CEMP Guideline for Marine Mammals thematic assessment integration method

OSPAR Agreement 2023-05[1]

These guidelines outline the method for thematic assessment integration as applied for the QSR 2023 thematic assessments.

1 Introduction

Status assessments of marine mammals contributing to OSPAR Quality Status Reports build on the monitoring of different aspects of marine mammals and their ecological condition, called 'criteria' in the Marine Strategy Framework Directive (MSFD) (**Table 1**). Assessments are done on the level of both species / population (called 'element' in MSFD) and functional species group (called 'features' in MSFD). Marine mammals are allocated to four functional groups (**Table 2**) which have been adopted in the EU Commission Decision (2017/848). In the context of the Marine Strategy Framework Directive, the term 'functional group' was specifically applied to groups of marine mammal species to provide a set of groups for the assessment of status of these often highly mobile and/or widely-dispersed species. A functional group comprises species with similar structural, functional or taxonomic characteristics, such as their mode of feeding or their habitat. Each group represents an ecological role (e.g., deep-diving odontocetes) within the marine ecosystem.

Operational indicators representing the criteria are used to convert monitoring data to status assessments of species/ population.

Table 1*: MSFD Article 8 Biodiversity Criteria for Marine Mammals (Descriptor 1) and relevant OSPAR Indicators.*

MSFD Criteria	Description	Relevant OSPAR Indicator
D1C1 (bycatch)	The mortality rate per species from incidental by-catch does not exceed levels which threaten the species.	M6 - Marine mammal by-catch See M6 OSPAR CEMP Guideline and QSR 2023 assessment for details
D1C2 (abundance)	The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured.	M3 - Seal abundance and distribution M4 - Abundance and distribution of cetaceans See M3 CEMP Guideline and M4 CEMP Guideline and M3 QSR

[1] English only

		2023 assessment and M4 QSR 2023 assessment for details
D1C3 (demography)	The population demographic characteristics (e.g., body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a natural population which is not adversely affected due to anthropogenic pressures.	M5 - Grey Seal Pup Production See M5 OSPAR CEMP Guideline and QSR 2023 assessment for details
D1C4 (distribution)	The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.	M3 - Seal abundance and distribution M4 - Abundance and distribution of cetaceans See M3 CEMP Guideline and M4 CEMP Guideline and M3 QSR 2023 assessment and M4 QSR 2023 assessmentfor details
D1C5 (habitat for the species)	The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.	Not available

***Table 2**: Marine mammal functional groups as identified under the MSFD (Commission Decision (EU) 2017/848 of 17 May 2017).*

Taxonomic group	Functional group	Example species
Cetaceans	Small odontocetes (toothed cetaceans)	Harbour porpoise, common dolphin, bottlenose dolphin
	Deep-diving odontocetes (toothed cetaceans)	Cuvier's beaked whale, long-finned pilot whales, sperm whale
	Baleen whales	Fin whale, minke whale
Seals	Seals	Grey seal, harbour seal

2 Description of the integration method

2.1 General overview of all levels of integration for marine mammals

A challenging issue regarding the integration for marine mammals is the general low number of species for which there are enough data to calculate the indicators and to assess against the threshold values, on top of the low number of assessed species per species group. In preparation of QSR 2023, the OSPAR Biodiversity Committee agreed that the small number of species available for an integration from species to functional group makes the one-out-all-out (OOAO) rule the only relevant option (BDC 22/9/1 §3.7c). The integration from functional group to ecosystem component is currently not required in MSFD assessments. This last step was discussed within OMMEG where it was deemed premature. No integration method above the functional group level is therefore proposed.

Such an approach for OSPAR QSR corresponds to the procedure used in the MSFD, and the following rules and methods are in line with the Article 8 MSFD Assessment Guidance (European Commission 2022). An overview of the integration procedure is given in Figure 1 across five levels of integration.

