

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

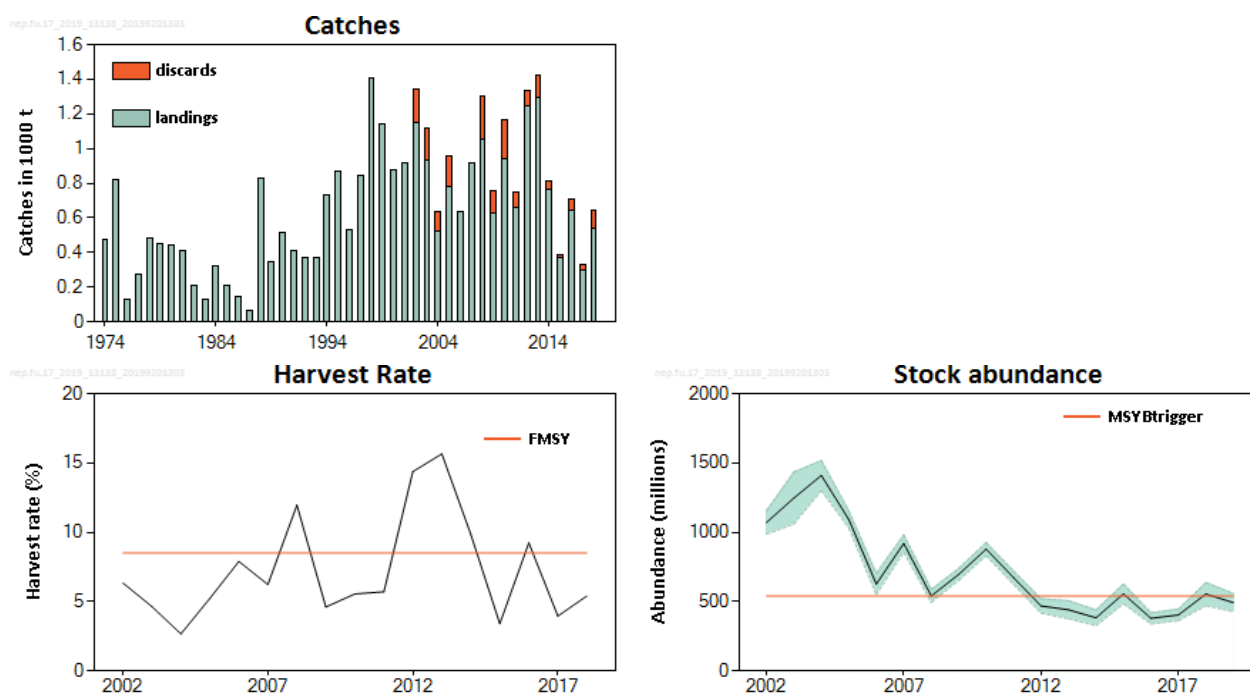
### ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for Western waters and adjacent waters is applied, catches in 2020 that correspond to the F ranges in the MAP are between 696 tonnes and 800 tonnes. The entire range is considered precautionary when applying the ICES advice rule.

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

### Stock development over time

The abundance showed an overall decreasing trend up to 2014, and is currently just below  $MSY B_{trigger}$ . The harvest rate has fluctuated across the time-series and is currently estimated to be below  $F_{MSY}$ .



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

### Stock and exploitation status

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

**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			
		2016	2017	2018		2017	2018	2019	
Maximum sustainable yield	$F_{MSY}$	✗	✓	✓	Below	$MSY B_{trigger}$	✗	✓	✗ Below trigger
Precautionary approach	$F_{pa}, F_{lim}$	?	✓	✓	Below possible reference points	$B_{pa}, B_{lim}$	?	✓	? Undefined
Management plan	$F_{MGT}$	✗	✓	✓	Below	$B_{MGT}$	✗	✓	✗ Below trigger

## Catch scenarios

The latest estimate of stock abundance is below  $MSY B_{trigger}$  (540 million individuals). The ICES maximum sustainable yield (MSY) approach states that under such conditions the  $F_{MSY}$  harvest rate (8.5%) for FU 17 should be reduced by multiplying it by the ratio of current abundance to  $MSY B_{trigger}$ . This corresponds to a harvest rate of  $8.5 \times (493/540) = 7.8\%$  for the advice in 2020.

