

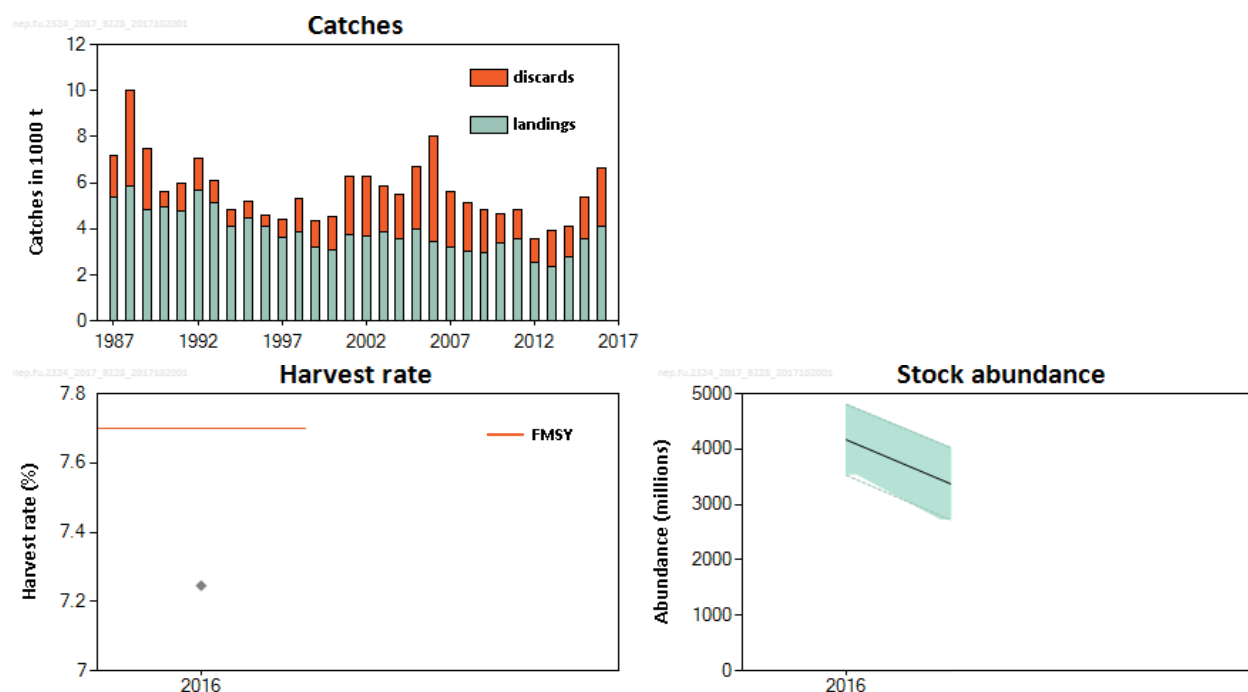
## Norway lobster (*Nephrops norvegicus*) in divisions 8.a and 8.b, functional units 23–24 (northern and central Bay of Biscay)

### ICES stock advice

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 2014–2016, catches in 2018 should be no more than 5531 tonnes.

### Stock development over time

An abundance estimate from an underwater TV (UWTV) survey has been available since 2016. The harvest rate in 2016 is estimated to be below the  $F_{MSY}$  proxy.



**Figure 1** Norway lobster in divisions 8.a and 8.b, functional units 23–24. 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). The orange line represents the  $F_{MSY}$  harvest rate.

## Stock and exploitation status

**Table 1** Norway lobster in divisions 8.a and 8.b, functional units 23–24. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2014	2015	2016		2015		2016	2017
Maximum Sustainable Yield	$F_{MSY}$	?	?	✓	Below	MSY $B_{Trigger}$	?	?	?
Precautionary Approach	$F_{pa}$ $F_{lim}$	?	?	✓	Below possible reference points	$B_{pa}$ , $B_{lim}$	?	?	?
Management plan	$F_{MGT}$	—	—	—	Not applicable	$B_{MGT}$	—	—	—
Qualitative evaluation	-					-	?	?	⬇

