OSPAR COMMISSION

Recovery of Sensitive Fish Species

Common Indicator Assessment

OSPAR

QUALITY STATUS REPORT 2023

2022

OSPAR's Quality Status Report 2023

Recovery of Sensitive Fish Species

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Convention OSPAR

La Convention pour la protection du milieu marin de l´Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d´Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. Les Parties contractantes sont l´Allemagne, la Belgique, le Danemark, l´Espagne, la Finlande, la France, l´Irlande, l´Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume- Uni de Grande Bretagne et d´Irlande du Nord, la Suède, la Suisse et l´Union européenne

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Key Message

56 (49%) of 114 regional populations that could support assessment achieved their long-term threshold for "Recovering" and 93 populations (82% of assessed populations) met the secondary threshold "No Further Decline". 18% (21 populations) did not achieve either threshold, of which 10 populations also showed signs of recent decline. Too few data were available to assess an additional 87 populations.

Background (brief)

OSPAR's strategic objective with respect to biodiversity and ecosystems is to protect and conserve marine biodiversity, ecosystems and their services to achieve good status of species and habitats, and thereby maintain and strengthen ecosystem resilience (strategic objective 5).

This common indicator presents species-level outcomes for fish in the Quality Status Report 2023. In addition, fish communities are assessed in foodweb common indicator assessments. This species-level indicator addresses the extent of recovery among populations of fish deemed sensitive to additional mortality from fishing. Fish species with life history traits such as large ultimate body size, slow growth rate, large length and late-age-at-maturity, are particularly sensitive to additional sources of mortality including through by-catch (Greenstreet et al., 2012; Rindorf et al., 2020). Populations of such species are known to have declined markedly in abundance through the 20th century (e.g., Bluemel et al., 2021; Sguotti et al., 2016), a period of marked expansion in fishing activity across the area assessed. Recovery in population status among a significant fraction of surveys that assess each species is therefore needed.

The assessment methodology has been updated since the Intermediate Assessment 2017 (IA2017) to ensure rare and data-poor sensitive species can be included in the indicator assessment.

Background (extended)

Life-history theory explains the evolution of species' life-history traits under different mortality scenarios. Stable environments, with low disturbance mortality, support communities characterised by 'K-type' life-history traits (large body size, slow growth rate, late age and larger size at maturation, lower fecundity, etc.) while communities in regions of higher disturbance are more dominated by species with generally opposite 'r-type' traits (MacArthur and Wilson, 1967; May, 1976; Stearns, 1977, 1992; Roff, 1993; Huston, 1994; Reznick et al., 2002). Life-history theory predicts that heavily exploited fish communities (high disturbance mortality) should have fewer K-type and more r-type species. Elasmobranch species are generally characterised by K-type traits and many elasmobranch populations declined markedly during the 20th century (Frisk et al., 2001; Greenstreet and Hall, 1996; Walker and Hislop, 1998; Greenstreet et al., 1999a; Greenstreet and Rogers, 2000; van Strien et al., 2009). Teleost species with similar K-type life histories also declined (Philippart, 1998; Rijnsdorp et al., 1996). By the 1960s, average life-history trait composition among the demersal fish assemblage had become more r-type orientated (Jennings et al., 1999a; Greenstreet and Rogers, 2000, 2006; Greenstreet et al., 2012a), and in closely related pairs of species, the species with the more K-type life-history traits showed the greatest population decline at a time when fishing activity was high (Jennings et al., 1998). A species' life-history trait composition provides an indication of its capacity to cope with additional mortality, and so determines its sensitivity to human activities that raise mortality rates above natural ambient levels. Species with K-type life-history traits are particularly sensitive to the additional mortality associated with fishing (Jennings et al., 1998; Gislason et al., 2008; Hobday et al., 2011; Le Quesne and Jennings, 2012). However, other pressures, such as climate change can also impact on populations of sensitive species (e.g., Bluemel et al., 2021).

Fishing activity is widespread across the assessment area and has been intense for a century or more (e.g. Rijnsdorp et al., 1996; Jennings et al., 1999b; Greenstreet et al., 1999b, 2009, 2011; Piet and Jennings, 2005; Shephard et al., 2011; Modica et al., 2014). As populations of fish species with K-type life-history traits across the region are likely to be in a depleted state, achieving acceptable status for these sensitive species will require population recovery. However, some species may be unable to sustain any level of fishing mortality,

which means population recovery may not be possible for all sensitive species if any sort of sustainable fishing industry is to be maintained (Le Quesne and Jennings, 2012).

To support the assessment of the status of fish communities within OSPAR and additionally for the European Union Marine Strategy Framework Directive (MSFD), the workshop on the production of abundance estimates for sensitive species (WKABSENS) (ICES, 2021b) developed an assessment procedure based on a simple binomial test for temporal change in occurrence, derived from presence-absence data of species sampled by groundfish surveys operating across the geographic area to be assessed. A significant increase in occurrence of a sensitive species between assessment periods is considered an indication that the assessment thresholds have been achieved and the population is recovering in the area sampled by a survey. For species that are not considered unknown, a lack of any significant decline in occurrence between assessment periods can be considered commensurate to halting further population decline. An additional binomial test was then used to determine whether a population was recovering among a significant fraction of the surveys available within each OSPAR Region or, for deep-sea species, across the whole OSPAR Maritime Area.

Assessment Method

Indicator metric and data collection

Approach for sensitive species

This assessment method (CEMP Guideline) has been updated since the IA2017 and is now calculated using records of occurrences (presences and absences) of species in catch data from standardized scientific groundfish surveys in order to capture changes in particularly rare species that were previously not assessed for data quality reasons. These species are commonly not well-sampled by the fishing gears employed (beam and otter trawls) due to low catchability and/or seasonal effect of survey timing. Therefore, the IA2017 methodology for this indicator and other assessment methods based on abundance estimates are not considered appropriate to detect temporal trends in data-poor species.

