

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

ICES stock advice

Please note: The present advice replaces the advice given for this stock in June 2016.

ICES advises that when the MSY approach is applied, and under the assumptions that discarding would occur only below the minimum conservation size (MCS) and that fishery selection patterns do not change from the average (2013–2015), catches in 2017 should not exceed 1143 tonnes. This would imply wanted catch of no more than 1020 tonnes.

In order to ensure the stock in this functional unit (FU) 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 this FU could rapidly lead to over-exploitation.

Stock development over time

The stock size has been generally declining since 2005 and has been below $MSY_{Btrigger}$ since 2012, and was in 2015 the lowest of the time-series. Harvest rates have been above F_{MSY} for all years except 2008.

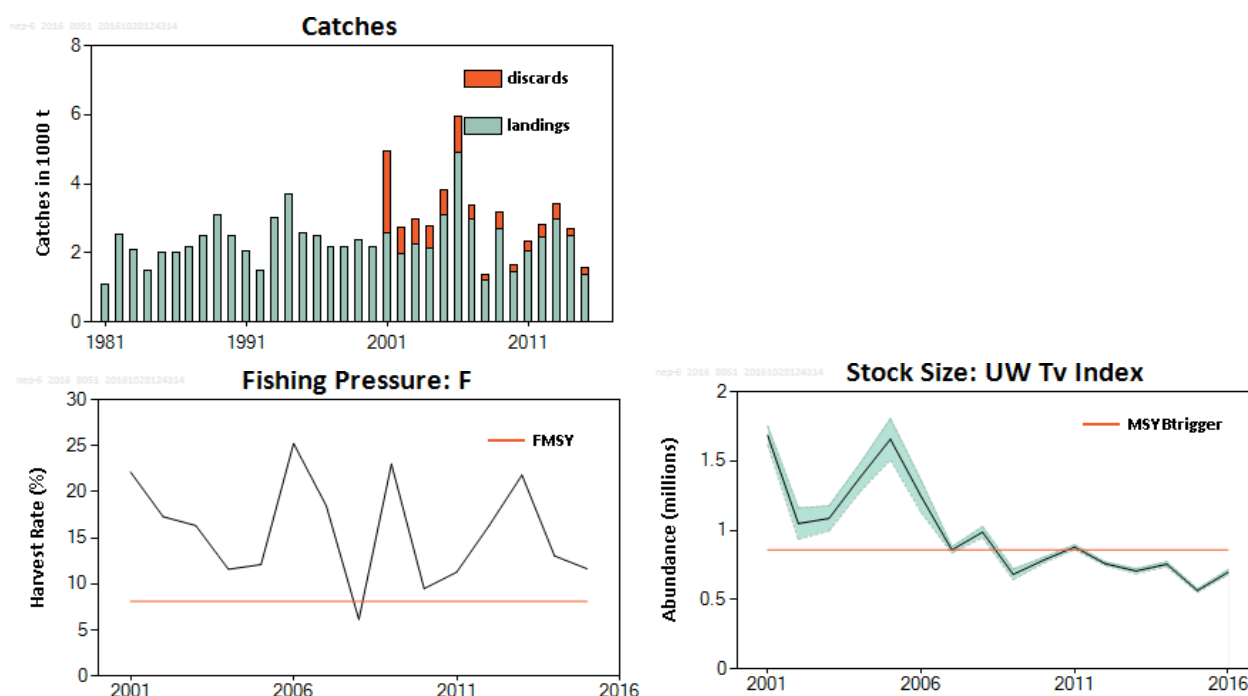


Figure 6.3.32.1 Norway lobster in Division 4.b, FU 6. Long-term trends in catches, harvest rate, and underwater TV survey (UWTV) abundance (used as F and SSB proxies). Discard data have only been included since 2000. Orange lines show proxies for $MSY_{Btrigger}$ and F_{MSY} . UWTV abundance calculated with a geostatistical method (2007–2016).

