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

## ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2020 should be no more than 6573 tonnes.

## Stock development over time

Stock abundance has increased since 2017. The harvest rate in 2018 is estimated to be below $F_{MSY}$.

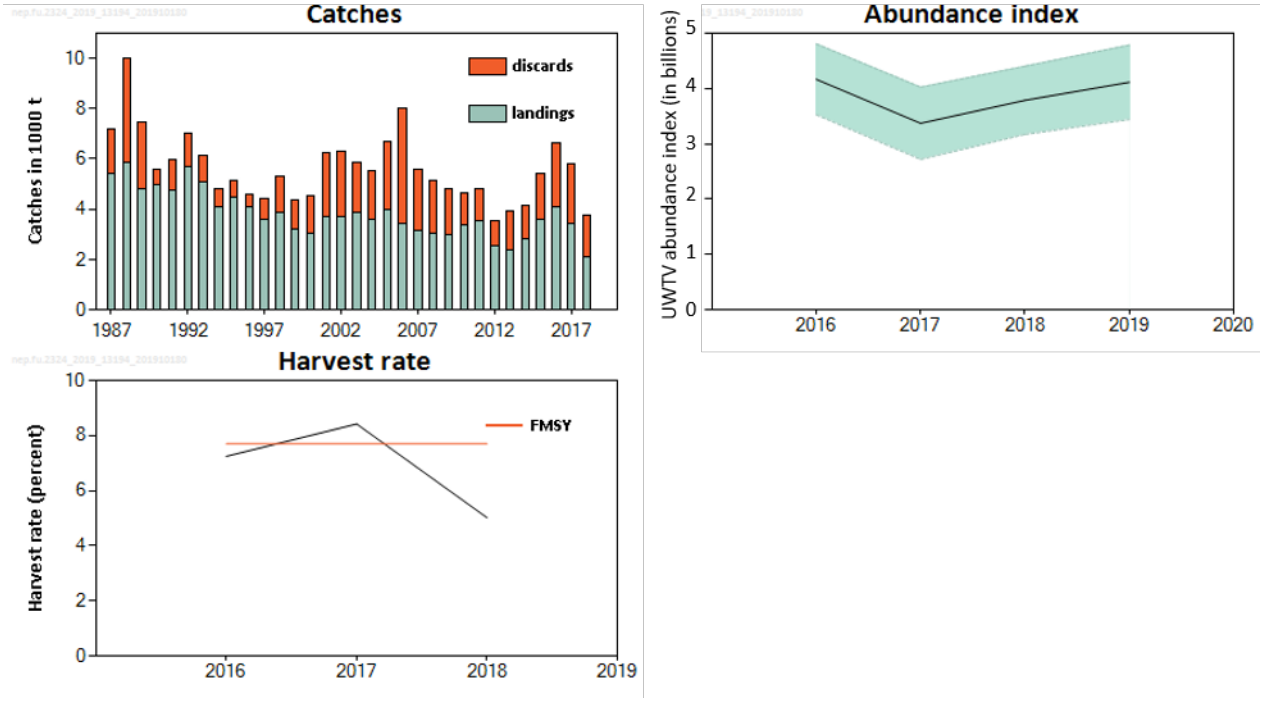


**Figure 1** Norway lobster in divisions 8.a and 8.b, functional units 23–24. Summary of the stock assessment. Catches, harvest rate (sum of landings and dead discards in numbers, divided by total abundance), and stock abundance (underwater television (UWTV) survey, in billions; 95% confidence intervals). The orange line represents the $F_{MSY}$ harvest rate.

## Stock and exploitation status

ICES assesses that fishing pressure on the stock in 2018 is below $F_{MSY}$; no reference points for stock size have been defined for this stock.

**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 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2016 | 2017 | 2018 | | 2017 | 2018 | 2019 | |
| Maximum sustainable yield | FMSY | ✓ | ✗ | ✓ | Below | MSY Btrigger | ? | ? | ? Undefined |
| Precautionary approach | Fpa,Flim | ✓ | ? | ✓ | Below possible reference points | Bpa,Blim | ? | ? | ? Undefined |
| Management plan | FMGT | ✓ | ✗ | ✓ | Below | BMGT | — | — | — Not applicable |

## Catch scenarios

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

| Variable | Value | Notes |
|---|---|---|
| Stock abundance | 4113 million | Abundance in UWTV assessment 2019 |
| Mean weight in wanted catch | 24.86 grammes | Average 2016–2018 |
| Mean weight in unwanted catch | 11.73 grammes | Average 2016–2018 |
| Unwanted catch proportion (total) | 59.46% | Average (proportion by number) 2016–2018 |
| Discards survival | 30% | Proportion by number. |
| Dead discard rate (total) | 50.71% | Average (proportion by number) 2016–2018 |

**Table 3** Norway lobster in divisions 8.a and 8.b, functional units 23–24. Catch scenarios for 2020. All weights are in tonnes. The figures in the table are rounded. Calculations were done with unrounded inputs, and computed values may not match exactly when calculated using the rounded figures in the table.

