

Norway lobster (*Nephrops norvegicus*) in divisions 7.a, 7.g, and 7.j, Functional Unit 19 (Irish Sea, Celtic Sea, eastern part of southwest of Ireland)

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 1192 tonnes.

To ensure that the stock in Functional Unit 19 is exploited sustainably, management should be implemented at the functional unit level.

Stock development over time

The harvest rates have been below F_{MSY} since 2014. Stock abundance has been declining since 2011 but has remained above $MSY B_{trigger}$, except in 2016.

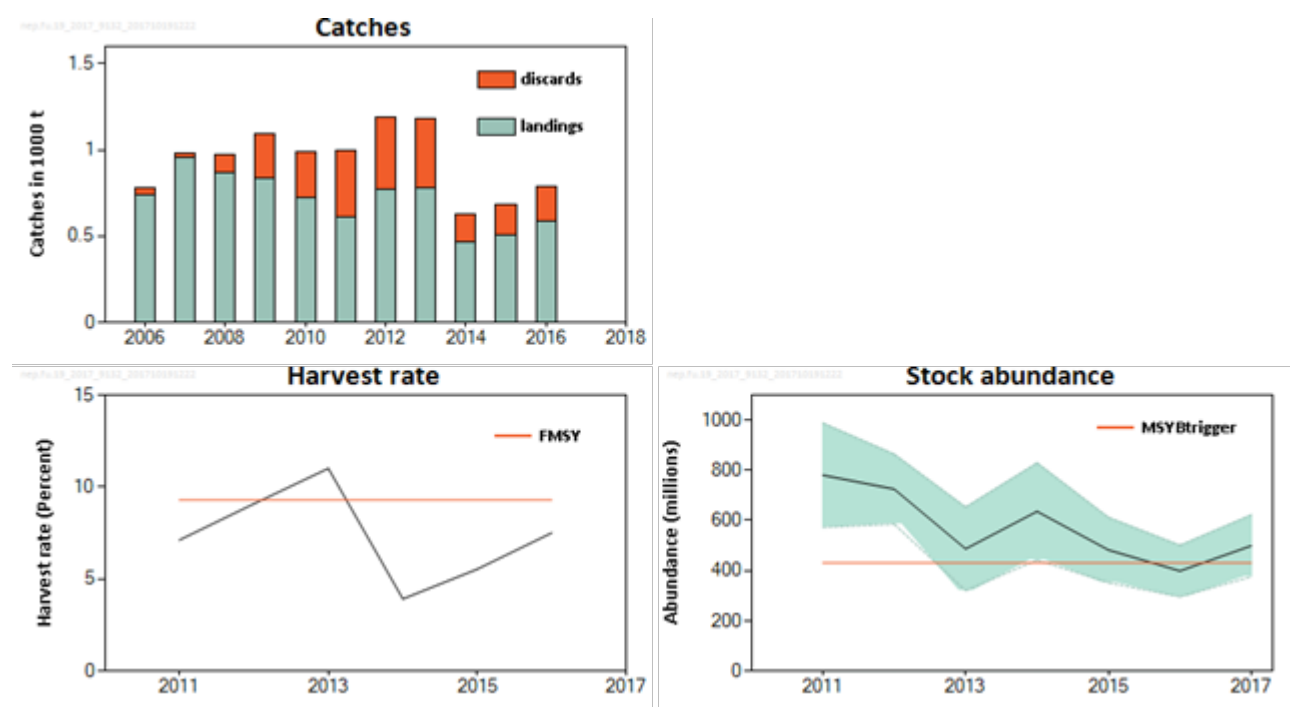


Figure 1 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Summary of the stock assessment. Catches, harvest rate (sum of landings and dead discards in numbers divided by total abundance), stock abundance (Underwater TV, millions; SSB proxy; 95% confidence intervals). Orange lines represent $MSY B_{trigger}$ and the F_{MSY} harvest rate.