The 25 surveys used to provide data for the indicator, are long-term monitoring programmes that occur each year in the same period taking representative samples according to specific guidelines, but the temporal extent and spatial coverage of surveys vary (CEMP Guideline). No single survey covers the entire OSPAR Maritime Area and no single survey is best suited to catch all species. Therefore, multiple surveys are considered and assessed separately, and their assessment outcomes are integrated to provide a regional population status where appropriate. For surveys that were used in the IA2017, the assessment units have remained the same or are broadly similar.

A total of 102 unique taxonomic groups, divided by OSPAR Region, were identified as sensitive (ICES, 2021a,b; Rindorf et al., 2020; Greenstreet et al., 2012b) and included on the list to be addressed by this common indicator (CEMP Guideline). Species populations are assessed within Greater North Sea (OSPAR Region II) and Celtic Seas (Region III), as was done for the IA2017, with the addition of Bay of Biscay and the Iberian Coast (Region IV) and Wider Atlantic (Region V), where data are available. Although deep-sea species should ideally be assessed across all surveys and regions combined, deep-sea species assessments are made for the Porcupine Bank in the Wider Atlantic Region only, since the survey WASpaOT3 is the only one that consistently samples deep-water (> 500 m). For species where International Council for the Exploration of the Sea (ICES) or International Commission for the Conservation of Atlantic Tunas (ICCAT) quantitative assessments are conducted in all, or part of their distribution these assessments are considered more robust for identifying temporal trends in population abundance and, therefore, populations are not reassessed by this common indicator.

The change in the probability of occurrence is assessed through a binomial test (CEMP Guideline). Long-term and short-term assessments of change are made contrasting the mean occurrence in the last six years of the available survey data i.e., the “assessment period” against previous “reference periods” (CEMP Guideline). For the short-term assessment the reference period is created from the six years previous to the assessment period and for the long-term reference period all years before the assessment period are used. This approach was introduced by ICES Working Group on Abundance of Sensitive Species (WKABSENS; ICES, 2021b).

Thresholds (Recovering and No Further Decline)

By virtue of their sensitivity to additional human-related mortality, the population abundance and occurrences of each sensitive species sampled by each survey is assumed to have declined as a result of past human activities. There is good evidence that fishing mortality has indeed caused declines in the populations of sensitive species. Thus, long-term assessments related to population recovery constituted the primary basis for the assessment for a species within a survey area.

The assessment thresholds are the same as those considered for the IA2017. However, the thresholds per species are now assessed based on statistically significant change in occurrence rather than a percentile of abundance.

The primary threshold of the assessments is that sensitive species should be recovering over the long term (i.e., the threshold is achieved when demonstrating a statistically significant increase in occurrence).

A secondary assessment is also performed to address an alternative question of whether further decline in the occurrence of sensitive species has been halted (i.e., the threshold is achieved when a species is either stable (no significant increase or decrease) or recovering in the long term and must not be unknown).

Each species is assessed separately for each survey and both the primary and the secondary threshold is considered when data allows. Species are classified as "not assessed" if no data exists in the available surveys but the species is known to be present in the area. If fewer than five records are reported then the assessment outcome is classified as "unknown" (CEMP Guideline).

Each survey assessed has a differing start year, meaning that assessments of long-term change are not necessarily directly comparable between surveys or regions (CEMP Guideline). A temporally coherent measure of change that is comparable across the whole of the OSPAR Maritime Area is captured by the assessment of short-term change, which can highlight where signs of recovery or ongoing depletion are evident.

Spatial integration within species

The results from multiple surveys per species were integrated across each OSPAR Region, which constitutes the assessment units for the indicator, to identify the final result per species per Region. Deep-sea species assessments are made for the Porcupine Bank in the Wider Atlantic only based on one survey, therefore, no integration is undertaken for these species. To integrate outcomes a probabilistic "binomial integration" method is utilised, in which each survey is considered an equal indicator of change in the species population (CEMP Guideline).

An additional outcome, "mixed" was defined for the few instances of regional integration of surveys where there was significant evidence for both increases and decreases. This outcome was considered neither evidence for a "recovering" population or a "declining" population. Similarly, "mixed" differs from "stable" since stable results from neither a significant increase or decrease overall as opposed to evidence for both outcomes. When the "mixed" outcome from the integration is considered against the assessment threshold (see section: Thresholds (Recovering and No Further Decline), it results in "not achieved" for both "recovering" and "no longer declining".

Results (brief)

Many (56), but not all, populations of assessed species (total 114) have achieved the primary threshold and are recovering in the long term (**Figure 1**) and the majority of the assessed populations (93) have achieved the secondary threshold and are no longer declining (either stable or recovering in the long term). Nevertheless, 21 populations of species assessed have failed to achieve either assessment objective and were found to be declining (or with mixed outcome whereby both increases and decreases were detected) in the long term (**Figure 1** and **Table 1** and **Table 2**). Additionally, there are still 87 populations of sensitive species with either unknown assessment outcomes (data-poor) or were not assessed at all (no data available).