**Catch scenarios assuming recent discard rates**

| Basis*** | Total catch | Dead removals | Wanted catch | Dead unwanted catch | Surviving unwanted catch | Harvest rate* | % Advice change** |
|---|---|---|---|---|---|---|---|
| | WC + DUC + SUC | WC + DUC | WC | DUC | SUC | for WC + DUC | |
| ICES advice basis | | | | | | | |
| MSY approach: $F_{MSY}$ | 6573 | 5767 | 3886 | 1881 | 806 | 7.70% | 5.7 |
| Other options | | | | | | | |
| $F_{2018}$ | 4284 | 3759 | 2533 | 1226 | 525 | 5.02% | −31 |
| EU MAP^: $F_{MSY}$ | 6573 | 5767 | 3886 | 1881 | 806 | 7.70% | 5.7 |

**Catch scenarios assuming zero discards**

| Basis*** | Total catch | Wanted catch | Unwanted catch | Harvest rate* | % advice change ** |
|---|---|---|---|---|---|
| | WC + UC | WC | UC | for WC + UC | |
| ICES advice basis | | | | | |
| MSY approach: $F_{MSY}$ | 5401 | 3193 | 2208 | 7.7% | −13.2 |
| Other options | | | | | |
| EU MAP^: $F_{MSY}$ | 5401 | 3193 | 2208 | 7.7% | −13.2 |
| $F_{2018}$ | 4366 | 2581 | 1785 | 6.2% | −30.0 |

* By number.
** Advice value for 2020 relative to the advice value for 2019 (6221 tonnes).
*** Ranges are not defined for this stock.
^ EU multiannual plan (MAP) for the Western Waters and adjacent waters (EU, 2019).

The advice for 2020 has increased by 5.7%, due to an increase in stock abundance.

## 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 | MSY approach |
|---|---|
| Management plan | The EU multiannual plan (MAP) for stocks in the Western Waters and adjacent waters applies to catches of this stock.<br><br>The MAP stipulates that when the $F_{MSY}$ ranges are not available, fishing opportunities should be based on the best available scientific advice. |

## Quality of the assessment

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 functional units (FUs) 23–24 (Figure 2) using this method. The reasons for this require further investigation.

The $F_{MSY}$ reference point (harvest rate of 7.7%) was established as an intermediate rate between the 10% average realized harvest rates of functional units with an observed history of sustainable exploitation, and the lower harvest rates of 5.5% in the FUs 23–24 stock in the recent past (ICES, 2017).

In 2019, the survey's camera system and reviewing method changed. A comparison showed no significant difference in density estimates between the new and the old methods. Previous assumptions relating to correction factors are still applied.

## Issues relevant for the advice

ICES provides advice based on the MSY approach because the $F_{MSY}$ range for the EU MAP is not defined.

From 2016, fisheries catching *Nephrops* in Subarea 8 are covered by the EU landings obligation (EU, 2015). However, an exemption for high survival has been granted for this fishery since 2016.

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). Méhault *et al.* (2016), however, found that the discard survival rate (55%) is higher than the historical reference. Further experiments (Mérillet *et al.*, 2018) estimated the rate at 51% when using the quick chute system for discarding *Nephrops*, which is mandatory since 1 January 2017. This updated estimate was deemed reliable enough to confirm the existing exemption (STECF, 2017). The updated discard survival rate will be considered when the revision of the reference points is carried out.

An improved selection pattern would reduce catches of undersized *Nephrops* and result in a higher yield in the long term.