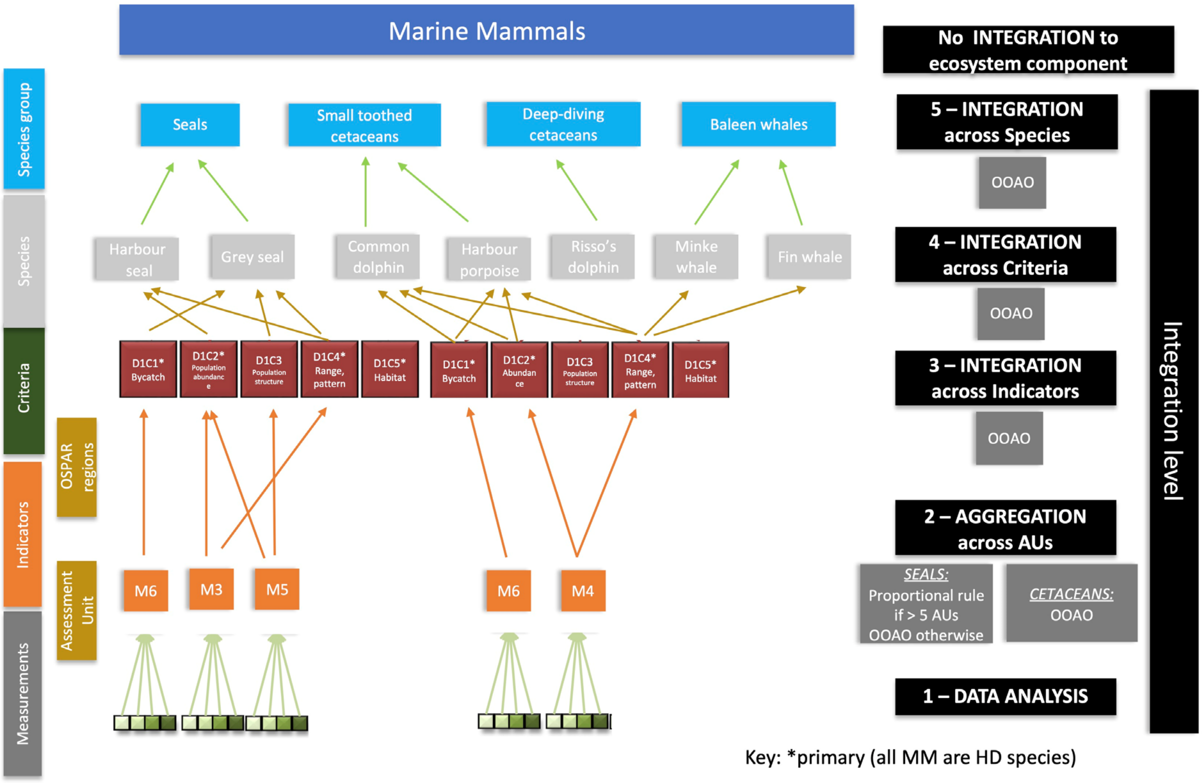

Figure 1: Levels and methods of integration for marine mammals (MM). Examples of species are presented. OOAO=One out all out, HD=Habitats Directive.

One of the most challenging issues for the marine mammal integration is the different scale of the species-specific assessment unit (AU) per indicator. For a given species of marine mammals, indicators need to first be aggregated over the different AUs before they can be integrated. For seals (OSPAR indicators M3, M5 and M6), there is a mix of many small coastal AUs and very large AUs which cover more than one OSPAR Region. For cetaceans (OSPAR indicators M4 and M6), there are in general large AUs which can be nested within one OSPAR Region or can overlap several OSPAR regions. As a result, different aggregation and integration rules apply to seals (a single functional group) and cetaceans (three functional groups: Small odontocetes, Deep-diving odontocetes, Baleen whales; **Table 2**) from level 1 to 2.

