

Norway lobster (*Nephrops norvegicus*) in Division 4.b, Functional Unit 6 (central North Sea, Farn Deep)

ICES advice on fishing opportunities

Please note: This advice was updated in November 2019 (ICES, 2019b).

ICES advises that when the EU multiannual plan (MAP) for the North Sea is applied, catches in 2020 that correspond to the F ranges in the MAP are between 1 679 tonnes and 1 947 tonnes. The entire range is considered precautionary when applying the ICES advice rule.

In order to ensure the stock in Functional Unit (FU) 6 is exploited sustainably, management should be implemented at the functional unit level. Any substantial transfer of the current surplus fishing opportunities from other FUs to FU 6 could rapidly lead to overexploitation.

Stock development over time

The stock abundance has increased since 2015, and currently it is above $MSY B_{trigger}$. Harvest rate is in a decreasing trend since 2013 and is just above F_{MSY} in 2018.

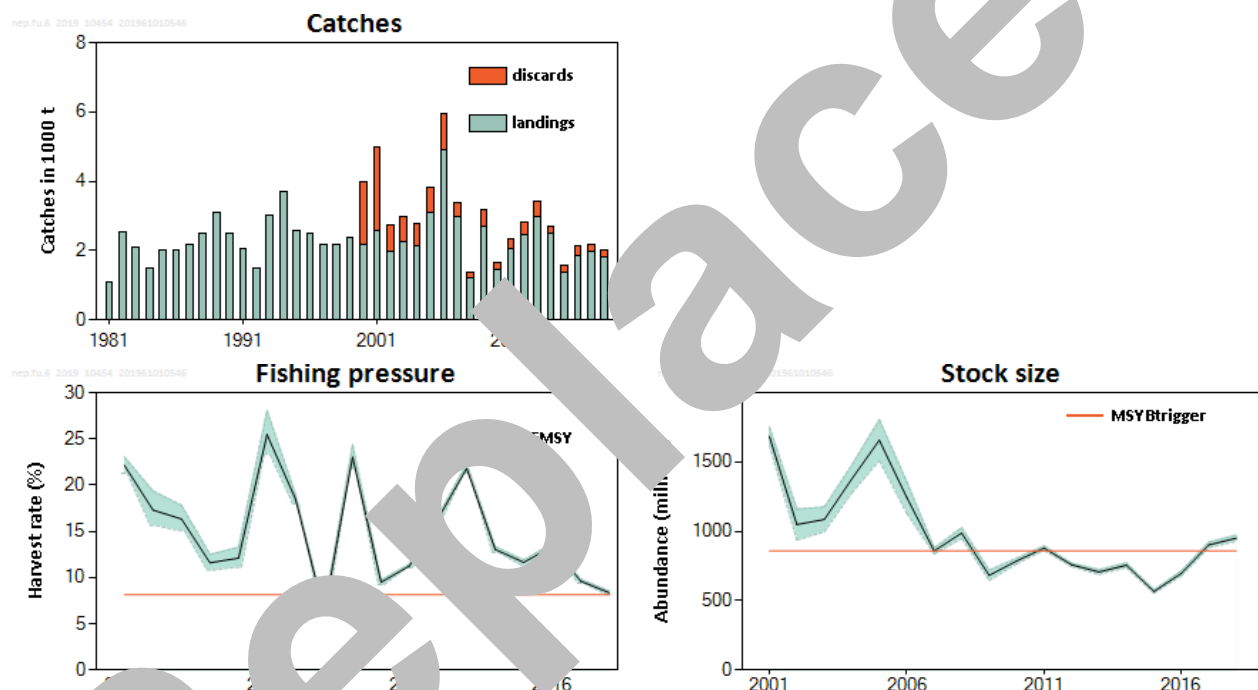


Figure 1. Norway lobster in Division 4.b, Functional Unit (FU) 6. Summary of the stock assessment. Long-term trends in catches, fishing pressure, and underwater TV survey (UWTV) abundance for animals greater than 17 mm carapace length (CPUE and SSB proxies). Discard data have only been included since 2000. Orange lines show proxies for F_{MSY} and $MSY B_{trigger}$. Shaded areas for abundance and harvest rates indicate 95% confidence intervals.