## Catch options

**Table 2** Norway lobster in divisions 8.a and 8.b, functional units 23–24. The basis for the catch options.

Variable	Value	Source	Notes
Stock abundance (2018)	3373 million individuals	ICES (2017a)	UWTV survey 2017 (used as abundance estimate for 2018).
Mean weight in landings	24.71 g	ICES (2017a)	Average 2014–2016.
Mean weight in discards	11.83 g	ICES (2017a)	Average 2014–2016.
Discard rate	52.6%	ICES (2017a)	Average 2014–2016 (by number). Calculated as total discards divided by landings + total discards.
Discard survival rate	30%	ICES (2017a)	Only applies in scenarios where discarding is assumed to continue.
Dead discard rate	43.7%	ICES (2017a)	Average 2014–2016 (by number). Calculated as dead discards divided by dead removals (landings + dead discards). Only applies in scenarios where discarding is assumed to continue.

**Table 3** Norway lobster in divisions 8.a and 8.b, functional units 23–24. Annual catch options. All weights are in tonnes.

a) Catch options for 2018 assuming zero discards.

Basis	Total catches	Wanted catches*	Unwanted catches*	Harvest rate**
ICES advice basis				
MSY approach ( $F_{MSY}$ harvest rate)	4659	3044	1615	7.70%
Other options				
10% harvest rate	6051	3954	2097	10.00%
$F_{2016}$	4385	2865	1520	7.20%

\* “Wanted” and “unwanted” catch are used to describe *Nephrops* that would be landed and discarded in the absence of the EU landing obligation, based on the average estimated discard rates for 2014–2016.

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

- b) Catch options for 2018 assuming discarding continues at the recent average rate.

Basis	Total catches	Dead removals	Landings	Dead discards	Surviving discards	Harvest rate*
	L+DD+SD	L+DD	L	DD	SD	for L+DD
ICES advice basis						
MSY approach; $F_{MSY}$	5531	4956	3614	1342	575	7.70%
Other options						
10% harvest rate	7183	6436	4694	1743	747	10.00%
$F_{2016}$	5206	4665	3402	1263	541	7.20%

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

## Basis of the advice

**Table 4** Norway lobster in divisions 8.a and 8.b, functional units 23–24. The basis of the advice.

Advice basis	ICES MSY approach.
Management plan	ICES is not aware of any agreed precautionary management plan for Norway lobster in this area.

## Quality of the assessment

Underwater TV (UWTV) surveys have been carried out for this stock since 2014; the first two survey years were considered to be exploratory and showed the feasibility of the method for this stock. In October 2016, ICES benchmarked this assessment using the 2016 UWTV survey, which provides an abundance estimate for functional units (FUs) 23–24 with high precision.

Last year, harvest rates for 2013–2015 were presented using the removals in each of these years and the estimated stock abundance from the 2016 survey as a way to assess the exploitation status of the stock in the absence of actual value. This year, the harvest rate for 2016 (based on the 2016 catches and survey abundance) was calculated and used for the catch option of  $F_{2016}$ .

Poor fits in the length–frequency models normally used for calculating  $F_{MSY}$  for category 1 *Nephrops* stocks meant that  $F_{MSY}$  values could not be estimated for FUs 23–24 using this method. The reasons for this require further investigation but is believed to be linked to uncertainty in natural mortality, growth, and selection patterns.

The level of catch sampling is good for this stock.