Stock and exploitation status

Table 1 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. 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 | ✓ | ✗ | ✓ Above trigger |
| Precautionary approach | F_{pa} , F_{lim} | ✓ | ✓ | ✓ | Below possible reference points | B_{pa} , B_{lim} | ✓ | ? | ✓ Above possible reference points |
| Management plan | F_{MGT} | - | - | - | Not applicable | SSB_{MGT} | - | - | - Not applicable |

Catch options

Table 2 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. The basis for the catch options.

| Variable | Value | Source | Notes |
|-------------------------|-------------------------|-------------|---|
| Stock abundance (2018) | 499 million individuals | ICES (2017) | UWTV 2017 (used as abundance estimate for 2018). |
| Mean weight in landings | 29.4 g | ICES (2017) | Average 2014–2016. |
| Mean weight in discards | 14.0 g | ICES (2017) | Average 2014–2016. |
| Discard rate | 41.6% | ICES (2017) | Average 2014–2016 (by number). Calculated as total discards divided by landings + total discards. |
| Discard survival rate | 25% | ICES (2017) | Only applies in scenarios where discarding is assumed to continue. |
| Dead discard rate | 34.7% | ICES (2017) | Average 2014–2016 (by number). Calculated as dead discards divided by removals (landings + dead discards). Only applies in scenarios where discarding is assumed to continue. |

Table 3 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Annual catch options. All weights are in tonnes.

a) Catch options for 2018 assuming zero discards.

| Basis | Total catch | Wanted catch* | Unwanted catch* | Harvest rate** |
|-------------------------|-------------|---------------|-----------------|----------------|
| ICES advice basis | | | | |
| MSY approach; F_{MSY} | 1068 | 797 | 271 | 9.3% |
| Other options | | | | |
| $F_{2014-2016}$ | 649 | 485 | 165 | 5.6% |

* “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 catch | 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} | 1192 | 1116 | 889 | 227 | 76 | 9.3% |
| Other options | | | | | | |
| $F_{2014-2016}$ | 725 | 679 | 541 | 138 | 46 | 5.6% |

* Calculated for dead removals and applied to total catch.

All harvest rates are calculated in numbers and refer to the dead removals. The difference in catch weights between catch options with the same harvest rates is related to the fact that, in the scenario allowing for discarding, a proportion of the discards is assumed to survive (25%).

Basis of the advice

Table 4 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. The basis of the advice.

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

Quality of the assessment

An annual UWTV survey has been carried out since 2011, with full coverage of all the discrete patches since 2013. The survey gives estimates of burrow densities for the main patches of *Nephrops* habitat in Functional Unit (FU) 19 and an abundance estimate for the entire stock with acceptable precision.

The main quality concern relates to mean weight estimates and discard rates that are quite variable over the time-series, partially reflecting the difference in mean sizes of patches with different underlying densities. Adequate catch sampling remains difficult for such a heterogeneous area.

Issues relevant for the advice

From 2016, fisheries catching *Nephrops* in Subarea 7 are covered by the EU landings obligation (EU, 2015). Creel fisheries are exempted from the landings obligation, with a *de minimis* exemption consisting of a 6% discard rate by weight for the trawl fishery in 2018 (reduced from 7% in 2016 and 2017). The average discard rate by weight in the trawl fishery for FU 19 over the last three years is 25%. The discard rate by number used in the calculation of the catch advice implies that the discard rate by weight will be 25.4% in 2018 for the entire fishery.

The proportion of discarded *Nephrops* in FU 19 is high relative to other areas because the vessels tend to be small with limited space and crew; therefore, the on-board tailing of the catch is not as prevalent as in other FUs around Ireland.

The density of *Nephrops* in FU 19 is considered medium (average density 0.3 individuals m⁻²). The knowledge of biological parameters is poor and the exploitation rate on males is usually higher than on females. For these reasons, a harvest ratio consistent with a combined sex $F_{0.1}$ is considered an appropriate proxy for F_{MSY} .