Stock and exploitation status

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

Table 1 Norway lobster in Division 4.b, Functional Unit 6. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2016	2017	2018		2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	$MSY B_{trigger}$	✗	✓	✓ Above trigger
Precautionary approach	$F_{pa} F_{lim}$?	?	?	Undefined	$B_{pa} B_{lim}$	✗	✓	✓ Above possible reference point
Management plan	F_{MGT}	✗	✗	✗	Above	$MAP MSY B_{trigger}$	✗	✓	✓ Above

Catch scenarios

Table 2 Norway lobster in Division 4.b, Functional Unit 6. The basis for the catch scenarios.

Variable	Value	Notes
Stock abundance	950 million individuals	UWTV 2018
Mean weight in wanted catch	28.71 g	Average 2016–2018
Mean weight in unwanted catch	10.55 g	Average 2016–2018
Unwanted catch proportion	24%	Average 2016–2018 (by number)
Discard survival ratio	15%	Only applies in scenarios where discarding is allowed.
Dead unwanted catch proportion	21%	Average 2016–2018 (proportion by number), only applies in scenarios where discarding is allowed.

Table 3 Norway lobster in Division 4.b, Functional Unit 6. Annual catch scenarios. All weights are in tonnes.

Catch scenarios assuming recent discard rates

Basis	Total catch	Dead removals	Wanted catch	Discard unwanted catch	Unwanted catch	Harvest rate*	% advice change **
	WC+DUC+SUC	WC+DUC	WC	DUC	SUC	for WC+DUC	
ICES advice basis							
EU MAP^: F _{MSY}	1947	1917	1744	173	30	8.12%	-1.74
F = MAP F _{MSY lower}	1679	1653	1494	149	26	7.0%	-15.3
F = MAP F _{MSY upper} ***	1947	1917	1744	173	30	8.12%	-1.74
Other scenarios							
MSY approach	1947	1917	1744	173	30	8.12%	-1.74
F ₂₀₁₈	2000	1971	1794	178	31	8.4%	1.04
F _{2016–2018}	2500	2461	2239	222	39	10.4%	26

Catch scenarios assuming zero discards

	Total catch	Wanted catch*	Unwanted catch*	Harvest rate **	% advice change
EU MAP [^] : F_{MSY}	1681	1681	196	8.12%	-5.3
$F = MAP F_{MSY lower}$	1449	1449	169	7.0%	-18.4
$F = MAP F_{MSY upper}^{***}$	1681	1681	196	8.12%	-5.3
Other scenarios					
MSY approach	1877	1681	196	8.12%	-5.3
F_{2018}	1930	1729	201	8.4%	-2.6
$F_{2016-2018}$	2410	2158	251	10.4%	22

[^] EU multi-annual plan (MAP) for the North Sea (EU, 2018).

* Calculated from total removals.

** Total catch 2018 relative to the F_{MSY} advice value 2019 (1 982 tonnes).

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

The change in the advice (-1.74% for the EU MAP F_{MSY} scenario) from November 2018, is a result of updating landings, mean weights and discard rates.

Basis of the advice

Table 4 Norway lobster in Division 4.b, Functional Unit 6. The basis of the advice.

Advice basis	EU multiannual plan (EU MAP) for the North Sea (EU, 2018).
Management plan	The EU multiannual plan (MAP) for stocks in the North Sea 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. ICES considers that the F_{MSY} range for this stock used in the MAP is precautionary.

Quality of the assessment

The harvest rates for 2017 were updated to account for a revision of landings estimates, which resulted in an increase in harvest rates for 2017.