## Issues relevant for the advice

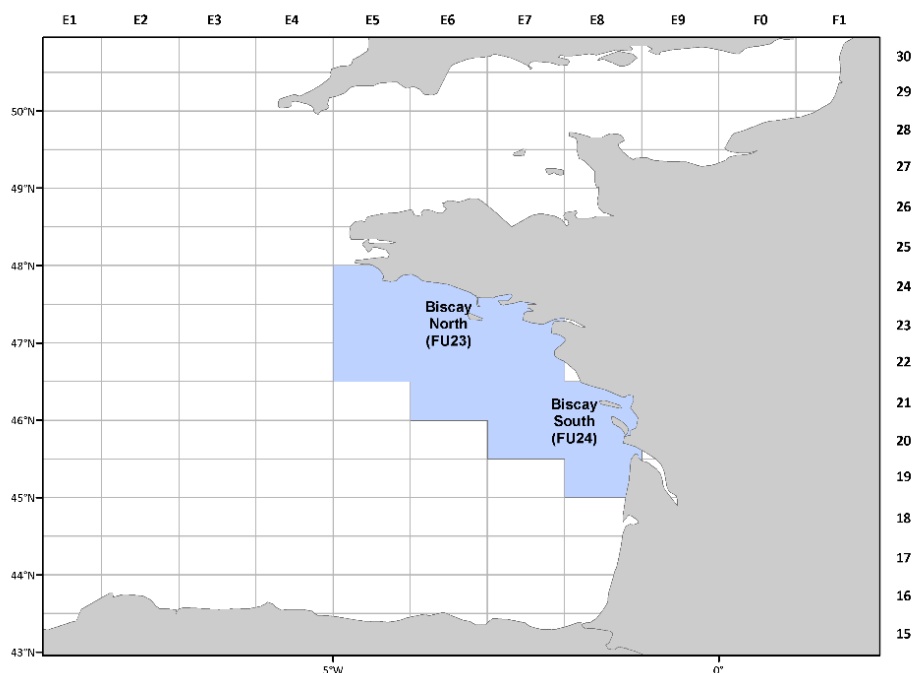
The  $F_{MSY}$  reference point (harvest rate of 7.7%) is based on the average realised harvest rates of functional units with an observed history of sustainable exploitation, while also taking into account the low harvest rates applied to the FUs 23–24 stock in the recent past.

From 2016, fisheries catching *Nephrops* in Subarea 8 are covered by the EU landings obligation (EC, 2015).

The assessment and advice for this stock were carried out by applying a discard survival rate of 30% based on historical experiments (Charuau *et al.*, 1982). However, Méhault *et al.* (2016) suggest that the discard survival rate is higher than the historical reference (a value of 55% was proposed). On that basis, a preliminary exemption to the landing obligation for the *Nephrops* fishery due to high survival was granted for 2016 and 2017 (EU, 2015, 2016). Updated estimates (37% and 51%, depending on the sorting process) based on further experiments (Merillet *et al.*, 2017) were considered reliable enough to confirm the exemption (STECF, 2017). These new discard survival rates only became available after the assessment and will be considered in future assessments.

In 2017, the number of burrows decreased by 19% compared to 2016. This could be related to an observed change in the sediment composition in part of the area, from muddy to more sandy, which is a less favourable habitat for Norway lobster. The reason for this change is unknown.

An improved selection pattern would reduce discarding and result in a higher yield in the long term.



**Figure 2** Norway lobster in divisions 8.a and 8.b, functional units 23–24. The functional units (FUs) 23 and 24 constitute a single stock of *Nephrops*.

## Reference points

**Table 5** Norway lobster in divisions 8.a and 8.b, functional units 23–24. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	Not defined		
	$F_{MSY}$	7.7% harvest rate	$F_{MSY}$ based on the average realised harvest rates of functional units with an observed history of sustainable exploitation, while also taking into account the low harvest rates applied to the FUs 23–24 stock in the recent past.	ICES (2016b)
Precautionary approach	$B_{lim}$	Not defined		
	$B_{pa}$	Not defined		
	$F_{lim}$	Not defined		
	$F_{pa}$	Not defined		
Management plan	$SSB_{mgt}$	Not defined		
	$F_{mgt}$	Not defined		

## Basis of the assessment

**Table 6** Norway lobster in divisions 8.a and 8.b, functional units 23–24. The basis of the assessment.

ICES stock data category	1 (ICES, 2016a).
Assessment type	Underwater TV survey.
Input data	One survey index (UWTV-FU23-24); commercial catches (international landings, length frequencies from sampling); fixed maturity parameters from sampling onboard; fixed natural mortalities. Discard survival rate of 30% (Charuau <i>et al.</i> , 1982).
Discards and bycatch	Included in the assessment for the entire time-series (>50% of catches in number).
Indicators	Length–frequency distributions by sex.
Other information	The latest benchmark (based on the UWTV survey) was performed in October 2016 (ICES, 2016b).
Working group	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE)

## Information from stakeholders

There is no additional available information for this stock.

