



# Pilot Assessment of Mean Maximum Length of Fish



MSFD Descriptor: 1 - Biological diversity  
MSFD Criterion: 1.7 - Ecosystem structure

**Key Message** This pilot assessment measures the change in species composition as determined by the mean maximum length of each species, which is assumed to represent their vulnerability to additional (often fishing-related) mortality. There is no consistent pattern across the assessed regions but there are often distinct changes over time within regions

## Background

Fishing mortality constrains the age structure of fish communities, reducing the proportion of larger / older individuals. Fishing is also size-selective, preferentially removing larger / older fish, and therefore affects fish community size composition. For the Intermediate Assessment 2017, three assessments relating to fish size have been developed to assess impacts of fishing on fish communities and the food web, considering parameters showing different responses in the ecosystem.

Maximum length (**Figure 1**) is one of the life-history characteristics that determine species vulnerability to additional mortality. This life-history characteristic is chosen because the assumption is that species known to grow to a large maximum length, also reproduce late and so are exposed for longer to pressures affecting the fish community compared to other fish species. Because they are exposed for longer such species are expected to be the first to decline if this pressure is high. This parameter was selected to represent vulnerability, as it is based on data that are widely available.

A decline in mean maximum length indicates that the abundance of the most vulnerable fish and elasmobranch species is decreasing, with a subsequent loss in species diversity. The indicator is calculated using catch data from scientific surveys. These are standardised monitoring programmes that occur each year in the same period taking representative samples according to specific guidelines. Different components of the fish community are distinguished based on their feeding behaviour using habitat-based trophic guilds: namely,

demersal communities (species living near the seafloor) and pelagic communities (species living only in the water column).



Figure 1: Maximum length based on the von Bertalanffy growth curve

## Results

### Greater North Sea

Within the Greater North Sea region there are some distinct differences between the sub-divisions, with mean maximum length declining in the southern and central sub-divisions and increasing in the northerly sub-divisions. This applies to demersal fish assemblages (**Figure 2**) and pelagic fish assemblages (**Figure 3**). Only in the Kattegat and Skagerrak is there a mixed signal from the indicator, with demersal fish still at a low level but showing the first signs of recovery, while pelagic fish show no change over time. In contrast to the declining trends in the southern Greater North Sea the mean maximum length of demersal fish assemblages in the English Channel appear to be increasing.

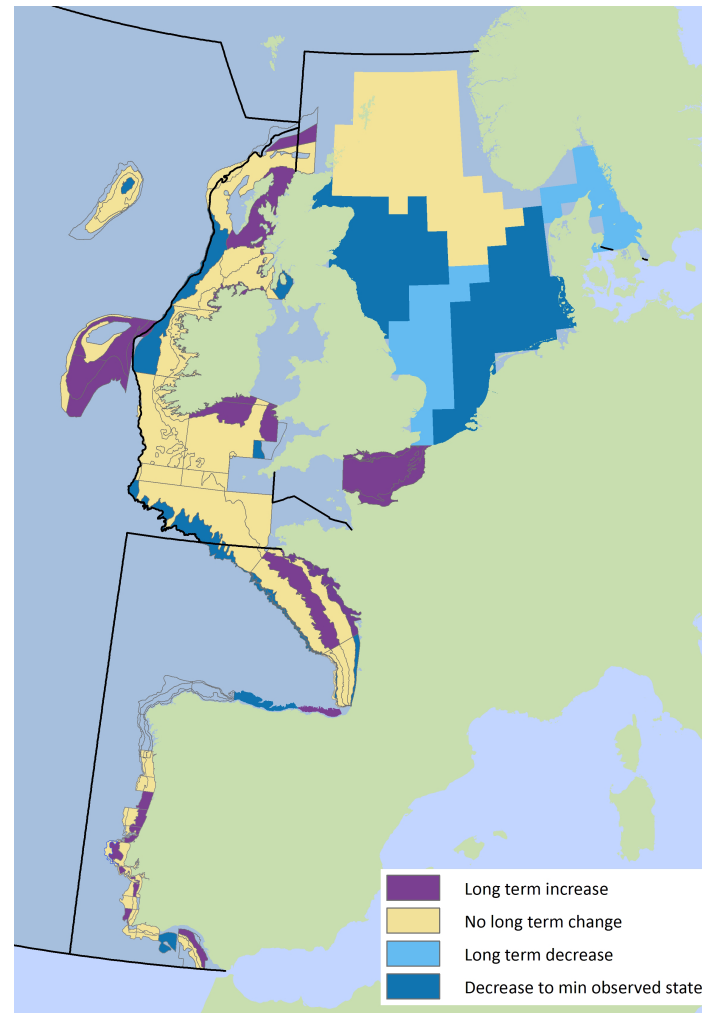


Figure 2: Spatial patterns in mean maximum length per sub-division for demersal fish assemblages

## Results cont...

### Celtic Seas

Within the Celtic Seas region there are some distinct differences for mean maximum length between the sub-divisions with a mixed picture for demersal and pelagic fish assemblages. Demersal mean maximum length decreases along the shelf edge waters to the west, 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 (**Figure 2**). For the pelagic fish community there are some more distinct sub-regional patterns with increases in the Irish Sea offshore, extending into the Celtic Sea but decreases in some northerly areas including the Sea of the Hebrides and west of Ireland (**Figure 3**).

