



# Size Composition in Fish Communities

MSFD Descriptor: 4 - Marine food webs

MSFD Criterion: 4.2 - Proportion of selected species at the top of food webs



**Key Message** Typical Length measures the size-structure of fish and elasmobranch communities and it decreases under high fishing pressure. Although low compared to the 1980s, Typical Length for the assessed demersal fish has been recovering across the OSPAR Maritime Area since 2010. Pelagic fish generally show fluctuations but no trend. Locally, there are deviations from these patterns

## Background

OSPAR's strategic objective with respect to biodiversity and ecosystems is to halt and prevent further loss in biodiversity, protect and conserve ecosystems and to restore, where practicable, ecosystems, which have been adversely impacted by human activities.

The Typical Length indicator is one of three food-web indicators currently used by OSPAR. It represents the average length of fish (bony fish and elasmobranchs) and provides information on the size composition within communities of fish. The indicator is calculated using catch data from species sampled by scientific surveys and given in units of centimetres.

Communities are represented by habitat-based feeding assemblages (groups of fish): namely, demersal assemblages (i.e.

species living on or near the sea floor) and pelagic assemblages (i.e. species living in the water column).

Fishing mortality constrains the age structure of fish populations, reducing the proportion of larger individuals (**Figure 1**). A gradual, steady decline in Typical Length is expected in response to high fishing pressure. This is because the size structure of the fish assemblage integrates the impacts of fishing pressure over long periods of time. Model simulations demonstrate that in food webs where predator-prey interactions dominate over other interactions, large species at high trophic levels (the position of the species within the food web) are highly sensitive to loss of diversity at lower trophic levels.



Figure 1: A large-bodied Atlantic Wolffish ©Jim Ellis

## Results

The results of this assessment (**Figure 2**) apply at the community level and do not identify particular species.

### Greater North Sea

The assessed demersal fish assemblage is recovering at the scale of the Greater North Sea as a whole due to recent increases in typical length indicator in some sub-divisions: Orkney / Shetland, Kattegat / Skagerrak and the United Kingdom coast in the English Channel. However, the current level is low relative to observed size structure in the early 1980s. Areas of concern, with long-term declines to lowest observed levels remain in the south-eastern and central-western North Sea. The pelagic fish assemblage generally shows fluctuations without trend, with the exception of a long-term decrease to a minimum level in the south-eastern North Sea.

### Celtic Seas

Although the surveys showed mixed signals within the Celtic Seas for the typical length of the demersal fish assemblage, surveys in the north suggest some recovery from previous low states with increases to the west of Scotland. However, decreases are also apparent for shelf edge waters to the west. Elsewhere the picture is similarly mixed with decreases near the Irish coast of the Irish Sea and in the Clyde area, but increases to the south of Ireland, Isle of Man, Sea of the Hebrides, and The Minch. The pelagic fish assemblage generally shows no long-term change at the sub-regional level. However, increases are seen to the south of Ireland and decreases in some northerly areas including the Sea of the Hebrides and in coastal areas in the Irish Sea and to the west of Ireland.