**Table 2** Norway lobster in Division 7.b, Functional Unit 17. The basis for the catch advice and scenarios.

Variable	Value	Notes
Stock abundance (2020)	493 million	UWTV survey 2019 (number of individuals).
Mean weight in wanted catch	22.4 grammes	Average 2008–2018.
Mean weight in unwanted catch	11.04 grammes	Average 2008–2018.
Unwanted catch	23.6%	Average 2016–2018 (proportion by number).
Discards survival	25%	Proportion by number.
Dead unwanted catch	18.9%	Average 2016–2018 (proportion by number).

**Table 3** Norway lobster in Division 7.b, Functional Unit 17. Annual catch advice and scenarios. The figures in the table are rounded. Calculations were done with unrounded inputs and computed values may not match exactly when calculated using the rounded figures in the table.

### Catch scenarios assuming recent discard rates

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 = EU MAP^: F <sub>MSY</sub> × Stock Abundance 2019 / MSY B <sub>trigger</sub>	800	773	694	80	27	7.8	–20
MAP F <sub>MSY lower</sub> × Stock Abundance 2019 / MSY B <sub>trigger</sub>	696	673	604	69	23	6.7	–31
MAP F <sub>MSY upper</sub> × Stock Abundance 2019 / MSY B <sub>trigger</sub>	800	773	694	80	27	7.8	–20
Other options							
F = MAP F <sub>MSY</sub>	877	848	761	87	29	8.5	–12.5
F = MAP F <sub>MSY lower</sub>	764	738	662	76	25	7.4	–24
F = MAP F <sub>MSY upper</sub> ***	877	848	761	87	29	8.5	–12.5
F <sub>2018</sub>	557	539	483	55	18	5.4	–44

#### Catch scenarios assuming zero discards

Basis	Total catch	Wanted catch	Unwanted catch	Harvest rate * %	% advice change **
	WC + UC	WC	UC	for WC + UC	
ICES advice basis					
MSY approach; $F = EU\ MAP^{\wedge}: F_{MSY} \times Stock\ Abundance\ 2019 / MSY\ B_{trigger}$	753	654	99	7.8	-25
$MAP\ F_{MSY\ lower} \times Stock\ Abundance\ 2019 / MSY\ B_{trigger}$	656	569	87	6.7	-35
$MAP\ F_{MSY\ upper} \times Stock\ Abundance\ 2019 / MSY\ B_{trigger}$	753	654	99	7.8	-25
Other options					
$F = MAP\ F_{MSY}$	826	717	109	8.5	-17.6
$F = MAP\ F_{MSY\ lower}$	719	624	95	7.4	-28
$F = MAP\ F_{MSY\ upper}^{***}$	826	717	109	8.5	-17.6
$F_{2018}$	524	455	69	5.4	-48

<sup>^</sup> EU multiannual plan (MAP) for Western waters (EU, 2019).

\* By number.

\*\* Advice value for 2020 relative to the advice value for 2019 (1002 tonnes).

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

The decrease in total catch advice is a result of the lower stock abundance estimate in 2019, and the lower applied harvest rate.

#### Basis of the advice

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

Advice basis	The EU multiannual plan (MAP) for stocks in the Western waters and adjacent waters ( <a href="#">EU, 2019</a> )
Management plan	The EU multiannual plan (MAP) for stocks in the Western waters and adjacent waters applies to this stock. The plan specifies conditions for setting fishing opportunities depending on stock status and making use of the $F_{MSY}$ range for the stock.
	In accordance with the MAP, catches higher than those corresponding to $F_{MSY}$ can only be taken providing SSB is greater than $MSY\ B_{trigger}$ , and one of the following conditions is met:
	<ul style="list-style-type: none"> <li>a) if it is necessary for the achievement of objectives of mixed fisheries;</li> <li>b) if it is necessary to avoid serious harm to a stock caused by intra- or inter-species stock dynamics;</li> <li>c) in order to limit variations in fishing opportunities between consecutive years to not more than 20%.</li> </ul>
	ICES considers that the $F_{MSY}$ range for this stock used in the MAP is precautionary.
	Full details of the plan are described in EU (2019).

#### Quality of the assessment

Biological sampling for this stock is considered adequate. Since 2002 a dedicated annual underwater television survey (UWTV) has provided abundance estimates for FU 17 (Figure 2) with high precision.

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

In 2019 the survey camera system and reviewing method changed. A comparison showed no significant difference in density estimates between the new and the old method. Previous assumptions relating to correction factors are still applied.