### Bay of Biscay and Iberian Coast

Within the Bay of Biscay and Iberian Coast region, there are some sub-divisional differences but no clear patterns. Decreases are observed for demersal fish assemblages in several sub-divisions along the shelf-edge in the Bay of Biscay as well as in the Sea of Cadiz (**Figure 2**). For demersal fish assemblages the main increases occur in the northern part of the Bay of Biscay closer to the shore and along the Portuguese coast. Few major sub-divisional changes over time are observed for pelagic fish (**Figure 3**).

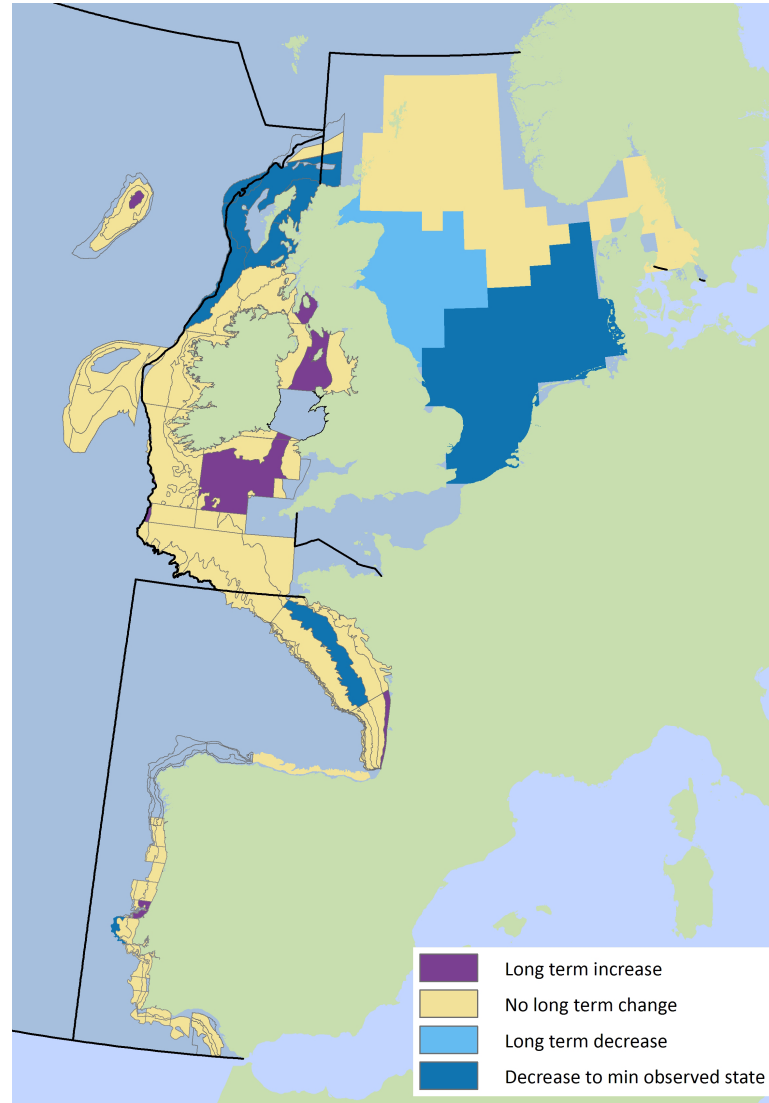


Figure 3: Spatial patterns in mean maximum length per sub-division for pelagic fish assemblages

## Conclusion

The pilot indicator shows no consistent pattern in mean maximum length across regions but there are often distinct changes over time within each region. For example, in the Greater North Sea there is an overall decline in mean maximum length for both demersal and pelagic fish assemblages, which implies that the proportion of vulnerable species (i.e. large or slow-growing species with late maturity), is declining. However, in the English Channel demersal fish assemblages appear to be recovering. In the Celtic Seas, there is no overall trend but lots of variation over time, between surveys, and between sub-divisions, especially for demersal fish. In the Bay of Biscay and Iberian Coast, mean maximum length of demersal fish is clearly increasing. This is also the case for pelagic fish, except in the northerly part of the Bay of Biscay.

The observed patterns in mean maximum length suggest that fishing has impacted the fish community such that vulnerable species have declined, although it also appears that the recent reduction in fishing mortality has resulted in a recovery of the fish community, albeit often locally.

The results from this pilot assessment can help to strengthen OSPAR's fish community assessments in the future.

## Knowledge Gaps

The main causes for the observed spatial and temporal patterns in the mean maximum length indicator are not yet known.

Reference levels representing a pristine or sustainably exploited state and that would allow a formal assessment, are not yet available.

This document was published as part of OSPAR's Intermediate Assessment 2017.

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