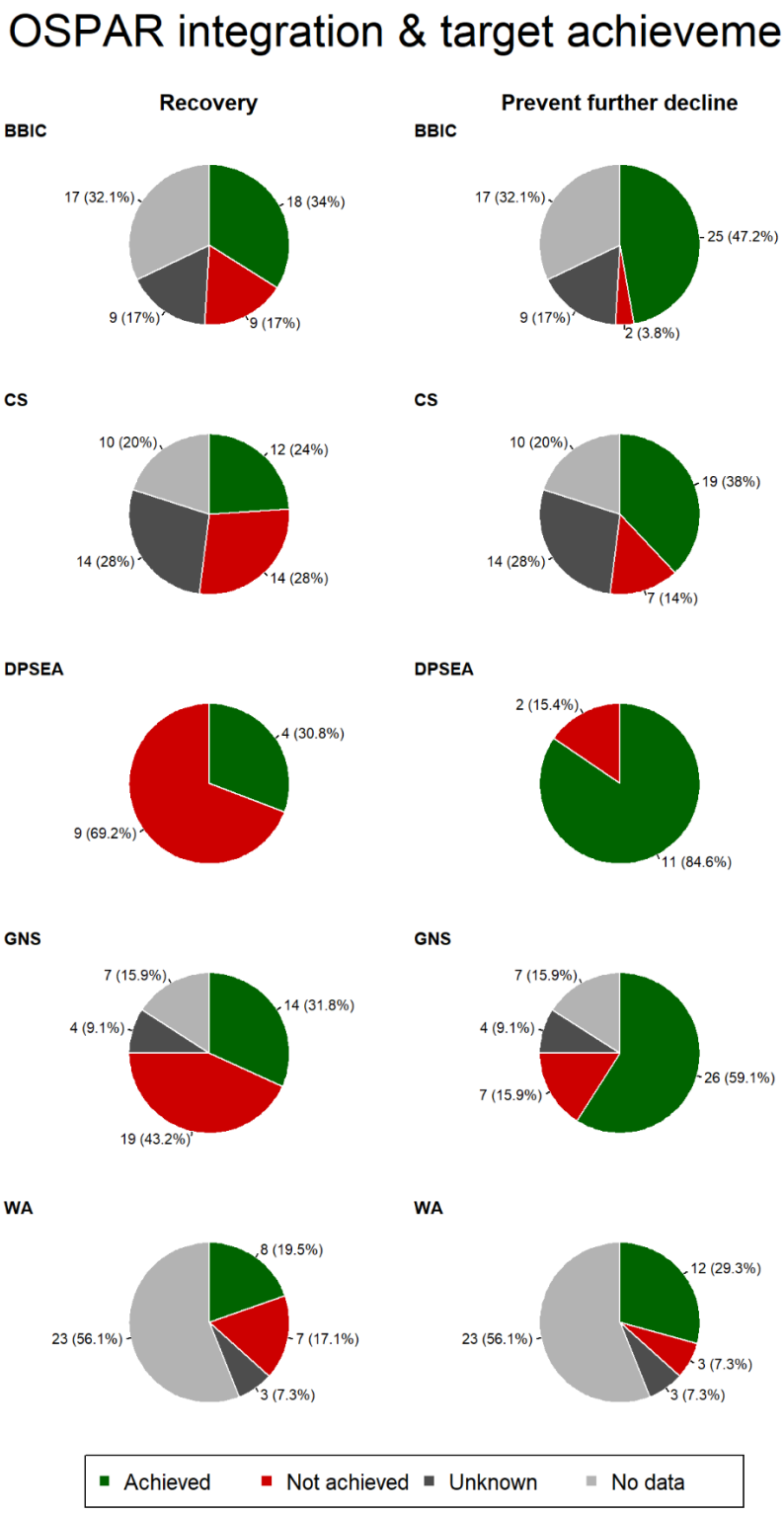


Figure 1: Summary of integrated assessment outcomes (achieved or not achieved) for two assessment objectives: (left) species populations are recovering in the long term and (right) species populations are no longer declining (either stable or recovering in the long term), by OSPAR Region (BBIC = Bay of Biscay and Iberian Coast, CS = Celtic Seas, WA = Wider Atlantic, GNS = Greater North Sea). Results for deep-sea species (DPSEA) are based on the single deep-sea survey on the Porcupine Bank in the Wider Atlantic only (WASpaOT3). Unknown result = species with insufficient data to assess against thresholds. No data = species present within a Region, but no data is available.

Ten species achieved the primary objective of recovering in both the long-term and short-term assessments in multiple regions (**Table 1, Table 2, Table 3** and **Table 4**): *Conger conger* (Region II, III and IV), *Helicolenus dactylopterus* (Regions II, III, IV and V), *Leucoraja circularis* (Region IV and V), *Lophius budegassa* (Region II

and III), *Mustelus* spp (Region II, III and IV), *Phycis blennoides* (Region IV and V), *Raja brachyura* (Region II and III), *Raja clavata* (Region II, III and IV), *Raja montagui* (Region II, III and IV), *Scyliorhinus canicular* (Region II, III and IV).

Additionally, populations were recovering in both short-term and long-term in the following regions: *Lophius piscatorius* and *Raja undulata* in Region II; *Dipturus* spp and *Galeorhinus galeus* in Region III; *Scyliorhinus stellaris* in Region III; *Alosa* spp., *Dipturus oxyrinchus*, *Sparus aurata* and *Torpedo marmorata* in Region IV; *Leucoraja fullonica* and *Molva macrophthalma* in Region V. Furthermore, four deep-sea species were recovering in both the long term and short term, namely: *Dipturus nidarosiensis,* Galeus spp., *Scymnodon ringens* and *Synaphobranchus kaupii* (**Table1, Table 2, Table 3** and **Table 4**). A population of a species is within a defined area (based on the surveyed area), when the assessment refers to a species it means over multiple populations or the whole OSPAR Maritime Area.

Ten populations (of 9 species) that have failed to achieve either of the long-term assessment thresholds are also showing signs of recent population decline (**Table 1, Table 2, Table 3** and **Table 4**): *Amblyraja radiata* (Region II), *Anarhichas lupus* (Region V), *Brama brama* (Region V), *Conger conger* (Region V), *Cyclopterus lumpus* (Region II and III), *Molva molva* (Region IV), *Molva macrophthalma* (Region III), and *Pollachius pollachius* (Region II) and the deep-sea species, *Mora moro,* in the Porcupine Bank (Region V). Of these, it is notable that *Cyclopterus lumpus* is declining in more than one Region.