## History of the advice, catch, and management

**Table 7** Norway lobster in divisions 8.a and 8.b, functional units 23–24. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in tonnes.

Year	ICES advice	Predicted landings corresponding to the advice	Catch advice	Agreed TAC	ICES estimated landings	ICES estimated total discards*
2003	50% reduction of current exploitation rate	2200		3000	3886	1977
2004	20% reduction of current exploitation rate	3300		3150	3571	1932
2005	20% reduction of current exploitation rate	3100		3100	3991	2698
2006	Maintain recent catch	3500		4000	3447	4544
2007	Maintain recent catch	3600		4320	3176	2411
2008	Maintain recent catch	3600		4320	3030	2123
2009	Maintain recent landings (average 2005–2007)	3400		4100	2987	1833
2010	No new advice, same as for 2009	3400		3900	3398	1275
2011	See scenarios			3900	3559	1263
2012	Reduce catch			3900	2520	1013
2013	Decrease landings by 5% (19% increase, followed by 20% PA reduction)	< 3200		3900	2380	1521
2014	Same advice as 2013	< 3200		3900	2807	1326
2015	Increase landings by no more than 14%	< 3214		3900	3569	1822
2016	Same advice as 2015	< 3214		3900	4091	2531
2017	MSY approach	≤ 4160**	≤ 6376	4160		
2018	MSY approach		5531**			

\* Dead + surviving discards.

\*\* Assuming recent discard rates.

## History of the catch and landings

**Table 8** Norway lobster in divisions 8.a and 8.b, functional units 23–24. Official catch distribution by fleet in 2016 as estimated by ICES. Discards split into dead and alive, assuming 30% discard survival.

Total catch	Landings	Total discards*	
100% surviving	100% bottom trawl	70% dead	30% surviving
6622 t	4091 t	2531 t	

\* Dead + surviving discards.

**Table 9** Norway lobster in divisions 8.a and 8.b, functional units 23–24. ICES estimates of removals, landings and discards. Only the French fleet is fishing in this FU.

Year	Removals (tonnes)*	Landings (tonnes)	Total discards (tonnes)
1987	6634	5397	1767
1988	8772	5875	4138
1989	6940	4835	3007
1990	5423	4972	644
1991	5603	4754	1213
1992	6532	5681	1217
1993	5791	5109	974
1994	4594	4092	717
1995	4933	4452	687
1996	4460	4118	487
1997	4249	3610	914
1998	4882	3865	1453
1999	3974	3209	1092
2000	4005	3069	1337
2001	5569	3730	2628
2002	5454	3679	2535
2003	5270	3886	1977
2004	4923	3571	1932
2005	5880	3991	2698
2006	6627	3447	4544
2007	4864	3176	2411
2008	4517	3030	2123
2009	4270	2987	1833
2010	4290	3398	1275
2011	4443	3559	1263
2012	3229	2520	1013
2013	3444	2380	1521
2014	3735	2807	1326
2015	4845	3569	1822
2016	5863	4091	2531

\* Removals are calculated as landings plus dead discards, assuming 30% survival rate of discards.

## Summary of the assessment

**Table 10** Norway lobster in divisions 8.a and 8.b, functional units 23–24. Assessment summary.

Year	Landings in number	Total discards in number	Removals* in number	UWTV abundance estimates	95% Conf. intervals	Harvest rate	Mean weight in landings	Mean weight in discards	Discard rate	Dead discard rate
	millions					%	grammes		%	
2014	121.6	117.9	204.1				23.1	11.2	49	40
2015	138.9	156.4	248.4				25.7	11.7	53	44
2016	161.4	201.0	302.1	4168	640	7.2	25.4	12.6	55	47
2017				3373	653					

\* Removals are calculated as landings plus dead discards, assuming 30% survival rate of discards.

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