Stock and exploitation status

Table 6.3.32.1 Norway lobster in Division 4.b, FU 6. State of the stock and fishery relative to reference points.

| | | Fishing pressure | | | Stock size | | |
|---------------------------|----------------------|------------------|------|------------------|----------------------|------|------------------|
| | | 2013 | 2014 | 2015 | 2014 | 2015 | 2016 |
| Maximum sustainable yield | F_{MSY} | ✗ | ✗ | ✗ Above | MSY | ✗ | ✗ Below trigger |
| Precautionary approach | F_{pa} , F_{lim} | ? | ? | ? Undefined | $B_{trigger}$ | ✗ | ✗ Below trigger |
| Management plan | F_{MGT} | - | - | - Not applicable | B_{pa} , B_{lim} | ? | ? Undefined |
| | | | | | SSB_{MGT} | - | - Not applicable |

Catch options

The latest estimate of stock abundance (value from the survey conducted in June 2016, 697 million) is below the MSY $B_{trigger}$ value (858 million). The ICES MSY approach states that under such conditions the F_{MSY} harvest rate (8.1% for FU 6 Norway lobster) should be reduced by multiplying it by the ratio of current abundance to MSY $B_{trigger}$. This corresponds to a harvest rate of $8.1 \times 697 \div 858 = 6.60\%$ for the advice for 2016.

Table 6.3.32.2 Norway lobster in Division 4.b, FU 6. The basis for the catch options.

| Variable | Value | Source | Notes |
|------------------------------------|--------------------------|--------------|---|
| Stock abundance | 697 millions individuals | ICES (2016a) | UWTV 2016 |
| Mean weight in landings | 28.962g | ICES (2016a) | Average 2013–2015 |
| Mean weight in discards | 10.711g | ICES (2016a) | Average 2013–2015 |
| Mean weight in unwanted catch >MCS | 13.6289g | ICES (2016a) | Average 2013–2015 |
| Mean weight in unwanted catch <MCS | 6.765g | ICES (2016a) | Average 2013–2015 |
| Discard rate (total) | 24.59% | ICES (2016a) | Average 2013–2015 (proportion by number) |
| Discard rate (>MCS) | 14.14% | ICES (2016a) | Average 2013–2015 (proportion by number) |
| Discard rate (<MCS) | 10.45% | ICES (2016a) | Average 2013–2015 (proportion by number) |
| Discard survival rate | 15% | ICES (2016a) | Only applies in scenarios when discarding is allowed. |
| Dead discard rate (total) | 21.70% | ICES (2016a) | Average 2013–2015 (proportion by number), only applies in scenarios when discarding is allowed. |
| Dead discard rate (<MCS) | 9.02% | ICES (2016a) | Average (proportion by number) 2013–2015, only applies in scenarios when discarding is allowed below MCS. |

Table 6.3.32.3 Norway lobster in Division 4.b, FU 6. The catch options. All weights are in tonnes.

Catch options assuming zero discards

| Rationale | Basis | Total catch | Wanted catch* | Unwanted catch* | Harvest rate** |
|---------------|---------------------------|-------------|---------------|-----------------|----------------|
| MSY approach | MSY approach | 1125 | 1004 | 121 | 6.60% |
| Other options | F_{MSY} | 1385 | 1236 | 149 | 8.12% |
| | $F_{current}$ (2013–2015) | 2641 | 2357 | 284 | 15.48% |

* “Wanted” and “unwanted” catch are used to described Norway lobster that would be landed and discarded in the absence of the EU landing obligation, based on discard rate estimates for the average of 2013–2015.