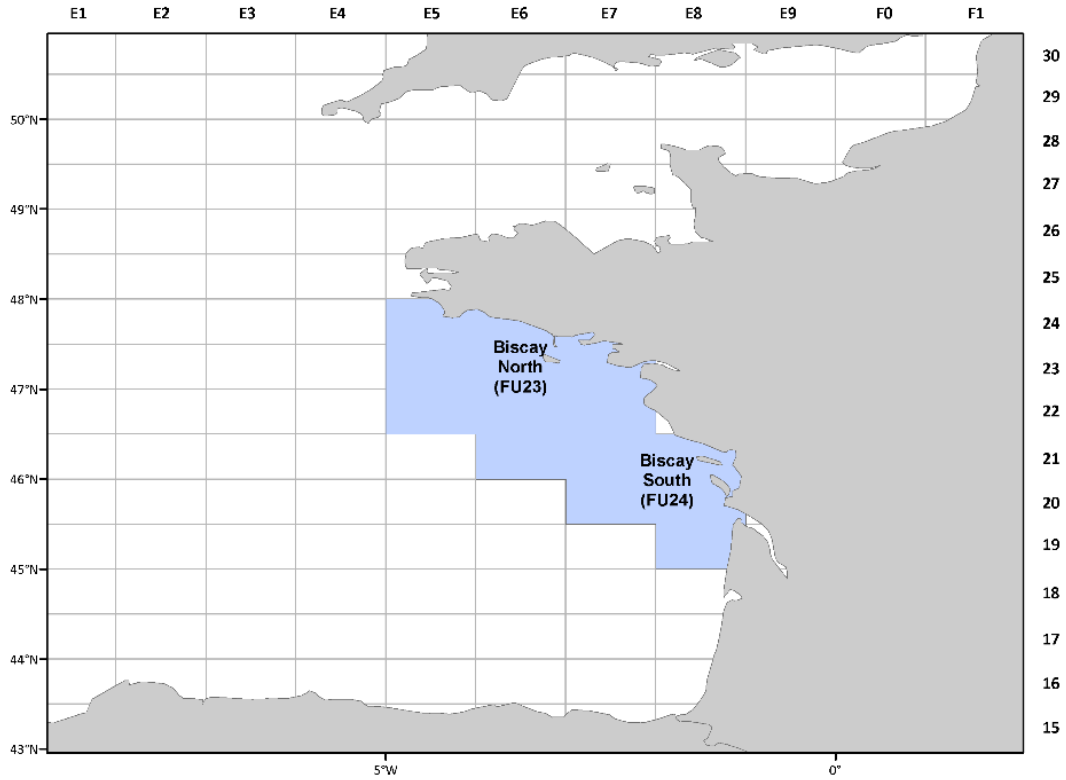


**Figure 2** Norway lobster in divisions 8.a and 8.b, functional units 23–24. The functional units (FUs) 23 and 24 constitute a single stock of *Nephrops.*

## 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 realized 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 (2016) |
| 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 | | |
| | Not defined MAP MSY $B_{trigger}$ | Not defined | | |
| | MAP $B_{lim}$ | Not defined | | |
| | MAP $F_{MSY}$ | 7.7% harvest rate | $F_{MSY}$ | EU (2019), ICES (2017) |
| | MAP range $F_{lower}$ | Not defined | | |
| | MAP range $F_{upper}$ | 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, 2018) |
| Assessment type | Underwater television (UWTV) survey (ICES, 2019). |
| Input data | One survey index (UWTV-FU 23–24); commercial catches (international landings, length frequencies from sampling); fixed maturity parameters from sampling on board; fixed natural mortalities. Discard survival rate of 30% (Charuau *et al.*, 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, 2017). |
| Working group | Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE) |

## Information from stakeholders

There is no additional information available.

## 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 and discards. All weights are in tonnes.

| Year | ICES advice | 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 | 3412 | 2387 |
| 2018 | MSY approach | | ≤ 5531** | 3600 | 2125 | 1627 |
| 2019 | MSY approach | | ≤ 6221** | 3878 | | |
| 2020 | MSY approach | | ≤ 6573** | | | |

* 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 2018 as estimated by ICES. All weights are in tonnes.

| Catch | | Landings | Discards* | |
|---|---|---|---|---|
| 13.0% surviving | 87.0% dead | ≈ 100% bottom trawl | 70% dead | 30% surviving |
| 3752 | | 2125 | 1627 | |

* 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 these FUs. All weights are in tonnes.

| Year | Removals* | Landings | Discards |
|---|---|---|---|
| 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 |
| 2017 | 5083 | 3412 | 2387 |
| 2018 | 3264 | 2125 | 1627 |