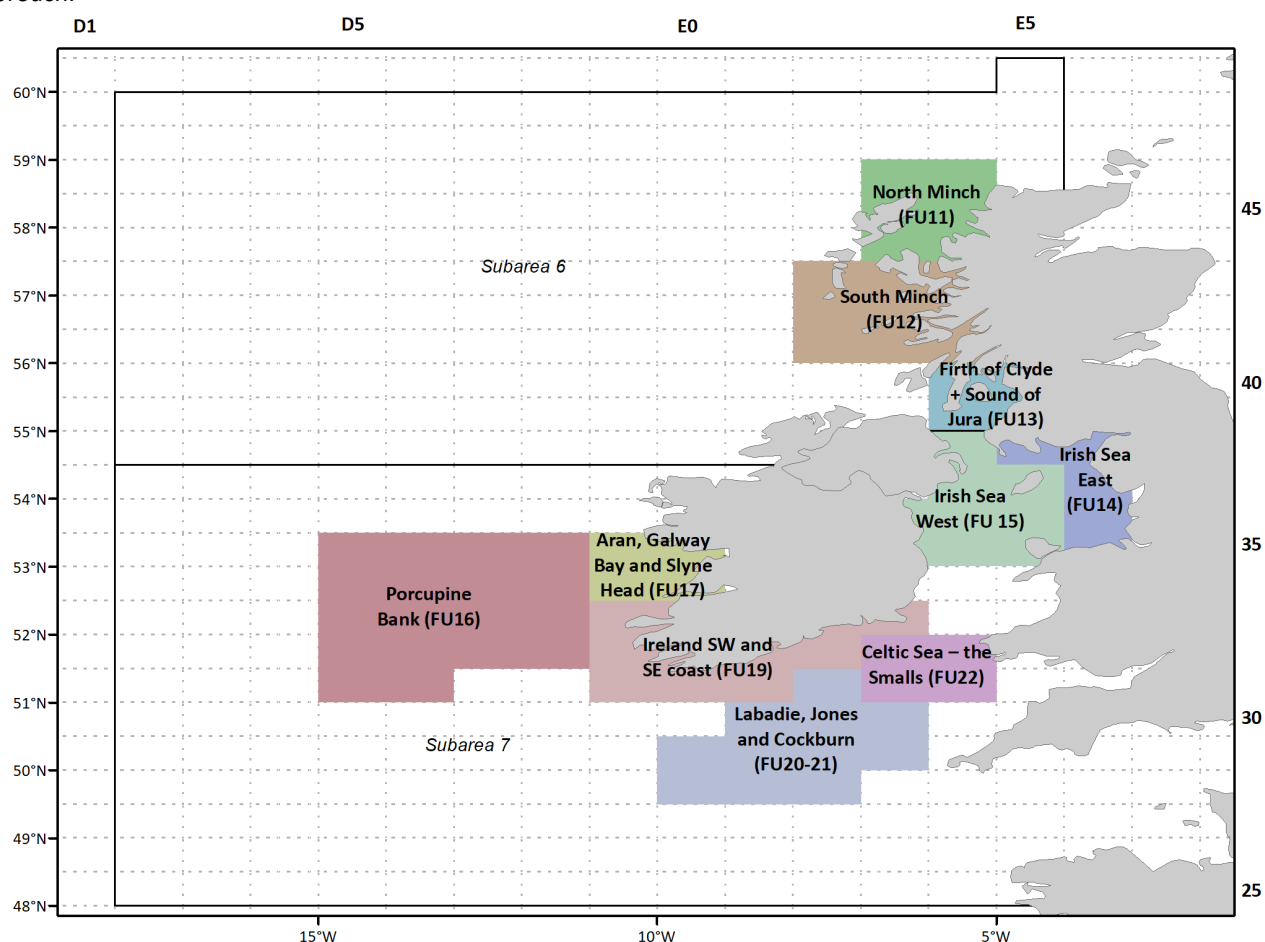
## Issues relevant for the advice

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 2016–2018 fishery indicate that discarding above the minimum conservation reference size (MCRS) continues and has changed markedly (Figure 3). This is likely due to a strong incoming recruitment. Consequently, ICES is providing advice for 2020 assuming average discard rates as observed over the last three years. This is considered to be the most realistic assumption.

Irish discard survival experiments indicate that the trawl discard survival may be around 64% (BIM, 2017). As a result, an exemption from the landings obligation based on high survivability has been granted by the European Commission. ICES continues to use the survival rate of 25% (ICES, 2016), as the survival rate estimated by BIM (2017) has not been evaluated by ICES.