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

Discarding assumed below MCS only*

| Rationale | Basis | Total catch | Dead removals | Landings (Wanted catch) | Unwanted >MCS** | Dead discards < MCS | Surviving discards | Harvest rate*** |
|---------------|----------------------------------|-------------|---------------|-------------------------|-----------------|---------------------|--------------------|-----------------|
| | | L+U+DD+SD | L+U+DD | L | U | DD | SD | for L+U+DD |
| MSY approach | MSY approach | 1143 | 1138 | 1020 | 90 | 28 | 5 | 6.60% |
| Other options | F _{MSY} | 1408 | 1402 | 1256 | 111 | 35 | 6 | 8.12% |
| | F _{current} (2013–2015) | 2683 | 2671 | 2394 | 211 | 66 | 12 | 15.48% |

* Assumed for all fleets.

** Unwanted landings (U) are those animals >MCS, but which have been historically discarded.

*** Calculated for dead removals.

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 (15%).

Basis of the advice

Table 6.3.32.4 Norway lobster in Division 4.b, FU 6. The basis of the advice.

| | |
|-----------------|--|
| Advice basis | MSY approach |
| Management plan | There is no management plan for Norway lobster in this area. |

Quality of the assessment

Market sampling misses portions of the tailed category of landings which tend to be smaller individuals; the market sampling data may thus be biased towards larger sizes. The assessment, therefore, only uses data from samples of the full unsorted catch when estimating the size composition of removals.

Data from the latest UWTV survey (June 2016) has been used as the most up-to-date indicator of stock abundance.

Issues relevant for the advice

The results of the 2016 UWTV became available in September 2016 and showed a significant increase above the 2015 level. The advice for 2017 has therefore been updated to reflect the more recent data.

Landings between 2010 and 2015 were increasingly dominated by large mature females which had failed to successfully mate. Although this trend appears to have ceased in the second half of 2015, there is likely to have been a negative impact upon recruitment levels, and this would be expected to continue through 2017.

For 2016 the EU landing obligation is applied to traps and trawl gears (80–99 mm mesh) fishing for Norway lobster in ICES Subarea 4. A *de minimis* exemption was made for animals below the 25 mm minimum conservation size (MCS), up to a maximum of 6% of total landings. Other gears and mesh sizes are not under the landing obligation. The catch advice assumed discarding of all Norway lobster to be below the MCS for all fleets.

Results from a North Sea mixed-fisheries analysis are presented in ICES (2016c). For 2017, assuming a strictly implemented discard ban (corresponding to the “Minimum” scenario), haddock would be the most limiting stock (assuming that the full advised catch is taken), constraining 36 out of 41 fleet segments (corresponding to 91% of the 2015 kW days of effort). Cod and eastern Channel sole would be limiting for fleets, corresponding to 5% and 4% of the 2015 effort, respectively. Conversely, in the “Maximum” scenario with *Nephrops* managed by separate TACs for the individual functional units (FUs), *Nephrops* would be considered the least limiting stocks in many FUs. *Nephrops* in FU 33, FU 5, FU 32, FU 7, and FU Others would be the least limiting stocks for fleets in these FUs, representing 32%, 16%, 10%, 4%, and 17% of the 2015 effort, respectively. Eastern Channel plaice and saithe would be least limiting for other fleet segments, representing 12% and 9% of the 2015 effort, respectively.

There is a single total allowable catch (TAC) for all of ICES Subarea 4, except for the Norway Deep. Management should ensure that fishing opportunities are in line with the scale of the resource in each of the stocks.