For this assessment the confidence in the improved methodology is moderate and the confidence in the data is high.

Table 1: Species assessment results (achieved or not achieved) for two assessment objectives: (left) species are recovering in the long-term and (right) species are no longer declining (either stable or recovering in the long-term), by OSPAR Region (BBIC = Bay of Biscay and Iberian Coast, CS = Celtic Seas, WA = Wider Atlantic, GNS = Greater North Sea). Results for deep-sea species (DPSEA) are based on the single deep-sea survey on the Porcupine Bank in the Wider Atlantic only (WASpaOT3). Unknown result = species with insufficient data to assess against thresholds. No data = species considered present within a Region, but no data is available.

Table 2: Regionally integrated assessment results for each species (BBIC = Bay of Biscay and Iberian Coast, CS = Celtic Seas, WA = Wider Atlantic, GNS = Greater North Sea). Results for deep-sea species (DPSEA) are based on the single deep-sea survey on the Porcupine Bank in the Wider Atlantic (WASpaOT3). The outcomes are assessed for the long-term reference period to determine whether the indicator objectives are met (left) and short-term reference period (right) to highlight where signs of recent recovery or ongoing depletion are evident. Unknown result = species with insufficient data to assess against thresholds. No data = species considered present within a Region, but no data is available. Note that the long-term reference period differs by survey.

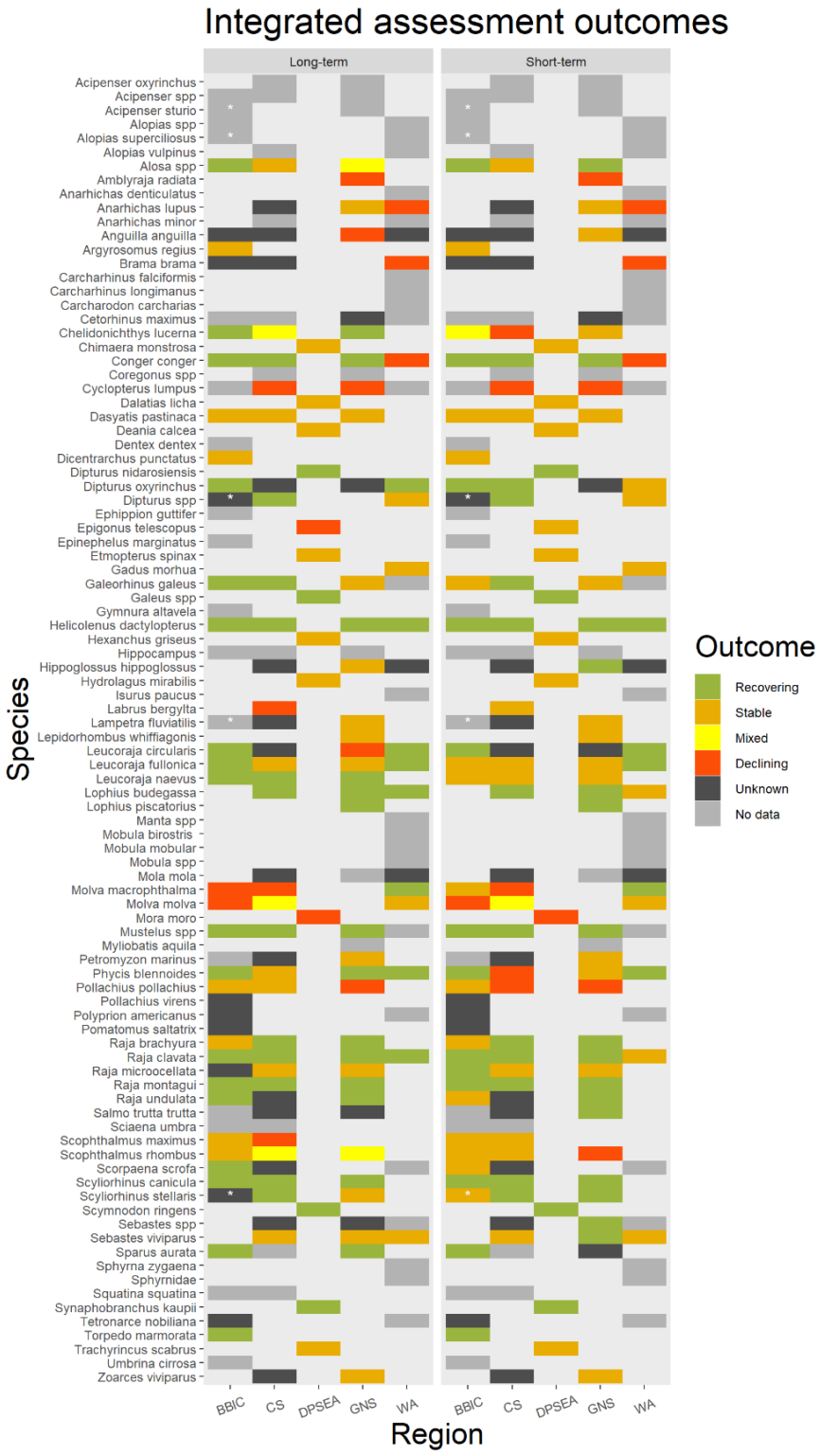


Table 3: Long-term species assessment results for each survey by OSPAR Region (BBIC = Bay of Biscay and Iberian Coast, CS = Celtic Seas, WA = Wider Atlantic, GNS = Greater North Sea). Results for deep-sea species (DPSEA) are based on the deep-sea survey on the Porcupine Bank in the Wider Atlantic (WASpaOT3). Unknown result = species with insufficient data to assess against thresholds. No data = species considered present within a Region, but no data is available. Note that the long-term reference period differs by survey.