The observed burrow density has declined, from high ( $> 0.8$  individuals  $m^{-2}$ ) at the beginning of the series to medium density ( $\sim 0.3$  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 seasonal fishery 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 (2016)
	$F_{MSY}$	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 (2016)
Precautionary approach	$B_{lim}$	Not defined		
	$B_{pa}$	Not defined		
	$F_{lim}$	Not defined		
	$F_{pa}$	Not defined		
Management plan	MAP MSY $B_{trigger}$	540 million individuals	MSY $B_{trigger}$	EU (2019), ICES (2016)
	MAP $B_{lim}$	Not defined		
	MAP $F_{MSY}$	8.5% harvest rate	$F_{MSY}$	EU (2019), ICES (2016)
	MAP range $F_{lower}$	7.4–8.5% harvest rate	Consistent with ranges provided by ICES (2016), resulting in no more than 5% reduction in long-term yield compared with MSY.	EU (2019), ICES (2016)
	MAP range $F_{upper}$	8.5–8.5% 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 (2019), ICES (2016)

## 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 ( <a href="#">ICES, 2018</a> ).
Assessment type	Underwater TV survey (ICES, 2019).
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 ( <a href="#">IBPNeph</a> ; ICES, 2015).
Working group	Working Group for the Celtic Seas Ecoregion ( <a href="#">WGCSE</a> )

## 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
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^		295	38
2018	MSY approach		≤ 551^		536	106
2019	MSY approach		≤ 1002^			
2020	Management Plan		800 (range 696–800)^			

\* 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 2018 as estimated by ICES. All weights are in tonnes.

Catch		Landings	Discards	
95.9% dead	4.1% surviving	100% otter trawl	75% dead	25% surviving
642 t		536 t	106 t	

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

Year	France	Rep. of Ireland	UK	Total landings	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
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
2017	0	295	< 1	295	38
2018	0	494	42	536	106

\* Dead + surviving discards.

n/a = not available.

## Summary of the assessment

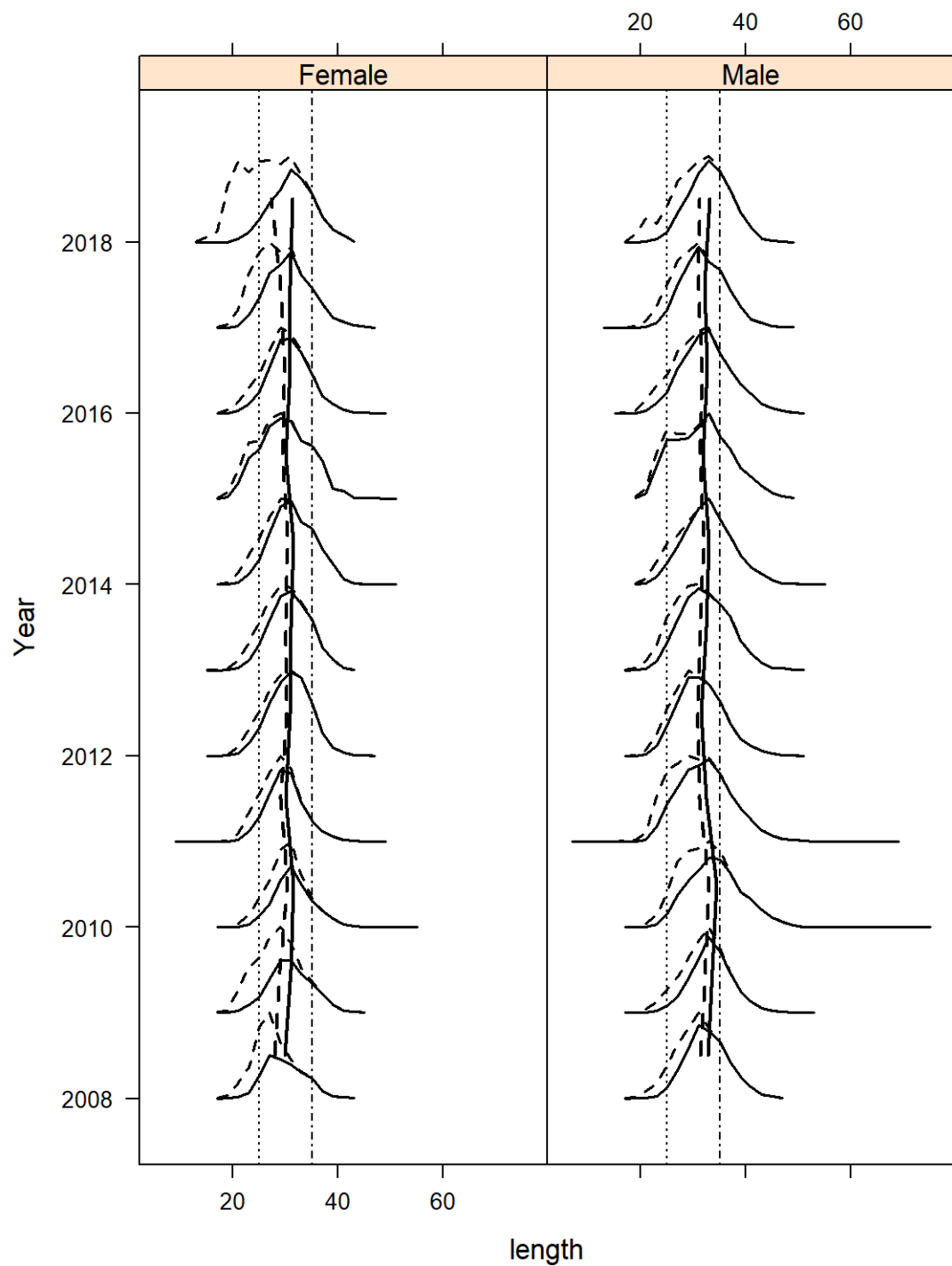
**Table 10** Norway lobster in Division 7.b, Functional Unit 17. Assessment summary.