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.

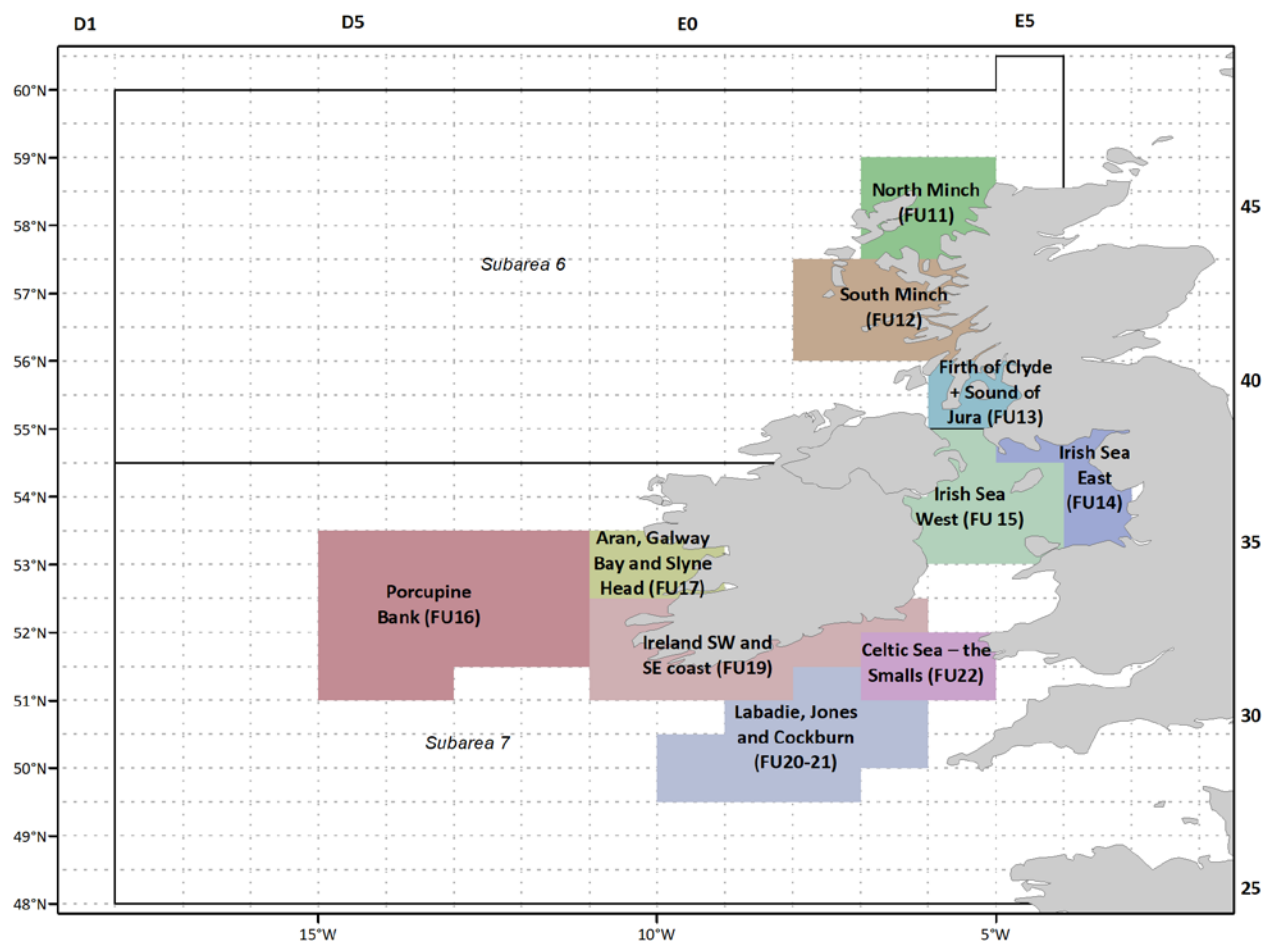


Figure 2 Norway lobster functional units in subareas 6 and 7.