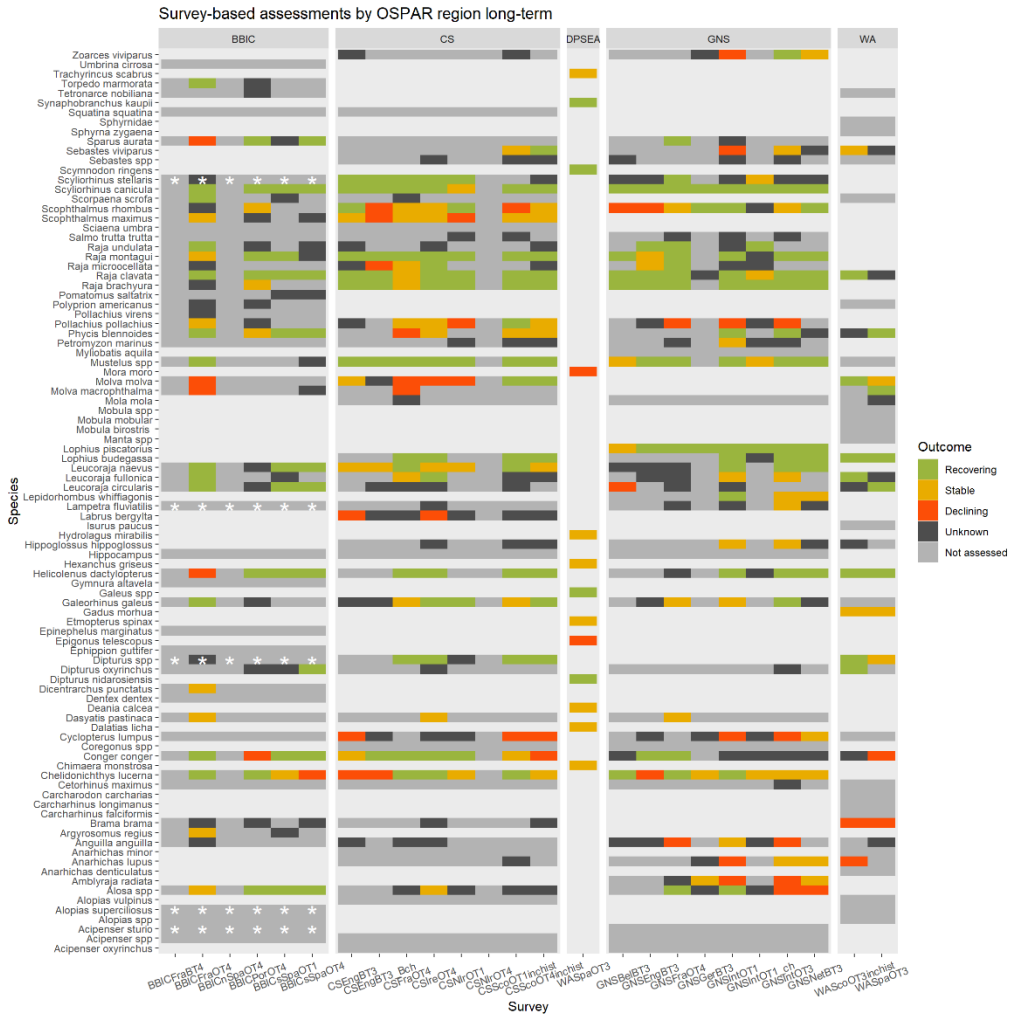
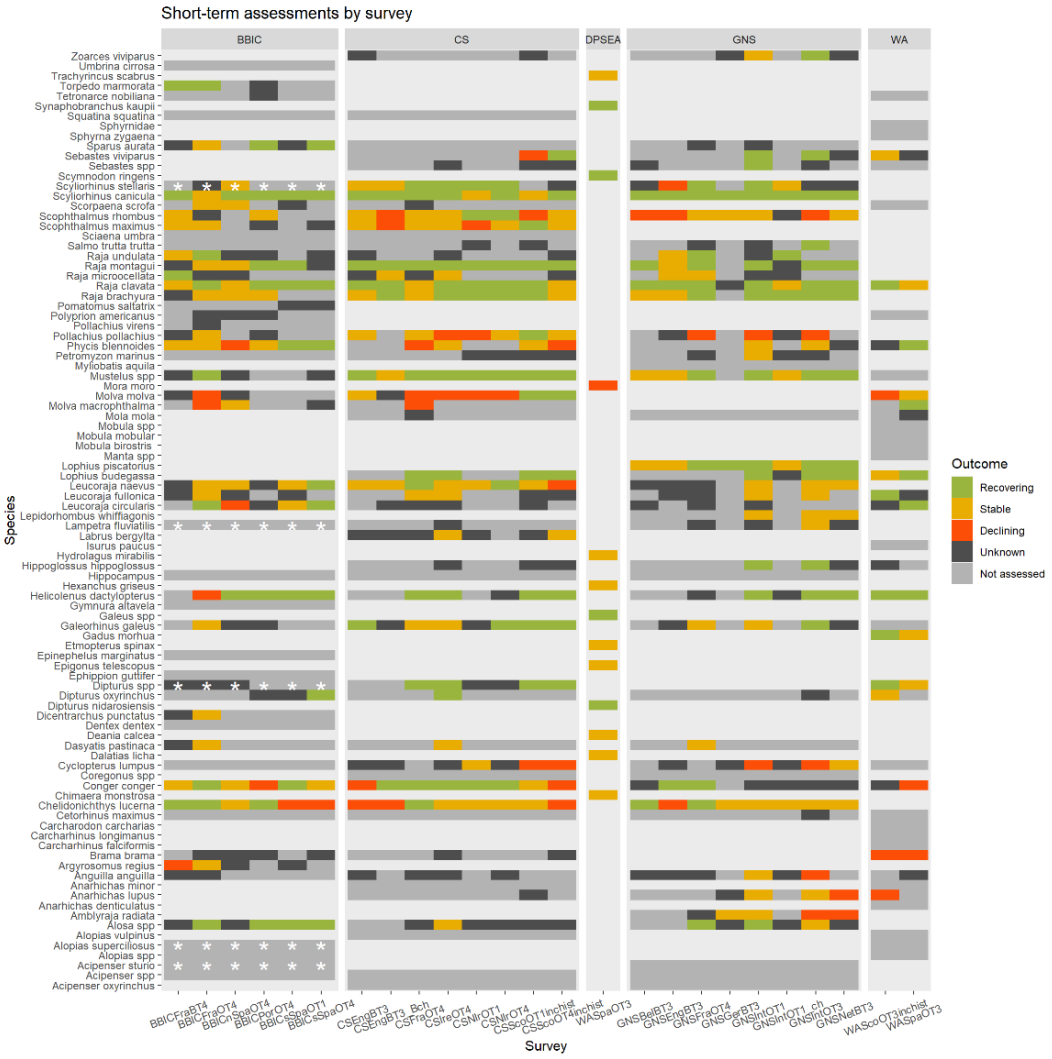