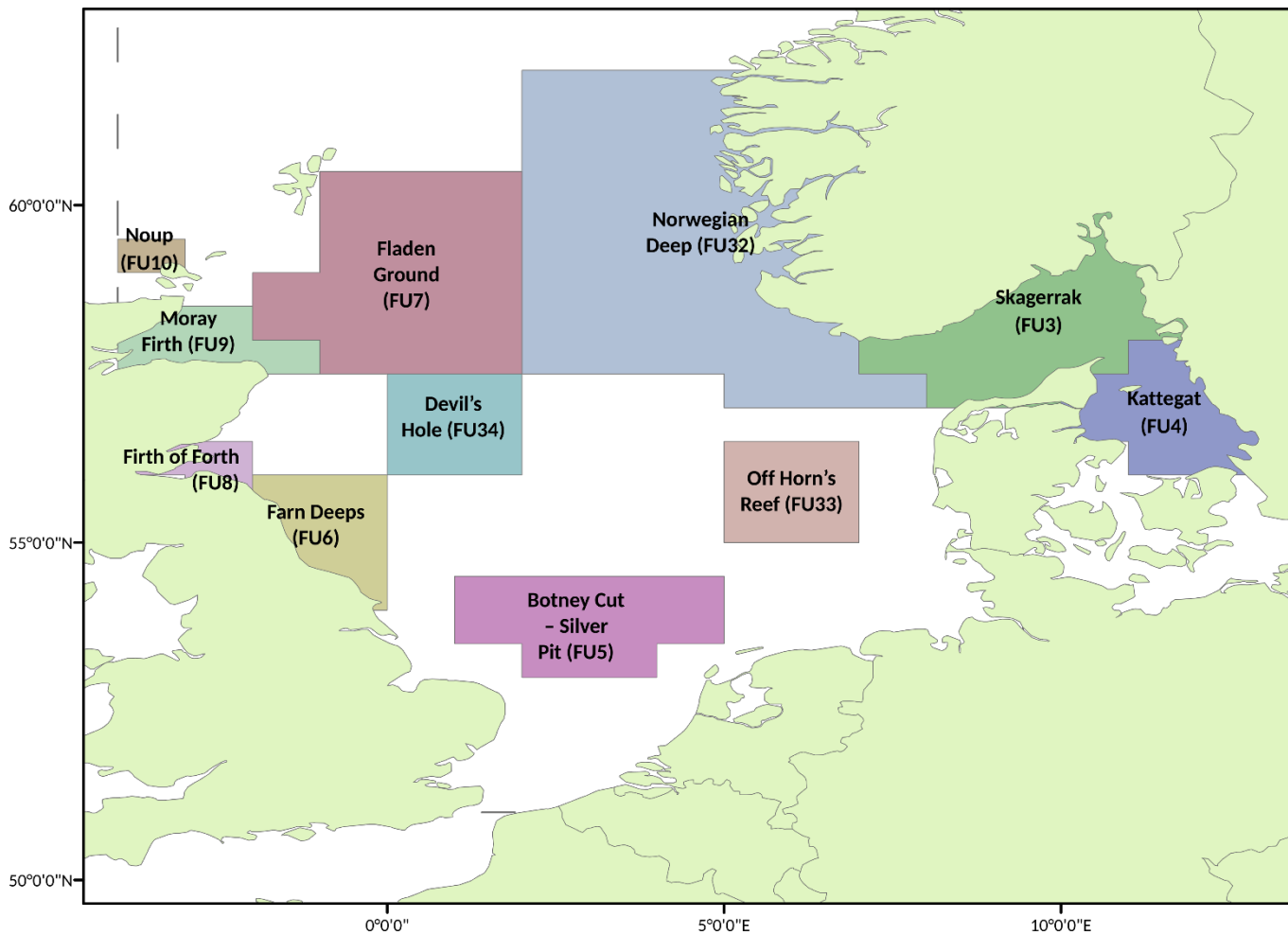


Figure 6.3.32.2 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 6.3.32.5 Norway lobster in Division 4.b, FU 6. Reference points, values, and their technical basis.

| Framework | Reference point | Value | Technical basis | Source |
|------------------------|-------------------|--------------------|--|-------------|
| MSY approach | MSY $B_{trigger}$ | 858 million | UWTV survey index at start of current decline (2007) | ICES (2010) |
| | F_{MSY} | Harvest rate 8.1%. | 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. | | |
| Management plan | SSB_{MGT} | Not defined. | | |
| | F_{MGT} | Not defined. | | |

