

Norway lobster (*Nephrops norvegicus*) in Division 4.a, Functional Unit 10 (northern North Sea, Noup)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches in each of the years 2021 and 2022 should not exceed 46 tonnes, assuming recent discard rates.

To ensure the stock in Functional Unit (FU) 10 is exploited sustainably, management should be implemented at the functional unit level.

Note: This advice sheet is abbreviated due to the COVID-19 disruption. The previous advice issued for 2019 and 2020 is attached as Annex 1.

Stock development over time

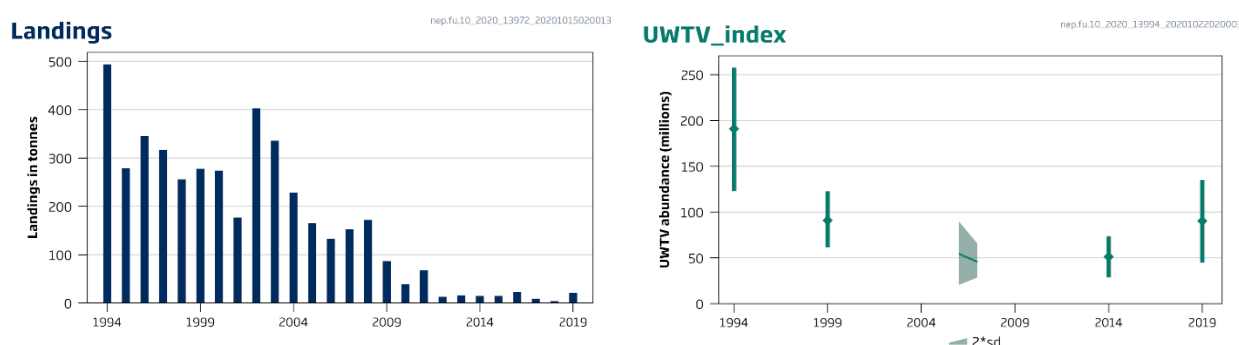


Figure 1 Norway lobster in Division 4.a, FU 10. Landings and stock abundance. Error bars and shaded areas indicate 95% confidence intervals.

Stock and exploitation status

Table 1 Norway lobster in Division 4.a, FU 10. State of the stock and the fishery relative to reference points.

		Fishing pressure				Stock size				
		2017	2018	2019		2018		2019	2020	
Maximum sustainable yield	F_{MSY}	?	?	?	Unknown	MSY $B_{trigger}$?	?	?	Undefined
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Unknown	B_{pa}, B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—	—	Not applicable
Qualitative evaluation	-	✓	✓	✓	Below possible reference points	-	?	?	?	Unknown

Catch scenarios

The ICES framework for category 4 Norway lobster stocks was applied (ICES, 2012). In the absence of a full analytical assessment, ICES bases its advice for Norway lobster on the most recent advice. Maximum sustainable yield (MSY) harvest rates estimated for other FUs vary between 7.5% and 16%. ICES uses the lower boundary as an upper limit for advice for data-limited Norway lobster stocks. As long as the harvest rate is less than 7.5%, the default basis for advice is that catches can be increased gradually by applying the 20% uncertainty cap to the previous advice. The precautionary buffer has not been applied previously. Stock size in relation to reference points is unknown and has not increased significantly. Therefore, the precautionary buffer has been applied this year.

Table 2 Norway lobster in Division 4.a, FU 10. The basis for the catch scenarios.

Variable	Value	Notes
Density in TV assessment	0.22 <i>Nephrops</i> m ⁻²	UWTV 2019 (UWTV was not conducted in 2020).
Mean weight in projected landings	26.78 g	Average 2017–2019 (from FU 9).
Mean weight in projected discards	10.05 g	Average 2017–2019 (from FU 9).
Projected discard rate (total)	1.8%	Average 2017–2019 (from FU 9, percentage by number).
Discard survival ratio	0%	Discard survival is assumed to be zero.
Surface area estimate	409 km ²	Benchmark estimate WKNEPHTV (ICES, 2007).