Table 4: Short-term results are temporally coherent across surveys and can highlight where signs of recent recovery or ongoing depletion are evident. Short-term species assessment results for each survey by OSPAR region (BBIC = Bay of Biscay and Iberian Coast, CS = Celtic Seas, WA = Wider Atlantic, GNS = Greater North Sea). Results for deep-sea species (DPSEA) are based on the deep-sea survey on the Porcupine Bank in the Wider Atlantic (WASpaOT3).



Individual species maps available at: https://odims.ospar.org/en/search/?datastream=recovery-of-sensitive-fish-species

Results (extended)

Results for the assessment of populations of each species are presented for each survey and regionally using the binomial integration method (see **Figure 1** for a regional summary, **Table 1** and **Table 2** for detailed integration results by species and **Table 3** and **Table 4** for individual survey results). Only a single survey was available for this assessment that operates at depths appropriate to assess deep-sea species, thus, results for deep-sea species reflect the outcomes of this survey in the Wider Atlantic (WASpaOT3) only.

Greater North Sea (Region II)

Declining species – primary and secondary thresholds not achieved

For the Region overall, *Amblyraja radiata*, *Cyclopterus lumpus* and *Pollachius pollachius* have not achieved the long-term or short-term assessment thresholds and are declining significantly in occurrence (**Table 1, Table 2, Table 3** and **Table 4**). A mixed outcome in the long term was found for *Scophthalmus rhombus* due to increases and decreases in some surveys, but in the short-term the species was found to be declining overall. Additional species not achieving the long-term assessment threshold (**Table1, Table 2, Table 3** and **Table 4**) were: *Leucoraja circularis*, with unknown change in the short-term, *Alosa* spp. showing signs of

recovery in the short term and the *Anguilla anguilla* population that has stabilised at low levels in the short term.

Recovering species – primary threshold achieved

For the Region overall, the primary assessment objective that species are recovering was achieved in both the long term and short term for: *Conger conger, Helicolenus dactylopterus*, *Lophius budegassa*, and *Lophius piscatorius, Mustelus* spp., *Raja brachyura*, *Raja clavata*, *Raja montagui*, *Raja undulata*, *Scyliorhinus canicula* (**Table 1, Table 2, Table 3** and **Table 4**).

Additional species achieving the primary long-term objective but stabilising in the short term (no further decline) include: *Chelidonichthys lucerna, Leucoraja naevus*, *Phycis blennoides* (**Table 1, Table 2, Table 3** and **Table 4**). A recovery in the long-term but unknown change in the short term was evident for *Spratus aurata*.

Recent signs of population decline

No further declines were found in the short term.

Recent signs of recovery

Signs of recent recovery (**Table 2** and **Table 4**) were found for: *Alosa* spp., *Hippoglossus hippoglossus*, *Salmo trutta trutta*, *Scyliorhinus stellaris*, *Sebastes viviparus*, and *Sebastes* spp. but these species did not achieve the primary assessment objective (no evidence for long-term recovery, **Table 1** and **Table 2**).

Celtic Seas (Region III)

Declining species – primary and secondary thresholds not achieved

For the Region overall, *Cyclopterus lumpus, Chelidonichthys lucerne, Molva molva* and *Molva macrophthalma* have not achieved the long-term assessment thresholds. Of these *Cyclopterus lumpus* and *Molva macrophthalma* have declined significantly in occurrence in the long term with ongoing population declines recently (short term) (**Table1, Table 2, Table 3** and **Table 4**). The outcome for *Chelidonichthys lucerne* is mixed in the long term and for *Molva molva* outcomes are mixed in both the long and short term suggesting that a mixture of increases and decreases are taking place across the surveys.

Additional species not achieving the long-term assessment thresholds but that had stabilised in the short term were: *Labrus bergylta*, *Scophthalmus maximus* and *Scophthalmus rhombus* (**Table 1, Table 2, Table 3** and **Table 4**).

Recovering species – primary threshold achieved

For the Region overall, the primary assessment thresholds that species are recovering was achieved in both the long term and short term for: *Conger conger, Dipturus* spp*., Galeorhinus galeus, Helicolenus dactylopterus, Lophius budegassa Mustelus* spp*., Raja brachyura, Raja clavata, Raja montagui, Scyliorhinus canicular* and *Scyliorhinus stellaris* (**Table 1, Table 2, Table 3** and **Table 4**). Long-term population recovery, which has stabilised in the short-term, was also evident for *Leucoraja naevus*.