Year	UWTV abundance estimate	95% Confidence interval	Landings (in number)	Total discards (in number)*	Removals (in number)	Harvest rate (by number)	Landings	Total discards*	Discard rate (by number)	Dead discard rate (by number)	Mean weight in landings	Mean weight in discards
	millions					%	tonnes		%		grammes	
2002	1070	84	55	18	68	6.3	1154	192	24.5	19.6	21.2	10.8
2003	1246	187	44	18	58	4.6	933	183	29.3	23.7	21.2	10.0
2004	1410	108	29	11	38	2.7	525	112	28.2	22.9	18.1	9.9
2005	1092	62	42	20	57	5.2	778	182	31.7	25.9	18.4	9.2
2006	627	76	n/a	n/a	50	7.9	637	n/a	n/a	n/a	n/a	n/a
2007	920	62	n/a	n/a	57	6.2	913	n/a	n/a	n/a	n/a	n/a
2008	541	47	48	22	65	12.0	1057	248	31.4	25.6	21.94	11.23
2009	696	43	25	9	32	4.6	625	129	27.6	22.2	25.12	13.63
2010	879	47	37	15	49	5.6	939	224	29.0	23.4	25.16	14.70
2011	672	48	32	9	38	5.7	659	92	21.1	16.7	20.62	10.75
2012	468	52	61	8	67	14.4	1246	86	12.0	9.2	20.40	10.39
2013	441	65	60	12	69	15.7	1295	129	16.7	13.1	21.59	10.73
2014	383	57	34	5	38	9.8	766	48	12.9	10.0	22.62	9.56
2015	556	71	18	2	19	3.4	370	15	8.4	6.4	20.91	9.13
2016	379	41	30	6	35	9.2	641	69	17.4	13.7	21.21	10.85
2017	404	41	13	4	16	4.0	295	38	21.4	16.9	22.23	10.46
2018	554	83	22	10	30	5.4	536	106	32.2	26.3	24.33	10.11
2019	493	66										

\* Dead + surviving discards.

n/a = not available.





**Figure 3** Norway lobster in Division 7.b, Functional Unit 17. Catch length–frequency distribution and mean size in catches (dotted lines) and landings (solid lines). The vertical lines indicate the minimum conservation reference size (25 mm) and the 35 mm visual reference level.

## Sources and references

- BIM. 2017. *Nephrops* survivability in the Irish demersal trawl fishery. Fisheries Conservation Report, Ireland's Seafood Development Agency (BIM). <http://www.bim.ie/media/bim/content/publications/fisheries/6882-BIM-nephrops-survival-report-final.pdf>.
- EU. 2019. Regulation (EU) 2019/472 of the European Parliament and of the Council of 19 March 2019 establishing a multiannual plan for stocks fished in the Western Waters and adjacent waters, and for fisheries exploiting those stocks, amending Regulations (EU) 2016/1139 and (EU) 2018/973, and repealing Council Regulations (EC) No 811/2004, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007 and (EC) No 1300/2008. Official Journal of the European Union, L 83: 1–17. <http://data.europa.eu/eli/reg/2019/472/oj>.
- 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. <https://doi.org/10.17895/ices.pub.5613>.
- 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. <https://doi.org/10.17895/ices.advice.5612>.
- ICES. 2018. 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. 2019. Working Group for the Celtic Seas Ecoregion (WGCSE). ICES Scientific Reports, 1:29. 1587 pp. <http://doi.org/10.17895/ices.pub.4982>.

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