Table 3 Norway lobster in Division 4.a, FU 10. Annual catch scenarios for 2021 and 2022. Discarding is assumed to continue at the recent average (2017–2019). All weights are in tonnes.

Rationale	Basis	Total catch	Projected landings	Projected discards	% harvest rate *	% advice change **
Precautionary approach	(Advice for 2019 and 2020 +20% cap) –20% PA buffer	46	46	0	1.93	–4
Other options	Recent average landings (2017–2019)	11	11	0	0.48	–77
	Average landings (2010–2019)	22	22	0	0.94	–54
	Advice for 2019 and 2020 –20%	38	38	0	1.60	–20
	Advice for 2019 and 2020	48	48	0	2.0	0
	Advice for 2019 and 2020 +20%	58	58	0	2.4	20
	MSY proxy harvest rate (HR)	178	177	1	7.5	270
	Maximum landings	497	494	3	21	940

* Calculated for dead removals and applied to total catch.

** Total catch in 2021 and 2022 relative to the advice value for 2019 and 2020 (48 tonnes).

History of the advice, catch, and management

Table 4 Norway lobster in Division 4.a, FU 10. History of ICES advice and ICES estimates of landings. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catches corresponding to advice	Recommended landings FUs 9 and 10	ICES landings *
1992				~2400	188
1993				2400	376
1994				2400	494
1995				2400	279
1996	<i>Status quo</i> TAC			2400	345
1997	<i>Status quo</i> TAC			2400	317
1998				2400	256
1999				2400	278
2000				1850	274
2001				1850	177
2002	Catches to be maintained at the 2000 level			2000	403
2003	Catches to be maintained at the 2000 level			2000	336
2004	Catches to be maintained at the 2000 level			2000	228
2005	Catches to be maintained at the 2000 level			2000	165
2006	No increase in effort			-	133
2007	No increase in effort, and recent average landings	240		2640	153
2008	No new advice, same as for 2007	240		2640 **	172
2009	No increase in effort, average landings 2003–2005	< 240			87
2010	No new advice, same as for 2009	< 240			39
2011	No advice	-			68
2012	Reduce catch	-			13
2013	20% Reduction in landings (last 3 years' average)	< 50			16
2014	No new advice, same as 2013	< 50			15
2015	No increase in landings (last 3 years' average)	< 32	< 33		15

Year	ICES advice	Landings corresponding to advice	Catches corresponding to advice	Recommended landings FUs 9 and 10	ICES landings *
2016	No new advice, same as for 2015	< 32	< 33		23
2017	Precautionary approach	≤ 38	≤ 40		9
2018	Precautionary approach	≤ 38	≤ 40		4
2019	Precautionary approach	≤ 46	≤ 48		21
2020	Precautionary approach	≤ 46	≤ 48		
2021	Precautionary approach	≤ 46	≤ 46		
2022	Precautionary approach	≤ 46	≤ 46		

* Does not include discards.

** Based on a 15% harvest rate applied to TV survey abundance data. Includes Moray Firth (FU 9).

Summary of the assessment

Table 5 Norway lobster in Division 4.a, FU 10. Sensitivity analysis of harvest rates for a range of potential densities, assuming the fishery selection pattern does not change. All weights are in tonnes. The shaded areas indicate harvest rates > the range of North Sea F_{MSY} proxies of 7.5%–16%.

Basis	Total catch	Projected landings	Projected discards	Range of potential densities (<i>Nephrops</i> m ⁻²)									
				0.05	0.1	0.15	0.2	0.22 *	0.3	0.4	0.6	0.8	
				Harvest rate in %									
Recent average (2017–2019)	11	11	0	2.1	1.05	0.70	0.53	0.48	0.35	0.26	0.176	0.132	
Average (2010–2019)	22	22	0	4.1	2.1	1.38	1.04	0.94	0.69	0.52	0.35	0.26	
2018 advice –20%	38	38	0	7.0	3.5	2.3	1.75	1.60	1.17	0.88	0.58	0.44	
(Advice for 2019 and 2020 +20% cap) –20% PA buffer	46	46	0	8.5	4.2	2.9	2.1	1.93	1.42	1.06	0.71	0.53	
2018 advice	48	48	0	8.9	4.4	3.0	2.2	2.0	1.48	1.11	0.74	0.55	
2018 advice +20%	58	58	0	10.7	5.4	3.6	2.7	2.4	1.79	1.34	0.89	0.67	
MSY proxy harvest rate	178	177	1	33	16.5	11.0	8.2	7.5	5.5	4.1	2.8	2.1	
Maximum	497	494	3	92	46	31	23	21	15.3	11.5	7.7	5.7	

* Density estimate from the UWTV survey in 2019.