2.1.1 Aggregation and integration method for seals

<u>Step 1: Aggregation within individual seal AUs to combine long- and short-term assessments</u>

For seals, in M3 & M5, both a long- and short-term assessment of a trend are reported on and considered as part of the overall outcome of the common indicator. As part of initial stages for overall aggregation, the long- and short-term assessments were considered and aggregated to a single outcome per AU (**Table 3**). As an 'unknown' or 'inconclusive' (see below) output at either the long- or short-term scale could not enable confidence in an 'achieved' overall outcome, only those AUs where both the scales of common indicator assessments 'achieved the threshold value' were considered to have 'achieved' overall during aggregation.

Table 3: *Seals (M3, M5): Overview of indicator results regarding long-term and short-term assessment of a trend and overall outcome of individual seal AU. Green means 'threshold achieved', red means 'threshold not achieved'; orange means 'inconclusive' and grey means 'unknown' or 'not assessed'.*

Long-term assessment	Short-term assessment		overall	overall (text)
		=		Achieved overall
		=		Not achieved overall
		=		Not achieved overall
		=		Not achieved overall
		=		Inconclusive overall
		=		Inconclusive overall
		=		not achieved overall
		=		not achieved overall
		=		Inconclusive overall
		=		Unknown (sites with not enough data)

<u>Step 2: Aggregation of AUs in each indicator for seals</u>

A proportional rule is followed for aggregating indicators within a seal species when there are more than five assessment units per (sub)region. A 75% threshold achieved rule is applied to the smaller assessment units or to one indicator nested within a larger assessment unit of another indicator before the two results are aggregated to status per species. This proportional rule is also implemented for integration of other biodiversity assessments (birds, fish) within OSPAR. For instance, the 75% threshold was developed for the OSPAR EcoQO (Ecological Quality Objective) on seabird population trends (ICES, 2011) and is recommended for use (when there are numerous assessed elements; Dierschke et al., 2021 page 25) with regards to integration in MSFD (European Commission, 2022). Further, none of the AU should be split in case it would overlap with two or more regions or subregions: at least 50% of the AU needs to fall within one (sub)region to be included. Overlap is computed by the ratio of the surface of an AU relative to the surface of the whole region (using the projection EPSG:3035, ETRS89-extended / LAEA Europe projection; https://epsg.io/3035). For seals, in M3 & M5, an assessment could be inconclusive if confidence intervals are spanning the threshold value (M3 CEMP Guideline and M5 CEMP Guideline). Nevertheless, an inconclusive (IN) assessment provides evidence in some cases for a declining trend that could exceed the threshold; although not significant it should be regarded as being assessed. In contrast, an unknown (NA) result is due to sites for which insufficient data were available overall to compute a trend, or, in the case of M5, either as a result of no, or only a few, pups having been born and counted in an AU, or the pup count time series being unsuitable for analysis. BDC 2022 agreed that for seals inconclusive assessments are considered during aggregation whereas unknown assessments are not (BDC 22/9/1 §3.7c).

Table 4 summarises the aggregation rules in step 2 for seals. These rules are detailed below with examples.

***Table 4**: Guide to aggregating assessments from several AUs within the same indicator for seals. Green means 'threshold achieved', red means 'threshold not achieved'; orange means 'inconclusive' and grey (NA) means 'unknown' or 'not assessed'. *Number of AUs being assessed is 5 or less, therefore use OOAO (one-out-all-out) instead of proportional to rule (75% threshold).*

Functional group	Species	AU	Indicator 1		Indicator 2		Indicator 3		Indicator 4		Indicator 5	
			per AU	Aggre-gation	per AU	Aggre-gation	per AU	Aggre-gation	per AU	Aggre-gation	per AU	Aggre-gation
		1										
		2										
		3										
	1	4		6/6		5/6		5/6		4/5*		4/5*
		5										
		6										
		7										
Seals		8										
		9										
		10										
	2	11		6/7		0/4*		4/7		4/7		2/6
		12										
		13										
		14										

* using OOAO because < 5 AUs

<u>Example 1:</u> Seal species 1 and indicator 1. The threshold is achieved for all 6 AUs, and the threshold is thus achieved when aggregating.