Recent signs of population decline

In the short term (**Table 2** and **Table 4**), signs of population decline were found for *Pollachius pollachius* and *Phycis blennoides,* both with a stable outcome in the long-term (secondary assessment threshold of no further decline achieved, **Table 1, Table 2** and **Table 3**).

Recent signs of recovery

Recent signs of recovery (**Table 2** and **Table 4**) were observed for *Dipturus oxyrinchus* with an unknown change in the long term (**Table1, Table 2** and **Table 3**).

Bay of Biscay and Iberian Coast (Region IV)

Declining species – primary and secondary thresholds not achieved

For the Region overall, *Molva macrophthalma* and *Molva molva,* have not achieved the long-term assessment thresholds and are declining significantly in occurrence (**Table1, Table 2** and **Table 3**). There were recent signs of decline also for *Molva molva,* whereas *Molva macrophthalma* has stabilised in the short term (**Table 2** and **Table 4**).

Recovering species – primary threshold achieved

For the Region overall, the primary assessment objective that species are recovering was achieved in both the long term and short term was achieved for: *Alosa* spp., *Conger conger*, *Dipturus oxyrinchus*, *Helicolenus dactylopterus*, *Leucoraja circularis*, *Mustelus* spp, *Phycis blennoides*, *Raja clavata*, *Raja montagui*, *Scyliorhinus canicula*, *Sparus aurata and Torpedo marmorata* (**Table1, Table 2, Table 3** and **Table 4**).

Additional species achieving the primary long-term threshold and stabilising in the short term are: *Galeorhinus galeus, Leucoraja fullonica, Leucoraja naevus, Raja undulata* and *Scorpaena scrofa* (**Table 1, Table 2, Table 3** and **Table 4**). For *Chelidonichthys lucerna,* a mixed outcome, as a result of both recent decreases and increases in surveys, was found in the short term, but nevertheless the species achieved the long term threshold for recovering.

Recent signs of population decline

No additional recent declines were found in the short term.

Recent signs of recovery

Recent signs of recovery (**Table 2** and **Table 4**) were found for *Raja microocellata* (but the population is unknown in the long term (**Table 1, Table 2** and **Table 3**) since no increase was found and not enough data exists to determine whether a decline has occurred).

Wider Atlantic (Region V)

Declining species – primary and secondary thresholds not achieved

For the Region overall, *Anarhichas lupus*, *Brama brama* and *Conger conger* are declining significantly in occurrence in both the long and short-term and have not achieved the assessment threshold (**Table 1, Table 2, Table 3** and **Table 4**).

Recovering species – primary threshold achieved

For the region overall, *Helicolenus dactylopterus, Leucoraja circularis, Leucoraja fullonica, Molva macrophthalma* and *Phycis blennoides* was found to be significantly increasing in occurrence (recovering), thus achieving the primary assessment threshold in both the long term and short term (**Table1, Table 2, Table 3** and **Table 4**).

Dipturus oxyrinchus, Lophius budegassa and *Raja clavata* have also achieved the primary long-term threshold (recovering) (**Table 1, Table 2** and **Table 3**) with recent evidence for population stability in the short term (**Table 2** and **Table 4**).

Recent signs of population decline

No further evidence of recent population decline was found.

Recent signs of recovery

No further evidence of recent population recovery was found.

OSPAR Maritime Area: Deep-sea species

Declining species – primary and secondary thresholds not achieved

Mora moro and *Epigonus telescopus* were found to have declined significantly in occurrence and have not achieved the assessment thresholds (see summary **Table 1** and **Table 2** and **Table 3** for further details on which surveys showed this response). Whilst in the short-term assessment, *Mora moro* showed signs of recent population decline, the *Epigonus telescopus* population had stabilised (**Table 2** and **Table 4**).

Recovering species – primary threshold achieved

The long-term primary assessment thresholds that species are recovering (see summary **Table 1** and **Table 2** and **Table 3** for further details on which surveys showed this response) was achieved for: *Dipturus nidarosiensis*, *Galeus* spp, *Scymnodon ringens* and *Synaphobranchus kaupii*. These species also showed signs of recent population recovery (**Table 2** and **Table 4**).

Recent signs of population decline

No further declines of deep-sea species were found in the short term.

Recent signs of recovery

No further evidence of recent population recovery was found.

Other sensitive species not assessed by this indicator

Fifteen species (or fish stocks) have been assessed by ICES or ICCAT (i.e., stocks with quantitative assessments) in at least one of the OSPAR Regions assessed by this indicator. The stock assessment status provided by third-party assessment is considered more robust than the FC1 indicator (which is most suited to data-poor species) so the binomial result is not presented for these species in the Regions detailed in **Table a**. Such external (non-indicator) assessments are included in the thematic assessment of fish.

Table a: Fish species not assessed with the binomial FC1 method due to the availability of an alternative ICES or ICCAT third-party quantitative assessments in certain Regions

Species	BBIC	CS	WA	GNS
Brosme brosme	na	ICES	ICES	ICES
Coryphaenoides rupestris*	-	-	-	ICES
Dipturus* spp.	-	-	-	ICES
Gadus morhua	na	ICES	-	ICES
Hoplostethus atlanticus	ICES	ICES	ICES	na
Lamna nasus	ICCAT	ICCAT	ICCAT	ICCAT
Lepidorhombus whiffiagonis	ICES	ICES	ICES	-
Lophius budegassa	ICES	-	-	-
Lophius piscatorius	ICES	ICES	ICES	-
Merluccius merluccius	ICES	ICES	ICES	ICES
Molva dypterygia	na	ICES	ICES	ICES
Pollachius virens	-	ICES	ICES	ICES
Rostroraja alba	ICES	ICES	na	na
Scophthalmus maximus	-	-	na	ICES

Squalus acanthias	ICES	ICES	ICES	ICES

ICES / ICCAT = third-party assessment status available for species/stock in this Region

- = FC1 assessment status provided where data are available

na = species not historically present in the Region

**species not distributed across the whole BBIC OSPAR Region*

BBIC = Bay of Biscay and Iberian Coast

CS = Celtic Seas

WA = Wider Atlantic

GNS = Greater North Sea

Conclusion (brief)

Taking into account all populations of sensitive species, including those without enough data to support assessment (i.e., no data and unknown outcomes), 28% of regional population assessments achieved the recovering threshold and 46% achieved the no further decline threshold (**Figure 1**).