Table 6 Norway lobster in Division 4.a, FU 10. Assessment summary.

Year	UWTV index (millions)			Landings (tonnes)
	Value	High	Low	
1994	191	258	123	494
1995				279
1996				345
1997				317
1998				256
1999	91	123	61	278
2000				274
2001				177
2002				403
2003				336
2004				228
2005				165
2006	55	90	20	133
2007	45	65	29	153
2008				172
2009				87
2010				39
2011				68
2012				13

Year	UWTV index (millions)			Landings (tonnes)
	Value	High	Low	
2013				16
2014	51	74	29	15
2015				15
2016				23
2017				9
2018				4
2019	90	135	45	21

Sources and references

ICES. 2007. Workshop on the Use of UWTV Surveys for Determining Abundance in *Nephrops* Stocks throughout European Waters (WKNEPHTV), 17–21 April 2007, Heraklion, Crete, Greece. ICES CM 2007/ACFM:14. 198 pp.

ICES. 2012. ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM:68. 42 pp. <https://doi.org/10.17895/ices.pub.5322>.

ICES. 2020. Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK). ICES Scientific Reports, 2:61. 1140 pp. <http://doi.org/10.17895/ices.pub.6092>.

Recommended citation: ICES. 2020. Norway lobster (*Nephrops norvegicus*) in Division 4.a, Functional Unit 10 (northern North Sea, Noup). In Report of the ICES Advisory Committee, 2020. ICES Advice 2020, nep.fu.10. <https://doi.org/10.17895/ices.advice.5807>.

Norway lobster (*Nephrops norvegicus*) in Division 4.a, Functional Unit 10 (northern North Sea, Noup)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches in each of the years 2019 and 2020 should not exceed 48 tonnes.

To ensure the stock in Functional Unit (FU) 10 is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

Underwater TV (UWTV) surveys in Functional Unit (FU) 10 have been conducted sporadically and have indicated that the density is relatively low ($0.13 \text{ Nephrops m}^{-2}$). Landings are at a historical minimum.

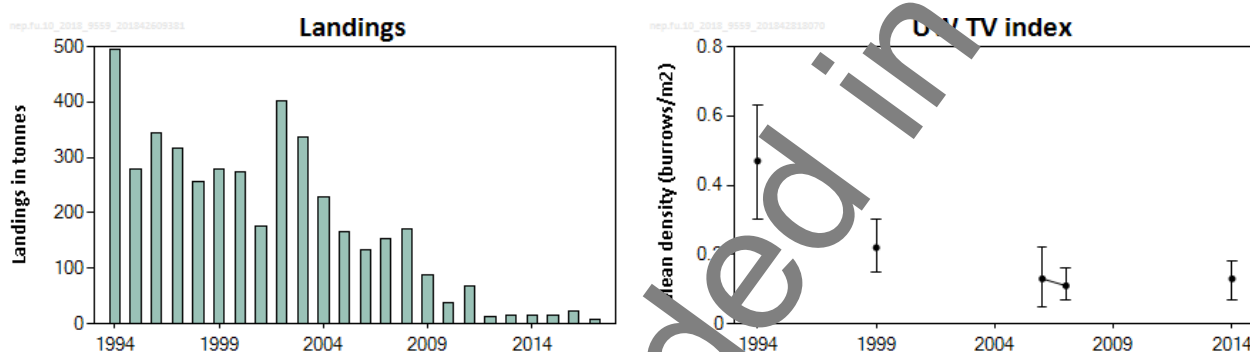


Figure 1 Norway lobster in Division 4.a, FU 10. Landings and stock density. Error bars indicate 95% confidence intervals.