Reference points

Table 5 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. Reference points, values, and their technical basis.

| Framework | Reference point | Value | Technical basis | Source |
|------------------------|-------------------|-------------------------|---|--------------|
| MSY approach | MSY $B_{trigger}$ | 430 million individuals | 5% interval on the probability distribution of abundance for the time-series 2011–2015, assuming a normal distribution. | ICES (2016a) |
| | F_{MSY} | 9.3% harvest rate | F_{MSY} proxy equivalent to $F_{0.1}$ for combined sexes, derived from a length-based per recruit analysis. | ICES (2016a) |
| 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 7.a, 7.g, and 7.j, Functional Unit 19. Basis of the assessment and advice.

| | |
|--------------------------|--|
| ICES stock data category | 1 (ICES, 2016b). |
| Assessment type | Underwater TV survey. |
| Input data | Commercial catches (international landings from Ireland, France, and UK); length frequencies from catch and discard sampling (Ireland); one UWTV survey index (UWTV-FU 19); maturity data from commercial catch and survey sampling; fixed natural mortality. Discard survival rate. |
| Discards and bycatch | Included in the assessment since 2006. |
| Indicators | Commercial length frequencies by sex. Two bottom trawl surveys (IGFS-WIBTS-Q4 and EVHOE-WIBTS-Q4). |
| Other information | This stock was benchmarked in 2014 (WKCELT ; ICES, 2014). |
| Working group | Working Group for the Celtic Seas Ecoregion (WGCSE) |

Information from stakeholders

There is no additional information for this stock.

History of the advice, catch, and management

Table 7 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. ICES advice and estimated landings. All weights are in tonnes.

| Year | ICES advice | Landings advice* | Catch advice | ICES landings | Total discards ** |
|------|---|------------------|--------------|---------------|-------------------|
| 1992 | | 3800 | | 888 | |
| 1993 | | ~4000 | | 905 | |
| 1994 | | ~4000 | | 390 | |
| 1995 | | ~4000 | | 695 | |
| 1996 | | 4000 | | 888 | |
| 1997 | | 4000 | | 756 | |
| 1998 | | 4000 | | 827 | |
| 1999 | | 4000 | | 579 | |
| 2000 | | 4000 | | 696 | |
| 2001 | | 4000 | | 815 | |
| 2002 | | 4440 | | 1318 | |
| 2003 | | 4440 | | 1239 | |
| 2004 | Restrict landings to 2000–2002 levels | 3300 | | 1074 | |
| 2005 | Restrict landings to 2000–2002 levels | 3300 | | 711 | |
| 2006 | Restrict landings to 2000–2002 levels | 3300 | | 741 | 37 |
| 2007 | Constrain effort at recent levels | -- | | 957 | 26 |
| 2008 | Constrain effort at recent levels | -- | | 866 | 107 |
| 2009 | No increase in effort and landings (2007) | < 800 | -- | 833 | 258 |
| 2010 | No new advice, same as for 2009 | < 800 | -- | 722 | 269 |
| 2011 | See scenarios | - | | 608 | 387 |
| 2012 | Reduce catches | - | | 770 | 420 |
| 2013 | MSY approach | < 820 | | 781 | 404 |

| Year | ICES advice | Landings advice* | Catch advice | ICES landings | Total discards ** |
|------|--------------|------------------|--------------|---------------|-------------------|
| 2014 | MSY approach | < 521 | | 468 | 161 |
| 2015 | MSY approach | < 715 | | 507 | 177 |
| 2016 | MSY approach | | ≤ 793*** | 591 | 194 |
| 2017 | MSY approach | | ≤ 838^ | | |
| 2018 | MSY approach | | ≤ 1192^ | | |

* Prior to 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 divisions 7.a, 7.g, and 7.j, Functional Unit 19. Catch distribution by fleet in 2016 as estimated by ICES.