Basis of the assessment

Table 6.3.32.6 Norway lobster in Division 4.b, FU 6. The basis of the assessment.

| | |
|--------------------------|---|
| ICES stock data category | 1 (ICES, 2016b). |
| Assessment type | Underwater TV survey linked to yield-per-recruit analysis from length data (ICES, 2016a). |
| Input data | One survey index (UWTV); Length–frequency data from the fishery. Commercial catches (international landings and length frequencies from English catch sampling covering 80% of the landings), Maturity data from commercial catch sampling. Natural mortalities from Morizur (1982). |
| Discards and bycatch | Included in the assessment, data series from the majority of the fleet/main fleets (covering 80% of the landings in 2015). |
| Indicators | Sex ratio, length frequencies. |
| Other information | Latest benchmark was performed in 2013 (ICES, 2013). The latest UWTV survey (June 2015) information was used to provide advice. |
| Working group | Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), Working Group on Mixed Fisheries Advice (WGMIXFISH-ADVICE) |

Information from stakeholders

Results for Norway lobster exist in the fishers' survey for Area 4 (similar to FU 6) and indicate similar trends to the assessment (Napier, 2014). No new information is available for 2015.

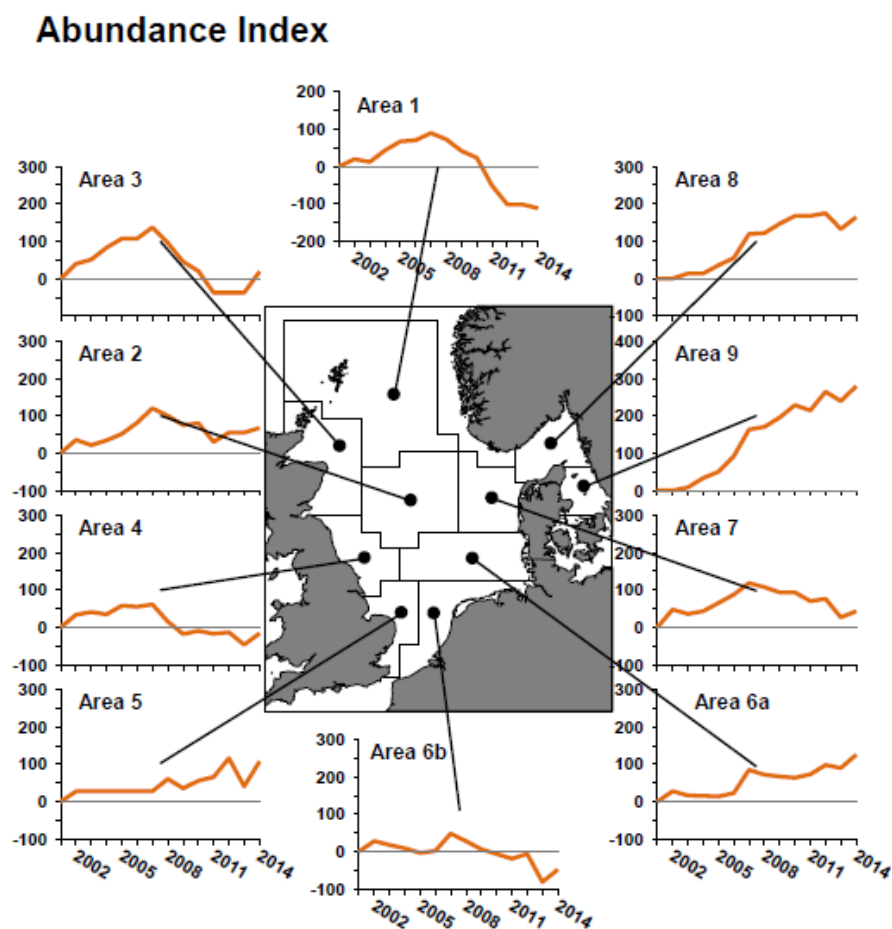


Figure 6.3.32.3 Cumulative time-series of index of perceptions of abundance of Norway lobster by roundfish sampling area from the Fishers' North Sea Stock Survey (see page 14 in Napier [2014] for an explanation of the index).