Stock and exploitation status

ICES cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined.

Table 1 Norway lobster in Division 4.a, FU 10. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size				
		2015	2016	2017		2015	2016	2017		
Maximum sustainable yield	F_{MSY}	?	?	?	Unknown	MSY	?	?	?	Undefined
Precautionary approach	$F_{pa} = F_{lim}$?	?	?	Unknown	$B_{pa} = B_{lim}$?	?	?	Undefined
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—	—	Not applicable
Qualitative evaluation		✓	✓	✓	Below possible reference points	-	?	?	?	Unknown

Catch scenarios

The ICES framework for category 4 Norway lobster stocks (ICES, 2012) was applied for this stock. As the first step, the same advice as given in 2016 corresponds to a potential harvest rate of 3.0%, based on the 2014 density estimate of $0.13 \text{ Norway lobster m}^{-2}$. As the stock appears to be very lightly exploited, the advice may be increased to a level corresponding to an acceptable harvest rate (HR), applying an uncertainty cap to restrict annual change to no more than 20%. The same advice as given in 2016 + 20% corresponds to a potential HR of 3.5%. This is well below the range of MSY harvest rates in the North Sea (between 7.5% and 16%), which is considered conservative. Assuming that discard rates do

not change from the rate of 11.9% (by number estimate for FU 9) and that the discard mortality rate is 100%, this implies catches of no more than 48 tonnes.

Table 2 Norway lobster in Division 4.a, FU 10. The basis for the catch scenarios.

Variable	Value	Notes
Density in TV assessment	0.13 <i>Nephrops</i> m ⁻²	UWTV 2014
Mean weight in wanted catches	27 g	Average 2015–2017 (from FU 9)
Mean weight in unwanted catches	10.8 g	Average 2015–2017 (from FU 9)
Unwanted catches rate (total)	11.9%	Average 2015–2017 (from FU 9, proportion by number)
Discard survival rate	0%	Discard survival is assumed to be zero
Surface area estimate	409 km ²	Benchmark estimate WNEPHTV (ICES, 2007)

Table 3 Norway lobster in Division 4.a, FU 10. Annual catch scenarios for 2019 and 2020. Discarding is assumed to continue at the recent average. All weights are in tonnes.

Rationale	Basis	Total catch	Wanted catch *	Unwanted catch *	Harvest rate **	% Advice change ***
Precautionary approach	Advice for 2017 & 2018 + 20%	48	46	2	3.5%	20%
Other options	Recent average landings (2015–2017)	17	16	1	1.22%	–59%
	Advice for 2017 & 2018 –20%	32	30	2	2.4%	–20%
	Advice for 2017 & 2018	40	38	2	3.0%	0%
	Average landings (2008–2017)	48	46	2	3.6%	20%
	MSY	102	97	5	7.5%	155%
	Maximum landings	520	494	26	38.5%	1200%

* “Wanted” and “unwanted” catch are used to described Norway lobster that would be landed and discarded, based on discard rates estimates for the average of (2015–2017).

** Calculated for dead removals and applied to total catch.

*** Total catch 2019 & 2020 relative to advice value for 2017 & 2018 (40 t)

Basis of the advice

Table 4 Norway lobster in Division 4.a, FU 10. The basis of the advice.

Advice basis	ICES precautionary approach
Management plan	The EU MAP for the North Sea is currently being finalized and is not yet adopted. For this stock it is not possible to estimate F _{MSY} ranges, therefore ICES continues to give advice based on the ICES precautionary approach.

Quality of the assessment

The time-series of UWTV survey data is incomplete, and the last survey was conducted in 2014. There are no reliable effort data for this FU and therefore no resulting landings per unit of effort (LPUE).

There is no recent discard information for this fishery. Discard percentages and mean weights have been taken from the closest inshore functional unit (FU 9). The catch options are based on a calculation of potential landing options and harvest rates, given the known surface area of Norway lobster habitat and observed densities of the functional unit.

Issues relevant for the advice

MSY harvest rates estimated for other FUs vary between 7.5% and 16%. Because this is a data-limited stock, ICES uses the lower bound of that range as an upper limit for advice.