| Catch | | Landings | Total discards | |
|------------|----------------|-------------------------|----------------|---------------|
| 93.8% dead | 6.2% surviving | Almost 100% otter trawl | 75% dead | 25% surviving |
| 785 t | | 591 t | 194 t | |

Table 9 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. History of landings and discards; ICES estimates of landings by country and total discards. All weights are in tonnes.

| Year | France | Rep. of Ireland | UK | Total landings | Total discards* |
|--------|--------|-----------------|----|----------------|-----------------|
| 1989 | 245 | 652 | 2 | 899 | |
| 1990 | 181 | 569 | 4 | 754 | |
| 1991 | 212 | 860 | 5 | 1077 | |
| 1992 | 233 | 640 | 15 | 888 | |
| 1993 | 229 | 672 | 4 | 905 | |
| 1994 | 216 | 153 | 21 | 390 | |
| 1995 | 175 | 507 | 12 | 695 | |
| 1996 | 145 | 736 | 7 | 888 | |
| 1997 | 93 | 656 | 7 | 756 | |
| 1998 | 92 | 733 | 2 | 827 | |
| 1999 | 77 | 499 | 3 | 579 | |
| 2000 | 144 | 541 | 11 | 696 | |
| 2001 | 111 | 702 | 2 | 815 | |
| 2002 | 188 | 1130 | 0 | 1318 | |
| 2003 | 165 | 1075 | 0 | 1239 | |
| 2004 | 76 | 997 | 1 | 1074 | |
| 2005 | 62 | 648 | 2 | 711 | |
| 2006 | 65 | 675 | 1 | 741 | 37 |
| 2007 | 63 | 894 | 0 | 957 | 26 |
| 2008 | 46 | 805 | 15 | 866 | 107 |
| 2009 | 55 | 764 | 15 | 833 | 258 |
| 2010 | 14 | 694 | 13 | 722 | 269 |
| 2011 | 23 | 585 | 1 | 608 | 387 |
| 2012 | 11 | 758 | 1 | 770 | 420 |
| 2013 | 4 | 771 | 6 | 781 | 404 |
| 2014 | 6 | 459 | 3 | 468 | 161 |
| 2015 | 5 | 502 | 0 | 507 | 177 |
| 2016** | 4 | 583 | 3 | 591 | 194 |

* Dead + surviving discards.

** Preliminary.

Summary of the assessment

Table 10 Norway lobster in divisions 7.a, 7.g, and 7.j, Functional Unit 19. 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 | | % | |
| 2006 | 26 | 3 | 28 | | | | 28.3 | 14.4 | 9 | 7 |
| 2007 | 31 | 2 | 32 | | | | 31.1 | 17.0 | 5 | 4 |
| 2008 | 26 | 6 | 30 | | | | 33.8 | 19.3 | 18 | 14 |
| 2009 | 27 | 18 | 41 | | | | 30.5 | 14.5 | 39 | 33 |
| 2010 | 24 | 20 | 39 | | | | 29.6 | 13.5 | 45 | 38 |
| 2011 | 24 | 31 | 47 | 665 | 171 | 7.1 | 25.0 | 12.6 | 56 | 49 |
| 2012 | 29 | 33 | 54 | 594 | 111 | 9.1 | 26.4 | 12.7 | 53 | 46 |
| 2013 | 29 | 33 | 54 | 487 | 161 | 11.0 | 27.4 | 12.1 | 54 | 47 |
| 2014 | 16 | 11 | 25 | 636 | 188 | 3.9 | 28.6 | 14.1 | 41 | 34 |
| 2015 | 17 | 13 | 27 | 482 | 126 | 5.5 | 29.8 | 13.8 | 43 | 36 |
| 2016 | 20 | 14 | 30 | 399 | 100 | 7.5 | 29.9 | 14.2 | 41 | 34 |
| 2017 | | | | 499 | 120 | | | | | |

*Dead + surviving discards.

Sources and references

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