For sensitive fish species able to support assessment, this indicator assessment suggests an improving situation with 49% (of 114 populations) achieving the primary threshold of recovering in the long term (based on regionally integrated outcomes). A further 32% of assessable populations had a stable long-term integrated outcome, so strong evidence exists that further decline in species has been halted with 82% of assessable populations achieving the secondary assessment threshold (either recovering or stable integrated outcome), increasing to 89% when examining the recent short-term assessment period.

Nevertheless, 18% of regionally integrated outcomes for populations failed to achieve either threshold suggesting long-term population declines. Although the evidence of recent population declines falls to 11% in the short-term, one species (*Cyclopterus lumpus*) is declining in both assessment periods and across multiple Regions (BBIC and CS) and should thus be prioritised for further examination and/or protection. *Molva macrophthalma* also failed both long-term objectives in Region III and IV, but has stabilised at low levels in recent years in Region IV. Additional management action may be warranted for the following populations that failed to achieve both long-term assessment objectives, along with evidence of recent population declines in a single region (**Table1, Table 2, Table 3** and **Table 4**): *Amblyraja radiata* (Region II), *Anarhichas lupus* (Region V), *Brama brama* (Region V), *Conger conger* (Region V), *Molva molva* (Region IV), and *Pollachius pollachius* (Region II) and the deep-sea species, *Mora moro,* assessed for the Porcupine Bank (Region V).

Conclusion (extended)

Taking into account all populations of sensitive species, including those without enough data to support assessment (i.e., no data and unknown outcomes), between 24% and 34% of regional population assessments achieved the recovering threshold and between 29% and 59% achieved the no further decline threshold (**Figure 1**). Similarly of the deep-sea species 20% were recovering and 29% no longer declining.

Of those populations able to support assessment (i.e., excluding data poor species), many, but not all, achieved the primary long-term assessment objective (recovering): 67% in Bay of Biscay and Iberian Coast (18 of 27 species), 46% in Celtic Seas (12 of 26 species), 42% in Greater North Sea (14 of 33 species), 53% in Wider Atlantic (8 of 15 species) and 31% of deep-sea species in the Porcupine Bank area of the Wider Atlantic (4 of 13 species).

A large proportion of populations able to support assessment in each OSPAR Region achieved the secondary assessment threshold (no longer declining) and were found to be either stable or recovering in the long-term: 93% in Bay of Biscay and Iberian Coast (25 species), 73% in Celtic Seas (19 species), 79% of species in Greater North Sea (26 species), 80% in Wider Atlantic (12 species) and 85% of deep-sea species in the Porcupine Bank area of the Wider Atlantic (11 species).

A smaller proportion of populations were found to have not achieved either assessment threshold in each OSPAR Region and were declining in the long term: 7% in Bay of Biscay and Iberian Coast (2 species), 27% in Celtic Seas (7 species), 21% Greater North Sea (7 species), 20% in Wider Atlantic (3 species) and 15% of deep-sea species in the Porcupine Bank area of the Wider Atlantic (2 species).

Although recent declines were also evident for *Chelidonichthys lucerna* (Region III) and *Scophthalmus rhombus* (Region II), the long-term evidence for change was not consistent across surveys (outcome "mixed").

Knowledge Gaps (brief)

Key knowledge gaps for the assessment are: the availability of historic data or suitable models for ecosystem recovery to support the setting of absolute recovery targets for sensitive fish species; the effects of warming seas on the potential for population recovery among sensitive fish species.

Many populations of sensitive species were not able to support assessment within this indicator since the trawl surveys are not the most suitable way to monitor their populations. The indicator methodology is applicable to a range of data and these will be investigated in future.

Knowledge Gaps (extended)

Some species assessed here are highly migratory and seasonality is not yet accounted for. Improvements to the methodology in future will address the impact of spatial autocorrelation in the datasets and, when addressed, will allow for a refinement in the integration methodology along with issues of seasonality.

Particularly low catchability in trawl surveys of some species (e.g., basking shark) will mean that some assessments can only ever result in "unknown" outcomes. Other means to assess these species e.g., through mark-recapture studies or through citizen science observations may prove useful in future assessment.

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Assessment Metadata

Field	Data Type	
Assessment type	List	Indicator Assessment
Summary Results (template Addendum 1)	URL	https://odims.ospar.org/en/submissions/ospar_rec_sens_fish_msfd_2022_12/
SDG Indicator	List	14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

Field	Data Type	
Thematic Activity	List	Biological Diversity and Ecosystems
Relevant OSPAR Documentation	Text	Agreement 2022-04 CEMP Guideline: Common Indicator FC1 Sensitive Fish Species
Linkage	URL	https://doi.org/10.17895/ices.pub.8299
Conditions applying to access and use	URL	https://oap.ospar.org/en/data-policy/
Data Snapshot	URL	https://odims.ospar.org/en/submissions/ospar_rec_sens_fish_dsnap_2022_12/
Data Results	Zip File	https://odims.ospar.org/en/submissions/ospar_rec_sens_fish_dres_2022_06/

OSPAR's Quality Status Report 2023

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Our vision is a clean, healthy and biologically diverse North-East Atlantic Ocean, which is productive, used sustainably and resilient to climate change and ocean acidification.

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