The Norway lobster fishery at the Noup is fished by only a few vessels that visit the ground occasionally, and landings constituted less than 1% of the North Sea total. In recent years most Norway lobster landings from Noup were made by TR1 vessels targeting whitefish.

There is no discard information for this fishery. The advice is based on an assumed discard rate borrowed from FU 9.

Mixed-fisheries considerations

Results from a North Sea mixed-fisheries analysis are presented in the ICES mixed-fisheries advice (ICES, 2018a). The analysis has been updated, taking into account latest changes made to the assessments and forecasts for stocks with reopened advice.[†]

After years of positive development, North Sea cod is again estimated to be the most limiting stock in the Greater North Sea mixed-fisheries model. For 2019, assuming a strictly implemented discard ban (corresponding to the "Minimum" scenario), cod is estimated to constrain 24 out of 40 fleet segments. Whiting is the second most limiting stock, constraining twelve fleet segments. Conversely, in the "Maximum" scenario, saithe and both plaice stocks (North Sea and eastern English Channel) plaice would be the least limiting for 17, 9, and 3 fleet segments, respectively. Finally, if Norway lobster were managed by separate TACs, Norway lobster in FU 7 would be the least limiting for seven fleet segments (ICES, 2018b). Norway lobster in FU 10 is not limiting in mixed-fisheries scenarios (ICES 2018a).

For those demersal fish stocks for which the F_{MSY} range is available, a "range" scenario is presented that minimizes the potential for TAC mismatches in 2019 within the F_{MSY} range. Currently, these range scenarios do not take into account Norway lobster stocks.