<u>Example 2:</u> Seal species 1 and indicator 2. The threshold is achieved for 5 AUs and not achieved in one AU. The threshold is achieved when aggregating as more than 75% ($\frac{5}{6} = 83\%$) of AUs have achieved the threshold.

<u>Example 3:</u> Seal species 1 and indicator 3. The threshold is achieved for 5 AUs and inconclusive in one AU. The threshold is achieved when aggregating as more than 75% ($\frac{5}{6} = 83\%$) of AUs have achieved the threshold. The inconclusive assessment is included in the denominator as an assessment was possible (data were available): even if the threshold were not achieved, the outcome would remain the same with the proportional rule.

Example 4: Seal species 1 and indicator 4. The threshold is achieved for 4 AUs; inconclusive for one AU and unknown for one AU. The result is inconclusive: the unknown outcome is excluded, and aggregation is performed on no more than 5 AUs and OOAO applies in this setting.

Example 5: Seal species 1 and indicator 5. The threshold is achieved for four AUs; unknown for one AU and not achieved for one AU. The threshold is not achieved because aggregation is performed on no more than five AUs and OOAO applies in this setting.

Aggregation examples for seal species 2 in Table 4 are more realistic than for species 1 and illustrates the challenges with seals where many AUs are defined.

Step 3: Integrate across indicators to determine species status

The QSR 2023 integrated assessment can build on three OSPAR Common Indicators: Seal Abundance (M3), Grey Seal Pup Production (M5) and Marine Mammal Bycatch (M6). Each indicator maps to a criterion (**Table 1**). The integration from single indicators to species status follows the OOAO rule.

Step 4: Integrate across species to functional groups

In preparation of QSR 2023, the OSPAR Biodiversity Committee agreed that the small number of species available for an integration from species to functional group makes the one-out-all-out (OOAO) rule the only relevant option (BDC 22/9/1 §3.7c).

The overall output of the integrated assessment is presented for each OSPAR Region in a comprehensive table displaying the status of each species by criterion, the overall status of each species after integration of criteria and the overall status of the species group after integration from species status (see example in **Table 5**).

Table 5. *Summary of indicator outcomes (M3, M5, M6) and status of seals. Green: indicator threshold achieved/Status good; red: indicator threshold not achieved/Status not good; orange: inconclusive; grey: unknown, data available but too scarce for indicator assessment; blank: not assessed. {filename Table 5 CEMP}*

Seals	Greater North Sea				Celtic Seas			
	Region II				Region III			
	M3	M5	M6	**Status**	M3	M5	M6	**Status**
Harbour seal				not good				
Grey seal								
Status of seals				**not good**				

The master table of all assessment results in **Table 6** showcases the individual steps during aggregation and integration for seals.

Table 6. *Master tables for seals showing indicator results per species-specific assessment units (AU) as well as aggregation per region and integration on species and species group level. Printed fractions (e.g., 1/12) show where the proportional rule has been applied. Green: indicator threshold achieved/Status good; red: indicator threshold not achieved/Status not good; orange: inconclusive; grey: unknown/not assessed, data available but too scarce for indicator assessment. Integration master for region a) Greater North Sea and b) Celtic Seas.*

a)