Data from the latest underwater TV survey (UWTV) survey (June 2018) have been used as the most up-to-date indicator of stock abundance.

Issues relevant for the advice

ICES was requested by the EU to provide advice based on the agreed North Sea MAP.

The results of the 2019 UWTV survey are expected to be available by June 2019 and the advice will be updated before the end of 2019 if there is significant deviation of the abundance estimate from the 2018 UWTV survey.

Since 2016, the EU landing obligation was phased in for all species of Norway lobster fisheries in ICES Subarea 4, with several exemptions still in place. Observations from the 2016–2018 survey indicate that discarding above the minimum conservation reference size (MCRS) continued and has not changed markedly (Figure 3). Consequently, ICES is providing advice for 2020 assuming average discard rates observed over the last three years, which is considered to be a more realistic assumption.

In 2016–2018, no Norway lobster were recorded as being below MCRS (BMS category) in FU 6, despite catches having been observed below the MCRS (Figure 3).

Catches generally have been higher than the level advised by ICES, highlighting the issue that current management arrangements are not sufficient to control the fishery within the sustainable limits determined by ICES. There is a single total allowable catch (TAC) for all of ICES Subarea 4, except for the Norwegian Deep. 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. From April 2016, the UK has imposed a range of measures on UK vessels for Norway lobster in FU 6 in an attempt to reduce fishing mortality on the stock.

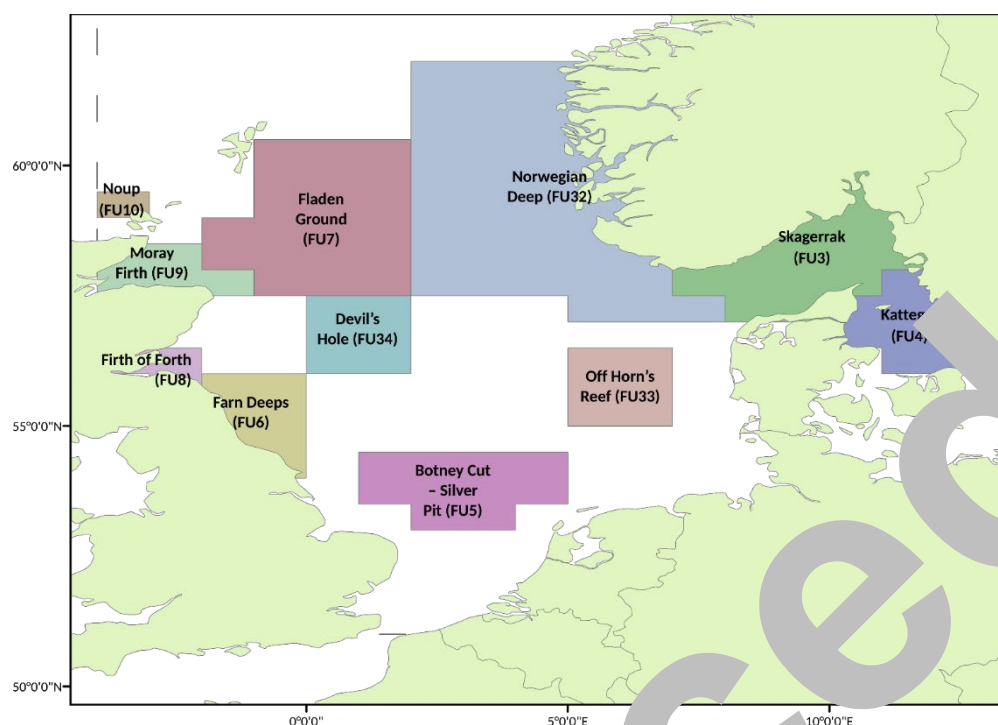


Figure 2 Norway lobster functional units (FU) in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 5 Norway lobster in Division 4.b, Functional Unit Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	858 million	UWTV survey index in 2007	ICES (2010)
	F_{MSY}	Harvest rate 8.12%	Survey, equivalent to $F_{35\%SPR}$ males	ICES (2010)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
EU Management plan (MCP)	MAP MSY $B_{trigger}$	858 million	MSY $B_{trigger}$	ICES (2010)
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	Harvest rate 8.12%	F_{MSY}	ICES (2010)
	MAP range F_{lower}	Harvest rate 7.0–8.12%	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2015)
	MAP range F_{upper}	Harvest rate 8.12–8.12%	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2015)

* EU Management plan for Norway lobster in the North Sea (EU, 2018).