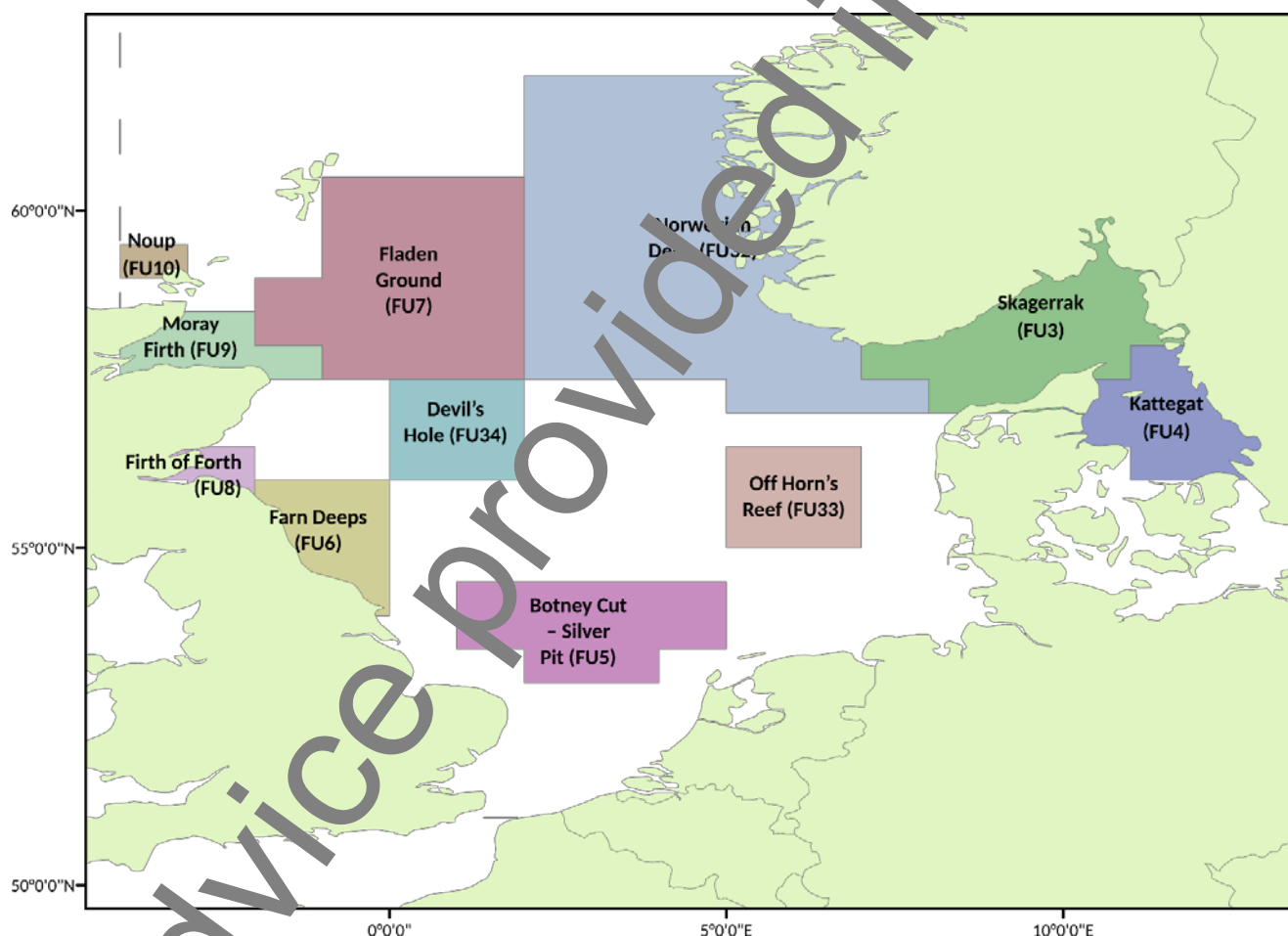


Figure 3 Norway lobster in Division 4.a, FU 10. Functional units in the North Sea.

Reference points

No reference points are defined for this stock.

[†] Version 2: mixed-fisheries text updated.

Basis of the assessment

Table 5 Norway lobster in Division 4.a, FU 10. The basis of the assessment.

ICES stock data category	4.1.4 (ICES, 2018c).
Assessment type	Data-limited approach for Norway lobster (ICES, 2018d).
Input data	Habitat extent, mean size, occasional UWTV surveys (incomplete time-series 1994, 1999, 2003, 2007, 2014). Commercial catches not included in the assessment but available for monitoring (international landings, length frequencies from Scottish catch sampling). One survey index (UWTV survey – limited time-series).
Discards and bycatch	Used to provide advice, but not included in the assessment. Discard rates and individual weights for this stock are unknown. Values from neighbouring Norway lobster stock (FU 9) were applied to generate the total catch advice.
Indicators	None.
Other information	None.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

Information from stakeholders

There is no additional available information.

History of the advice, catch, and management

Table 6 Norway lobster in Division 4.a, FU 10. History of ICES advice and ICES estimates of landings. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catches corresponding to advice	Recommended landings FUs 9 and 10	ICES landings *
1992				~2400	188
1993				2400	376
1994				2400	494
1995				2400	279
1996	Status quo TAC			2400	345
1997	Status quo TAC			2400	317
1998				2400	256
1999				2400	278
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2004	Catches to be maintained at the 2000 level			2000	228
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2007	No increase in effort, and recent average landings	240		2640	153
2008	No new advice, same as for 2007	240		2640 **	172
2009	No increase in effort, average landings 2003–2005	< 240			87
2010	No new advice, same as for 2009	< 240			39
2011	No advice	-			68
2012	Reduce catch	-			13
2013	20% Reduction in landings (last 3 years' average)	< 50			16
2014	No new advice, same as 2013	< 50			15

Year	ICES advice	Landings corresponding to advice	Catches corresponding to advice	Recommended landings FUs 9 and 10	ICES landings *
2015	No increase in landings (last 3 years' average)	< 32	< 33		15
2016	No new advice, same as for 2015	< 32	< 33		23
2017	Precautionary approach	≤ 38	≤ 40		9
2018	Precautionary approach	≤ 38	≤ 40		
2019	Precautionary approach	≤ 46	≤ 48		
2020	Precautionary approach	≤ 46	≤ 48		

* Does not include discards.

** Based on a 15% harvest rate applied to TV survey abundance data. Includes Moray Firth (FU 9).

History of the catch and landings

Table 7 Norway lobster in Division 4.a, FU 10. Catch distribution by fleet in 2017 as estimated by ICES.