Functional group	Species	AU (No)	M3		M5		M6		Inte-gration species level (M3, M5, M6)	Inte-gration functional group
			per AU	Aggre-gation Greater North Sea	per AU	Aggre-gation Greater North Sea	per AU	Aggre-gation Greater North Sea		
		North coast & Orkney (4)								
		Shetland (5)								
		Moray Firth (6)								
		East Scotland (7)								
		Northeast England (8)								
		Southeast England (9)								
	Harbour seal	French North Sea & Channel Coast (16)		3/12						
		Belgium coast and Dutch Delta (17)								
		Wadden Sea (18)								
		Limfjorden (19)								
		Kattegat (20)								
Seals		Skagerrak (22)								
	Grey seal	OSPAR Region II								
	Grey seal	Single unit (combined Regions I-III)								
		North coast & Orkney (4)								
		Moray Firth (6)								
		East Scotland (7)								
		Northeast England (8)								
	Grey seal	Southeast England (9)				8/8				
		French North Sea & Channel Coast (16)								
		Belgium coast and Dutch Delta (17)								
		Wadden Sea (18)								

b)

Functional group	Species	AU	M3		M5		M6		Inte-gration species level (M3, M5, M6)	Inte-gration functional group
			per AU	Aggre-gation Celtic Seas	per AU	Aggre-gation Celtic Seas	per AU	Aggre-gation Celtic Seas		
Seals	Harbour seal	Southwest Scotland (1)								
		West Scotland (2)								
		Western Isles (3)								
		Northern Ireland (14)								
	Grey seal	OSPAR Region III								
	Grey seal	Single unit (combined Regions I-III)								
	Grey seal	West Scotland (2)								
		Western Isles (3)								

2.1.2 Aggregation and integration method for cetaceans

Step 1: Aggregation of AUs in each indicator for cetaceans

Given the small number of AUs per region, the OOAO rule was deemed appropriate for aggregating indicators within a cetacean species. AUs are split in case it would overlap with two or more regions or subregions: at least 10% of the AU needs to fall within one region to be included. Overlap is computed by the ratio of the surface of an AU relative to the surface of the whole region (using the projection EPSG:3035, ETRS89-extended / LAEA Europe projection; https://epsg.io/3035). In contrast to seals, unknown assessments are considered for aggregation for cetaceans given the smaller number of AUs, and their much larger geographical extent in general, compared to seals.

Table 7 summarizes the aggregation rules for cetaceans. In contrast to seals, the same AU can be included in two different larger regions if overlap of that AU exceeds 10% in each of the regions. Aggregation rules are detailed below with examples.

Table 7*: Guide to aggregating assessments from several AUs within the same indicator for cetacean species. Green: indicator threshold achieved, red: indicator threshold not achieved, grey: unknown or not assessed. A blank cell means that the AU is not considered for aggregation in this region due to <10% spatial overlap.*

Functional group	Species	AU	region 1						region 2					
			Indicator 1			Indicator 2			Indicator 1			Indicator 2		
			Over-lap	per AU	Aggre-gation	Over-lap	per AU	Aggre-gation	Over-lap	per AU	Aggre-gation	Over-lap	per AU	Aggre-gation
Cetaceans	1	1	40%		2/2	40%		0/2	60%		2/3	60%		0/3
		2	15%			15%			85%			85%		
		3	5%			5%			95%			95%		
	2	4	69%		2/3	69%		2/3	31%		3/4	31%		2/4
		5	8%			8%			92%			92%		
		6	29%			29%			71%			71%		
		7	11%			11%			89%			89%		

Example 1: Cetacean species 1 and indicator 1. In region 1, two AUs (out of 3) have overlap that exceeds 10%: since the threshold is achieved for both AUs, the threshold is also achieved when aggregating at the level of region 1. In region 2, three AUs (out of 3) have overlap that exceeds 10%: since the threshold is not achieved for AU 3, the threshold is also not achieved when aggregating at the level of region 2 because of OOAO. The 10% overlap rule prevents a ‘not achieved’ outcome when aggregating in region 1 given that most of the AU (No 3) falls within region 2, and thus most of the pressure is likely within region 2.

Example 1 (continued): Cetacean species 1 and indicator 2. In region 1, two AUs (out of 3) have overlap that exceeds 10%: since the threshold is not achieved for both AUs, the threshold is also not achieved when aggregating at the level of region 1. In region 2, three AUs (out of 3) have overlap that exceeds 10%: since the threshold is not achieved for all AUs, the threshold is also not achieved when aggregating at the level of region 2.