## Results cont...

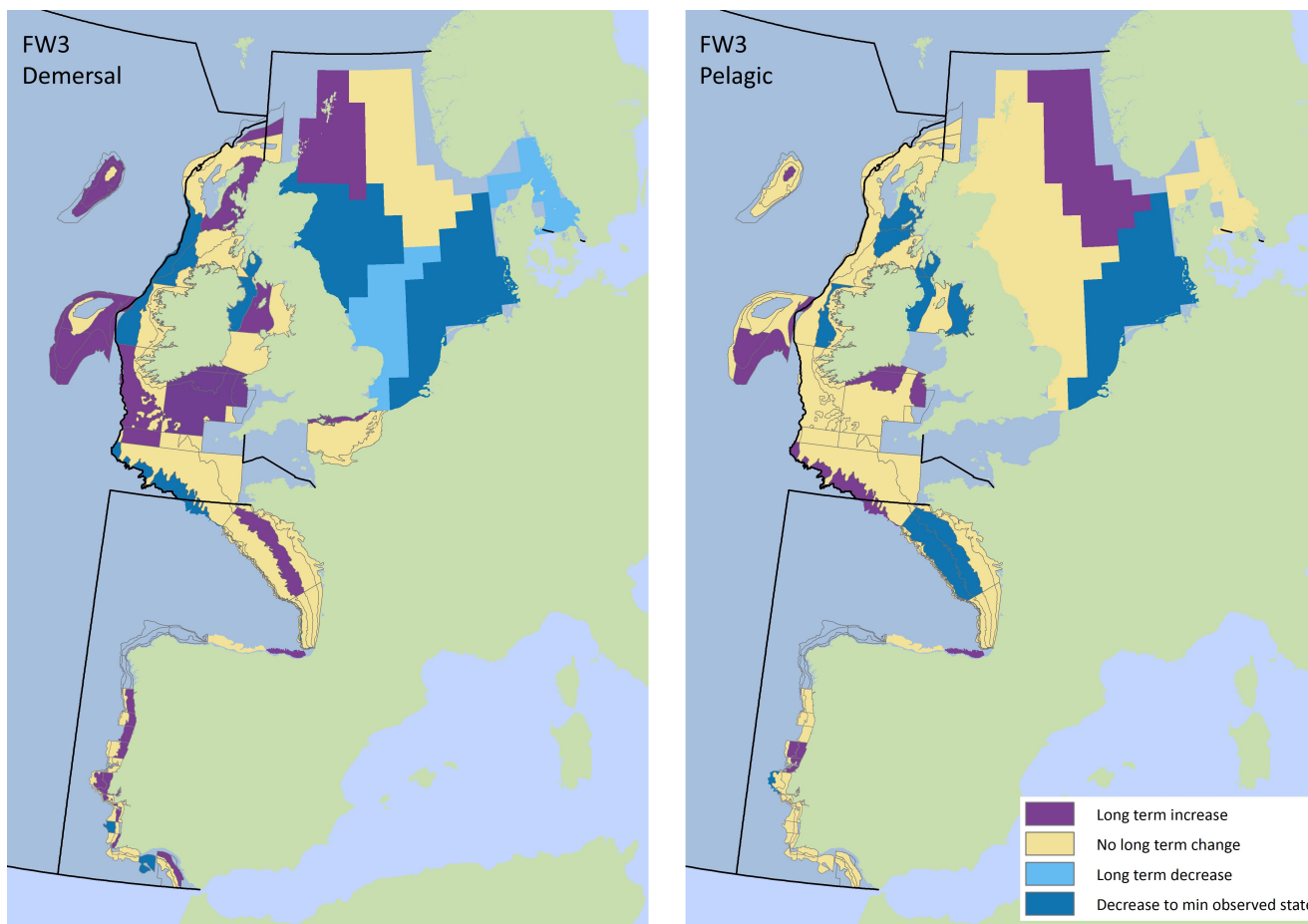
### Bay of Biscay and Iberian Coast

The typical length of the demersal fish assemblage has increased in this region due to long-term increases in northerly sub-divisions in shelf waters to the west of France and in the coastal area of the Sea of Cadiz. Many sub-divisions to the west of Portugal have also shown increases, in contrast to decreases in some areas to the south. The pelagic fish assemblage generally showed no long-term change. However, decreases to a low state relative to previously observed size structure were identified in northerly sub-divisions in shelf waters to the west of France.

### Wider Atlantic

The typical length of the demersal fish assemblage has increased at the Porcupine Bank and the Rockall Bank. While fluctuations without long-term change in size structure have been shown in the pelagic fish assemblages, in the recent period (last six years) a linear increase has been shown for the Porcupine Bank.

There is moderate / low confidence in the method for this assessment and high confidence for data availability.



## Conclusion

Long-term decreases in Typical Length, between the 1980s and 2000s in the Greater North Sea and from the 1990s to 2005 in the Celtic Seas, imply that the size structure of fish communities deteriorated such that communities are now more dominated by small-bodied fish. In the Wider Atlantic and Bay of Biscay and Iberian Coast, an overall increase has been observed since 2010.

However, while the indicator in demersal fish assemblages is often still at a relatively low value, recovery since 2010 appears to be underway in the Typical Length of demersal fish and elasmobranchs in the Greater North Sea and Celtic Seas, overall or at least in some sub-divisions. The pelagic fish assemblage shows no long-term change in much of the OSPAR Maritime Area.

## Knowledge Gaps

Further work is required to evaluate appropriate baselines and assessment values for this indicator. This is necessary because any historical baseline for the fish and elasmobranch community is likely to represent an impacted state. Assessment values should preferably be identified through multi-species modelling.

Figure 2: Spatial pattern of Typical Length indicator and time series for key surveys. Typical Length for fish and elasmobranchs is separated into demersal assemblages (left) and pelagic assemblages (right) for sub-divisions for key surveys, where data are available. The duration of the period for which long-term change is defined is dependent on the survey data available, all time periods considered are over ten years long

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The full assessment can be found at [www.ospar.org/assessments](http://www.ospar.org/assessments)