* Removals are calculated as landings plus dead discards, assuming a 30% survival rate for 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 | Abundance index | High | Low | Harvest rate (by number) | Mean weight in landings | Mean weight in discards | Discard rate (by number) | Dead discard rate (by number) | Landings | Discards |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | millions | | | number of individuals | | | % | grammes | | % | | tonnes | |
| 1987 | 288.974 | 268.244 | 39.386 | | | | | 0.019 | 0.007 | 48.14 | 39.386 | 5397 | 1767 |
| 1988 | 324.498 | 686.969 | 59.709 | | | | | 0.018 | 0.006 | 67.918 | 59.709 | 5875 | 4123 |
| 1989 | 244.875 | 404.228 | 53.608 | | | | | 0.02 | 0.007 | 62.275 | 53.608 | 4835 | 2634 |
| 1990 | 213.779 | 78.546 | 20.458 | | | | | 0.023 | 0.008 | 26.869 | 20.458 | 4972 | 627 |
| 1991 | 217.338 | 151.634 | 32.813 | | | | | 0.022 | 0.008 | 41.096 | 32.813 | 4754 | 1213 |
| 1992 | 274.286 | 174.362 | 30.795 | | | | | 0.021 | 0.008 | 38.864 | 30.795 | 5681 | 1354 |
| 1993 | 240.638 | 124.368 | 26.567 | | | | | 0.021 | 0.008 | 34.073 | 26.567 | 5109 | 1007 |
| 1994 | 188.879 | 88.267 | 24.649 | | | | | 0.022 | 0.008 | 31.848 | 24.649 | 4092 | 741 |
| 1995 | 202.294 | 84.78 | 22.682 | | | | | 0.022 | 0.008 | 29.533 | 22.682 | 4452 | 706 |
| 1996 | 182.041 | 55.25 | 17.522 | | | | | 0.023 | 0.009 | 23.283 | 17.522 | 4118 | 495 |
| 1997 | 188.694 | 104.994 | 28.031 | | | | | 0.019 | 0.008 | 35.75 | 28.031 | 3610 | 805 |
| 1998 | 161.549 | 150.995 | 39.55 | | | | | 0.024 | 0.01 | 48.312 | 39.55 | 3865 | 1453 |
| 1999 | 135.304 | 122.72 | 38.834 | | | | | 0.024 | 0.009 | 47.562 | 38.834 | 3209 | 1148 |
| 2000 | 133.383 | 163.33 | 46.155 | | | | | 0.023 | 0.009 | 55.047 | 46.155 | 3069 | 1455 |
| 2001 | 172.819 | 305.547 | 55.31 | | | | | 0.022 | 0.008 | 63.873 | 55.31 | 3730 | 2537 |
| 2002 | 180.442 | 329.002 | 56.069 | | | | | 0.02 | 0.008 | 64.581 | 56.069 | 3679 | 2620 |
| 2003 | 163.771 | 201.841 | 46.315 | | | | | 0.024 | 0.01 | 55.206 | 46.315 | 3886 | 1977 |
| 2004 | 154.405 | 222.102 | 50.172 | | | | | 0.023 | 0.009 | 58.99 | 50.172 | 3571 | 1932 |
| 2005 | 179.758 | 315.346 | 55.117 | | | | | 0.022 | 0.009 | 63.693 | 55.117 | 3991 | 2698 |
| 2006 | 128.777 | 487.288 | 72.594 | | | | | 0.027 | 0.009 | 79.097 | 72.594 | 3447 | 4544 |
| 2007 | 117.273 | 214.788 | 56.18 | | | | | 0.027 | 0.011 | 64.683 | 56.18 | 3176 | 2411 |
| 2008 | 115.274 | 198.031 | 54.598 | | | | | 0.026 | 0.011 | 63.207 | 54.598 | 3030 | 2123 |
| 2009 | 123.504 | 174.48 | 49.722 | | | | | 0.024 | 0.011 | 58.554 | 49.722 | 2987 | 1833 |
| 2010 | 138.12 | 113.53 | 36.523 | | | | | 0.025 | 0.011 | 45.114 | 36.523 | 3398 | 1275 |

| Year | Landings in number | Total discards in number | Removals* in number | Abundance index | High | Low | Harvest rate (by number) | Mean weight in landings | Mean weight in discards | Discard rate (by number) | Dead discard rate (by number) | Landings | Discards |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | millions | | | number of individuals | | | % | grammes | | % | | tonnes | |
| 2011 | 108.011 | 121.603 | 44.074 | | | | | 0.033 | 0.01 | 52.96 | 44.074 | 3559 | 1263 |
| 2012 | 101.424 | 117.935 | 44.872 | | | | | 0.025 | 0.009 | 53.763 | 44.872 | 2520 | 1012 |
| 2013 | 114.853 | 154.914 | 48.564 | | | | | 0.021 | 0.01 | 57.425 | 48.564 | 2380 | 1521 |
| 2014 | 121.594 | 117.93 | 40.437 | | | | | 0.023 | 0.011 | 49.235 | 40.437 | 2807 | 1326 |
| 2015 | 138.92 | 156.4 | 44.074 | | | | | 0.026 | 0.012 | 52.959 | 44.074 | 3569 | 1822 |
| 2016 | 161.371 | 200.973 | 46.575 | 4167746000 | 4807776000 | 3527716000 | 7.2 | 0.025 | 0.013 | 55.465 | 46.575 | 4091 | 2531 |
| 2017 | 143.502 | 200.6 | 49.457 | 3372539114 | 4025129114 | 2719949114 | 8.4 | 0.024 | 0.012 | 58.297 | 49.457 | 3412 | 2387 |
| 2018 | 83.463 | 152.342 | 56.096 | 3787768868 | 4403748868 | 3171788868 | 5.0 | 0.025 | 0.011 | 64.605 | 56.096 | 2125 | 1627 |
| 2019 | | | | 4113421560 | 4786151560 | 3440691560 | | | | | | | |

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

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