Norway lobster in Division 14a/F2-16: Catch distribution by fleet in 2017 as estimated by ICES			
Catch (2017)	Wanted catch		Unwanted catch
Unknown	Directed <i>Nephrops</i> fishery 6% TR2	Mixed <i>Nephrops</i> /demersal fishery 94% TR1	Unknown
	9 tonnes		

Table 8 Norway lobster in Division 4.a, FU 10. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes. Na =not available.

Year	UK Scotland				Other UK	Total landings
	<i>Nephrops</i> trawl	Other trawl	Coastal	Sub-total		
1981	12	23	0	35	0	35
1982	12	7	0	19	0	19
1983	10	6	0	16	0	16
1984	76	35	0	111	0	111
1985	1	21	0	22	0	22
1986	45	22	0	67	0	67
1987	13	32	0	45	0	45
1988	23	53	0	76	0	76
1989	24	60	0	84	0	84
1990	101	117	0	218	0	218
1991	111	86	0	197	0	197
1992	58	130	0	188	0	188
1993	200	176	0	376	0	376
1994	307	187	0	494	0	494
1995	163	116	0	279	0	279
1996	181	164	0	345	0	345
1997	85	131	1	317	0	317
1998	84	72	0	256	0	256
1999	21	67	0	278	0	278
2000	106	78	0	274	0	274
2001	88	89	0	177	0	177
2002	246	157	0	403	0	403
2003	258	78	0	336	0	336
2004	174	54	0	228	0	228
2005	81	84	0	165	0	165
2006	44	89	0	133	0	133
2007	46	107	0	153	0	153
2008	74	98	0	172	0	172
2009	24	63	0	87	0	87
2010	4	35	0	39	0	39
2011	27	41	0	68	0	68

Year	UK Scotland				Other UK	Total landings
	<i>Nephrops</i> trawl	Other trawl	Creel	Sub-total		
2012	2	11	0	13	0	13
2013	4	12	0	16	0	16
2014	3	11	1	15	0	15
2015	1	14	0	15	0	15
2016	9	14	0	23	0	23
2017*	0	9	0	9	0	9

* Provisional.

Summary of the assessment

Table 9 Norway lobster in Division 4.a, FU 10. Sensitivity analysis of harvest rates for a range of potential densities, assuming the fishery selection pattern does not change.

Basis	Total catch	Wanted catch	Unwanted catch	Range of potential densities (<i>Nephrops</i> m ⁻²)								
				0.05	0.1	0.13	0.15	0.2	0.3	0.4	0.6	0.8
				Harvest rate in %								
Recent average (2015–2017)	17	16	1	3.2%	1.59%	1.22%	1.06%	0.79%	0.53%	0.40%	0.26%	0.20%
2016 advice –20%	32	30	2	6.2%	3.1%	2.4%	2.1%	1.54%	1.03%	0.77%	0.51%	0.38%
2016 advice	40	38	2	7.7%	3.8%	3.0%	2.6%	1.92%	1.28%	0.96%	0.64%	0.48%
2016 advice + 20%	48	46	2	9.2%	4.6%	3.5%	3.1%	2.3%	1.54%	1.15%	0.77%	0.58%
Average (2008–2017)	48	46	2	9.3%	4.6%	3.6%	3.1%	2.3%	1.54%	1.16%	0.77%	0.58%
MSY	102	97	5	19.6%	9.8%	7.5%	6.5%	4.9%	3.3%	2.5%	1.63%	1.23%
Maximum	520	494	26	100%	50%	38%	33%	25%	16.7%	12.5%	8.3%	6.2%

Sources and references

ICES. 2007. Workshop on the Use of UWTV Surveys for Determining Abundance in *Nephrops* Stocks throughout European Waters (WKNEPHTV). 17–21 April 2007, Heraklion, Crete, Greece. ICES CM 2007/ACFM:14. 198 pp.

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ICES. 2018d. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 24 April–3 May 2018, Ostend, Belgium. ICES CM 2018/ACOM:22. In preparation.