History of the advice, catch, and management

Table 6.3.32.7 Norway lobster in Division 4.b, FU 6. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in thousand tonnes.

| Year | ICES advice | Landings advice | Catch advice | ICES landings | ICES total discards* |
|------|---|-----------------|------------------|---------------|----------------------|
| 2004 | | | | 2.2 | 0.6 |
| 2005 | | | | 3.1 | 0.7 |
| 2006 | No increase in effort | | | 4.9 | 1.0 |
| 2007 | No increase in effort, harvest rate < 15% | 3.5 | | 3.0 | 0.4 |
| 2008 | No new advice, same as for 2007 | 3.5 | | 1.2 | 0.2 |
| 2009 | No increase in effort and landings (2007) | < 3.0 | | 2.7 | 0.5 |
| 2010 | Harvest rate no greater than that equivalent to fishing at F_{2008} | < 1.2 | | 1.4 | 0.2 |
| 2011 | MSY transition | < 1.9 | | 2.1 | 0.2 |
| 2012 | MSY transition | < 1.4 | | 2.5 | 0.3 |
| 2013 | MSY transition | < 1.4 | | 3.0 | 0.4 |
| 2014 | MSY transition | < 1.026 | | 2.5 | 0.2 |
| 2015 | (update November) MSY approach | < 1.127 | | 1.4 | 0.2 |
| 2016 | MSY approach | < 0.680 | ≤ 0.738 ** | | |
| 2017 | MSY approach | | ≤ 1.143 *** | | |

* Dead + surviving discards

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

*** Assuming discarding below MCS only.

History of catch and landings

Table 6.3.32.8 Norway lobster in Division 4.b, FU 6. Catch distribution by fleet in 2015 as estimated by ICES.

| Catch (2015) | | Landings | Discards | |
|--------------|--------------|---|----------|----------------|
| 98% dead | 2% surviving | Almost entirely taken in demersal trawl fisheries | 85% dead | 15 % surviving |
| 1561 t | | 1371 t | 190 t | |

Table 6.3.32.9 Norway lobster in Division 4.b, FU 6. 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.

