	0	237	20
2017	7	258	0	265	29

* Dead + surviving discards.
NA = not available.

Summary of the assessment

Table 10 Norway lobster in Division 7.a, Functional Unit 14. Assessment summary.

Year	UWTV abundance estimate	95% Confidence Interval	Landings (in numbers)	Total discards (in number)*	Removals (in numbers)	Harvest rate (by number)	Landings	Total discards*	Discard proportion (by number)	Dead discard proportion (by number)	Mean weight in landings	Mean weight in discards
	millions					%	tonnes		%		grammes	
2000			30	11	40		567	80	26.4	24.4	19.05	7.52
2001			26	5	31		532	42	17.0	15.5	20.87	7.97
2002			26	5	30		577	42	15.4	14.1	22.41	8.98
2003			13	1	14		377	11	9.9	9.0	29.39	7.64
2004			22	4	25		472	28	14.8	13.5	21.93	7.57
2005			27	4	30		570	33	13.0	11.8	21.48	8.44
2006			25	3	28		628	22	10.1	9.2	25.07	7.98
2007			40	6	46		959	47	13.8	12.5	23.94	7.33
2008	408	63	30	4	34	8.2	681	37	12.7	11.6	22.88	8.49
2009	350	76	19	1	20	5.7	708	6	3.7	3.3	36.49	8.58
2010**	422	103					582					
2011**	449	99					561					
2012**	694	99					530					
2013	487	82	25	5	30	6.0	495	39	16.4	15.0	19.94	7.87
2014	449	92	30	4	34	7.5	679	32	10.8	9.8	22.37	9.60
2015	591	86	15	2	17	2.9	378	18	13.0	11.9	25.19	7.82
2016	433	106	15	2	17	4.0	237	20	13.6	12.4	15.82	8.38
2017	580	89	14	3	17	2.9	265	29	18.0	16.5	18.97	9.50
2018	514	118										

* Dead + surviving discards.
** No estimates for 2010–2012 because of insufficient sampling.

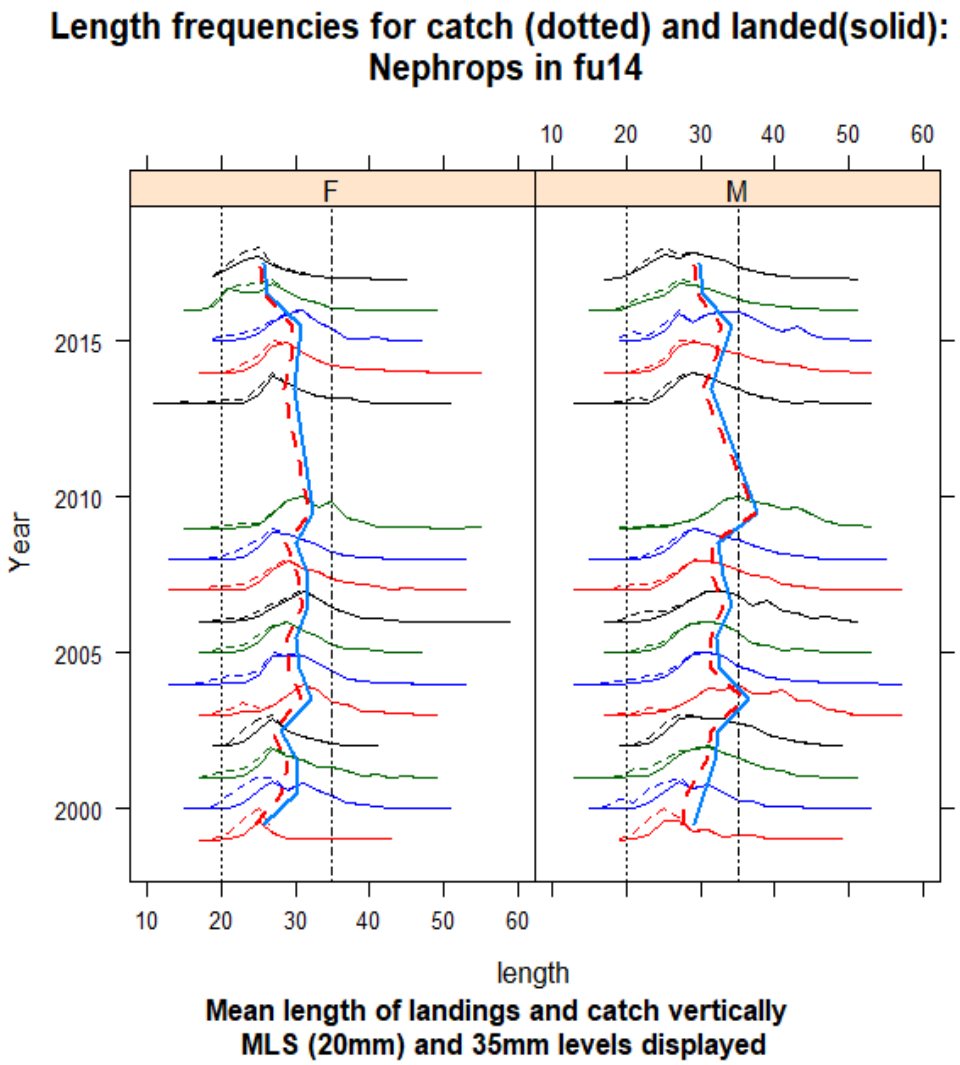

Figure 3 Norway lobster in Division 7.a, Functional Unit 14. Catch length–frequency distribution and mean size in catches and landings. Vertical lines are minimum landing size (20 mm) and 35 mm.

Sources and references

Brander, K. M., and Bennett, D. B. 1986. Interactions between Norway lobster (*Nephrops norvegicus* L.) and cod (*Gadus morhua* L.) and their fisheries in the Irish Sea. Canadian Special Publication on Fisheries and Aquatic Science, 92: 269–281.

Brander, K. M., and Bennett, D. B. 1989. Norway lobsters in the Irish Sea: Modelling one component of a multispecies resource. *In* Marine Invertebrate Fisheries: Their Assessment and Management, pp. 183–204. Edited by J. F. Caddy. Wiley, London.

EU. 2018. Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a multiannual plan for fish stocks in the Western Waters and adjacent waters, and for fisheries exploiting those stocks, amending Regulation (EU) 2016/1139 establishing a multiannual plan for the Baltic Sea, and repealing Regulations (EC) No 811/2004, (EC) No 2166/2005, (EC) No 388/2006, (EC) 509/2007 and (EC) 1300/2008. COM/2018/0149 final. 30 pp. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018PC0149&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. 2016. 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. 2018a. Advice basis. *In* Report of the ICES Advisory Committee, 2018. ICES Advice 2018, Book 1, Section 1.2. https://doi.org/10.17895/ices.pub.4503.

ICES. 2018b. Report of the Working Group for the Celtic Seas Ecoregion (WGCSE), 9–18 May 2018, ICES Headquarters, Copenhagen, Denmark. ICES CM 2018/ACOM:13. 1340 pp.