** For the EU, $F_{MSY upper} = F_{MSY}$.

Basis of the assessment

Table 6 Norway lobster in Division 4.b, Functional Unit 6. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018).
Assessment type	Underwater TV survey (UWTV) linked to yield-per-recruit analysis from length data (ICES, 2019a).
Input data	One survey index (UWTV); Length–frequency data from the fishery. Commercial catches (international landings and length frequencies from English catch sampling and Scottish landing sampling, covering 80% of the landings); maturity data from commercial catch sampling. Natural mortalities from Morizur (1982): 0.3 for males and immature females, and 0.2 for mature females for all years.
Discards, BMS landings, and bycatch	Included in the assessment, data from the majority of the main fleets (covering 70% of the landings in 2018). BMS landings, where reported, are included as dead removals in the assessment since 2016.
Indicators	Sex ratio, length frequencies.
Other information	The latest benchmark was performed in 2013 (ICES, 2013). The latest UWTV survey (2018) information was used to provide advice.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGN)

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 4.b, Functional Unit 6. ICES advice and catch estimates. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	ICES landings	ICES total discards*
2004				2 153	615
2005				3 094	715
2006	No increase in effort			4 903	1 051
2007	No increase in effort, harvest rate < 15%	< 3 000		2 966	432
2008	No new advice, same as for 2007			1 220	166
2009	No increase in effort and landings (2007)	< 3 000		2 713	461
2010	Harvest rate no greater than that equivalent to fishing at F_{2008}	1 200		1 443	201
2011	MSY transition	< 1 900		2 070	246
2012	MSY transition	< 1 400		2 460	345
2013	MSY transition	< 1 400		2 982	450
2014	MSY transition	< 1 026		2 503	198
2015	(update November) MSY approach	< 1 127		1 371	190
2016	MSY approach	< 680	≤ 738 **	1 854	272 ^^^
2017	MSY approach		≤ 1 143 ***	1 963	198 ^^^
2018	MSY approach		≤ 1 876 ^	1 807	190 ^^^
2019	MAP^^ changes (Harvest 2019-2020: 8-12%)		1 709-1 982 ^		
2020	MAP^^ changes		1 679-1 947 ^		

* Dead weight of discards.

** Assuming catches are landed and selection patterns do not change.

*** Assuming fishing below MCS only.

^ Assuming discards are average of the last three years.

^^ EU multiannual plan (MAP) for the North Sea (EU, 2018).

^^^ Since 2016, discards refer to unwanted catches (including BMS landings).

History of the catch and landings

Table 8 Norway lobster in Division 4.b, Functional Unit 6. Catch distribution by fleet in 2018 as estimated by ICES.

Catch (2018)		Wanted catch			Unwanted catch	
99% dead	1% surviving	Mixed <i>Nephrops</i> /demersal	Directed <i>Nephrops</i>	13% other	85% dead	15% surviving

		fishery 12% TR1	fishery 75% TR2		
1 997 tonnes (t)		1 807 t			190 t

Table 9 Norway lobster in Division 4.b, Functional Unit 6. ICES estimates of landings by country, total landings, and discards . All weights are in tonnes.