| Year | UK England & N. Ireland | UK Scotland | Sub total | Other countries** | Total landings | Total discards*** |
|-------|-------------------------|-------------|-----------|-------------------|----------------|-------------------|
| 1981 | 1006 | 67 | 1073 | 0 | 1073 | |
| 1982 | 2443 | 81 | 2524 | 0 | 2524 | |
| 1983 | 2073 | 5 | 2078 | 0 | 2078 | |
| 1984 | 1471 | 8 | 1479 | 0 | 1479 | |
| 1985 | 2009 | 18 | 2027 | 0 | 2027 | |
| 1986 | 1987 | 28 | 2015 | 0 | 2015 | |
| 1987 | 2158 | 33 | 2191 | 0 | 2191 | |
| 1988 | 2390 | 105 | 2495 | 0 | 2495 | |
| 1989 | 2930 | 168 | 3098 | 0 | 3098 | |
| 1990 | 2306 | 192 | 2498 | 0 | 2498 | |
| 1991 | 1884 | 179 | 2063 | 0 | 2063 | |
| 1992 | 1403 | 60 | 1463 | 10 | 1473 | |
| 1993 | 2941 | 89 | 3030 | 0 | 3030 | |
| 1994 | 3530 | 153 | 3683 | 0 | 3683 | |
| 1995 | 2478 | 90 | 2568 | 1 | 2569 | |
| 1996 | 2386 | 96 | 2482 | 1 | 2483 | |
| 1997 | 2109 | 80 | 2189 | 0 | 2189 | |
| 1998 | 2029 | 147 | 2176 | 1 | 2177 | |
| 1999 | 2197 | 194 | 2391 | 0 | 2391 | |
| 2000 | 1947 | 231 | 2178 | 0 | 2178 | 1805 |
| 2001 | 2319 | 255 | 2574 | 0 | 2574 | 2393 |
| 2002 | 1739 | 215 | 1954 | 0 | 1954 | 795 |
| 2003 | 2031 | 214 | 2245 | 0 | 2245 | 716 |
| 2004 | 1952 | 201 | 2153 | 0 | 2153 | 615 |
| 2005 | 2936 | 158 | 3094 | 0 | 3094 | 715 |
| 2006 | 4430 | 434 | 4864 | 39 | 4903 | 1051 |
| 2007 | 2525 | 437 | 2962 | 4 | 2966 | 432 |
| 2008 | 976 | 244 | 1220 | 0 | 1220 | 166 |
| 2009 | 2299 | 414 | 2713 | 0 | 2713 | 461 |
| 2010 | 1258 | 185 | 1443 | 0 | 1443 | 201 |
| 2011 | 1806 | 250 | 2056 | 14 | 2070 | 246 |
| 2012 | 2177 | 256 | 2433 | 27 | 2460 | 345 |
| 2013 | 2666 | 305 | 2971 | 11 | 2982 | 450 |
| 2014 | 2104 | 345 | 2449 | 54 | 2503 | 198 |
| 2015* | 1186 | 174 | 1360 | 11 | 1371 | 190 |

* Provisional.

** Other countries includes the Netherlands, Belgium, and Denmark.

*** Dead + surviving discards.

Summary of the assessment

Table 6.3.32.10 Norway lobster in Division 4.b, FU 6. Assessment summary.

| Year | UWTV abundance index | 95% CI | Landings (t) | Discard rate | Mean weight landings(g) | Mean weight discards (g) | N removed | Observed harvest rate |
|------|----------------------|--------|--------------|--------------|-------------------------|--------------------------|-----------|-----------------------|
| 2001 | 1685 | 67 | 2574 | 66.60% | 20.67 | 9.62 | 373 | 22.1% |
| 2002 | 1048 | 112 | 1953 | 46.10% | 20.00 | 9.50 | 181 | 17.3% |
| 2003 | 1085 | 90 | 2245 | 42.10% | 21.89 | 9.56 | 177 | 16.3% |
| 2004 | 1377 | 101 | 2152 | 41.70% | 23.14 | 9.22 | 160 | 11.6% |
| 2005 | 1657 | 148 | 3094 | 34.50% | 23.58 | 10.32 | 200 | 12.1% |
| 2006 | 1244 | 114 | 4858 | 31.30% | 22.53 | 10.58 | 314 | 25.2% |
| 2007 | 858 | 23 | 2966 | 25.00% | 24.95 | 10.89 | 159 | 18.5% |
| 2008 | 987 | 39 | 1213 | 24.90% | 26.63 | 10.97 | 61 | 6.1% |
| 2009 | 682 | 38 | 2711 | 29.30% | 24.45 | 10.54 | 157 | 23.0% |
| 2010 | 785 | 21 | 1443 | 23.00% | 25.18 | 11.74 | 74 | 9.5% |
| 2011 | 878 | 17 | 2072 | 22.60% | 27.05 | 11.02 | 99 | 11.3% |
| 2012 | 758 | 13 | 2457 | 27.42% | 27.30 | 10.16 | 124 | 16.4% |
| 2013 | 706 | 18 | 2982 | 29.80% | 27.60 | 9.80 | 154 | 21.8% |
| 2014 | 755 | 18 | 2503 | 14.90% | 29.90 | 13.50 | 98 | 13.0% |
| 2015 | 565 | 13 | 1371 | 28.97% | 29.39 | 9.99 | 66 | 11.6% |
| 2016 | 697 | 19 | | | | | | |