Year	UK England & N. Ireland	UK Scotland	Other countries **	Total landings	Discards
1981	1 006	67	0	1 073	
1982	2 443	81	0	2 524	
1983	2 073	5	0	2 078	
1984	1 471	8	0	1 479	
1985	2 009	18	0	2 027	
1986	1 987	28	0	2 015	
1987	2 158	33	0	2 191	
1988	2 390	105	0	2 495	
1989	2 930	168	0	3 098	
1990	2 306	192	0	2 498	
1991	1 884	179	0	2 063	
1992	1 403	60	10	1 473	
1993	2 941	89	0	3 030	
1994	3 530	153	0	3 683	
1995	2 478	90	1	2 569	
1996	2 386	96	0	2 483	
1997	2 109	80	0	2 189	
1998	2 029	147	1	2 177	
1999	2 197	194	0	2 391	
2000	1 947	231	0	2 178	1 805
2001	2 319	255	0	2 574	2 393
2002	1 739	211	0	1 954	795
2003	2 031	211	0	2 245	716
2004	1 952	201	0	2 153	615
2005	2 936	158	0	3 094	715
2006	4 430	171	39	4 903	1 051
2007	2 525	171	4	2 966	432
2008	976	244	0	1 220	166
2009	2 299	414	0	2 713	461
2010	1 251	185	0	1 443	201
2011	1 806	250	14	2 070	246
2012	2 177	256	27	2 460	345
2013	2 177	305	11	2 982	450
2014	2 177	345	54	2 503	198
2015	1 286	174	11	1 371	190
2016	1 726	125	3	1 854	272 ^^^
2017	1 726	260	18	1 963	198 ^^^
2018	1 557	229	21	1 807	190 ^^^

* Functional.

** Other countries: Netherlands, Belgium, and Denmark.

^^^ Since 2016, discards refer to unwanted catches (including BMS).

Summary of assessment

Table 10 Norway lobster in Division 4.b, Functional Unit 6. Assessment summary.

Year	UWTV abundance (millions)	95% CI	Landings (t)	Discard ratio (by number)	Mean Weight Landings (g)	Mean Weight Discards (g)	Number removed (millions)	Harvest rate (by number)
2001	1 685	67	2 574	67%	20.67	9.62	373	22.1%
2002	1 048	112	1 954	46%	20.00	9.50	181	17.3%
2003	1 085	90	2 245	42%	21.89	9.56	177	16.3%
2004	1 377	101	2 153	42%	23.14	9.22	160	11.6%
2005	1 657	148	3 094	35%	23.58	10.32	200	12.1%

2006	1 244	114	4 903	31%	22.53	10.58	317	25.5%
2007	858	23	2 966	25%	24.95	10.89	159	18.5%
2008	987	39	1 220	25%	26.63	10.97	61	6.2%
2009	682	38	2 713	29%	24.45	10.54	157	23.0%
2010	785	21	1 443	23%	25.18	11.74	74	9.5%
2011	878	17	2 070	23%	27.05	11.02	99	11.3%
2012	758	13	2 460	27%	27.30	10.16	124	16.4%
2013	706	18	2 982	30%	27.60	9.80	154	21.8%
2014	755	18	2 503	14.9%	29.90	13.50	98	13.0%
2015	565	18	1 371	29%	29.39	9.99	66	11.6%
2016	697	19	1 854	29%	27.97	10.23	93	13.3%
2017	902	21	1 963	22%	29.18	10.29		9.6%
2018	950	23	1 807	21%	28.97	11.22		8.4%

* For Norway lobster greater than 17 mm carapace length.

Length frequencies for catch (dotted) and landed(solid): Nephrops in fu6

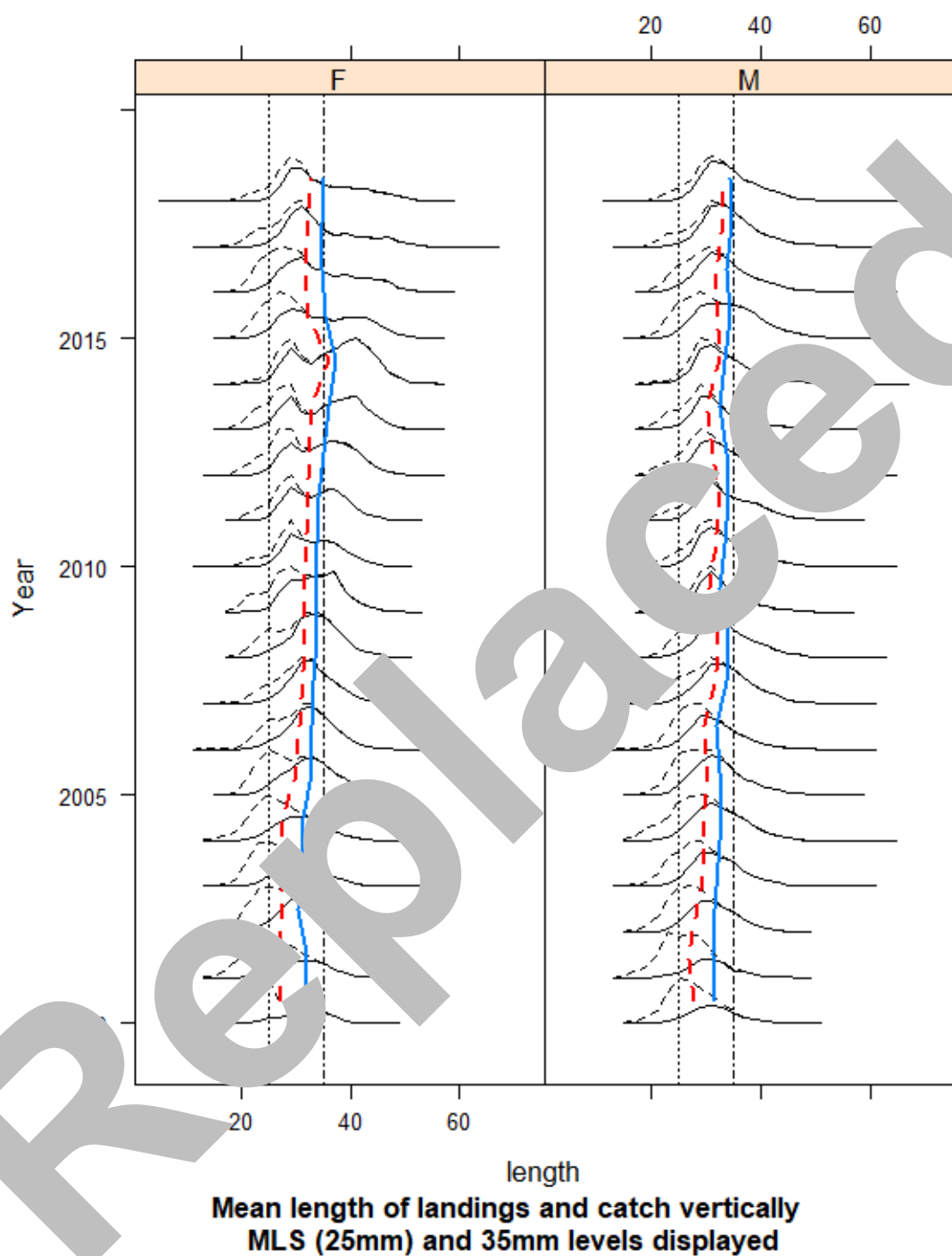


Figure 3 Norway lobster in Farn Deep (FU 6). Catch length–frequency distribution and mean size in catches (red and dashed line) and landings (blue line). Vertical lines are minimum landing size (25 mm) and 35 mm.

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Recommended citation: ICES. 2019. Norway lobster (*Nephrops norvegicus*) in Division 4.b, Functional Unit 6 (central North Sea, Farn Deep). In Report of the ICES Advisory Committee, 2019. ICES Advice 2019, nep.fu.6, <https://doi.org/10.17895/ices.advice.4865>