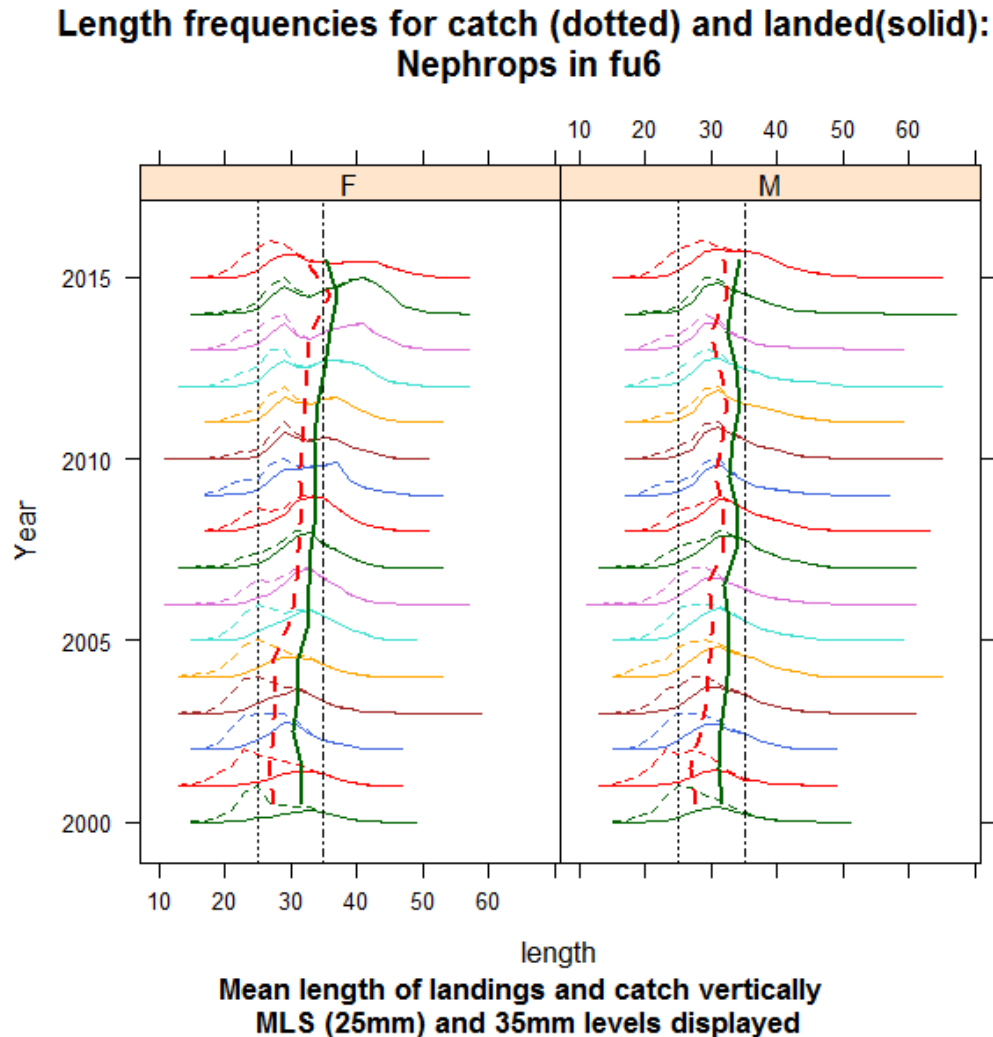


Figure 6.3.32.4 Norway lobster in Farn Deep (FU 6). Catch length–frequency distribution and mean size in catches and landings. Vertical lines are minimum landing size (25 mm) and 35 mm.

Sources and references

- ICES. 2010. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 5–11 May 2010, ICES Headquarters, Copenhagen. ICES CM 2010/ACOM:13. 1058 pp.
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