Example 2: Cetacean species 2 and indicator 1. In region 1, three AUs (out of 4) have overlap that exceeds 10%; and for one AU (No 5), the outcome of the assessment is ‘unknown’: the aggregated assessment is also ‘unknown’ out of precaution. If an assessment had been possible, the outcome could have been ‘threshold not achieved’. The same logic applies to aggregation of indicator 1 in region 2: the outcome at region level is ‘unknown’.

Example 2 (continued): Cetacean species 2 and indicator 2. In region 1, three AUs (out of 4) have overlap that exceeds 10%; and for one AU (No 4), the outcome of the assessment is ‘not achieved’: the aggregated assessment is also ‘not achieved’ because of OOAO. In region 2, four AUs (out of 4) have overlap that exceeds 10%; and for one AU (No 7), the outcome of the assessment in ‘unknown’: even if that ‘unknown’ assessment would turn out to be ‘threshold achieved’, the outcome of aggregating indicator 2 at the level of region 2 would remain ‘threshold not achieved’ because of OOAO.

Step 2: Integrate across indicators to determine species status

The QSR 2023 integrated assessment can build on two OSPAR Common Indicators: Abundance and distribution of cetaceans (M4) and Marine Mammal By-catch (M6). Each indicator maps to a criterion (**Table 1**). The integration from single indicators to species status follows the OOAO rule.

Step 3: Integrate across species to functional groups

In preparation of QSR 2023, the OSPAR Biodiversity Committee agreed that the small number of species available for an integration from species to functional group makes the one-out-all-out (OOAO) rule the only relevant option (BDC 22/9/1 §3.7c).

The overall output of the integrated assessment is presented for each OSPAR Region in a comprehensive table displaying the status of each species by criterion, the overall status of each species after integration of criteria and the overall status of the species group after integration from species status (see example in **Table 8**).

Table 8. *Summary of indicator outcomes (M4, M6) and status of small toothed cetaceans. Green: indicator threshold achieved/Status good; red: indicator threshold not achieved/Status not good; grey: unknown, data available but too scarce for indicator assessment; blank: not assessed. T&D species are shown in italics.*

Small toothed cetaceans	Greater North Sea			Celtic Seas			Bay of Biscay and Iberian Coast		
	Region II			Region III			Region IV		
	M4	M6	**Status**	M4	M6	**Status**	M4	M6	**Status**
Harbour porpoise			not good			not good			not good
Common dolphin			not good			not good			not good
Offshore bottlenose dolphin									
Coastal bottlenose dolphin									not good
White-sided dolphin									
White-beaked dolphin									
Striped dolphin									
Status of small toothed cetaceans			**not good**			**not good**			**not good**

The master table in **Table 9** showcases the individual steps during aggregation and integration for cetaceans.

Table 9. *Master table for cetaceans showing indicator results per species-specific assessment units (AU) and overlap (%) with regions. The aggregation per region and the integration on species and functional group level is presented as well. Green: indicator threshold achieved / Status good; red: indicator threshold not achieved / Status not good; grey: unknown / not assessed, data available but too scarce for indicator assessment. Integration master for region a) Greater North Sea Coast; b) Celtic Seas Coast, c) Bay of Biscay and Iberian Coast.*

a)

Functional group	Species	AU	Greater North Sea	Celtic Seas	Bay of Biscay and Iberian Coast	M4		M6		Inte-gration species level (M4 & M6)	Inte-gration functional group
			% overlap	% overlap	% overlap	per AU	Aggre-gation Greater North Sea	per AU	Aggre-gation Greater North Sea		
Small toothed cetaceans	Harbour porpoise	North Sea	89.5%	9.5%	0.0%						
	Common dolphin	North-East Atlantic	26.9%	40.1%	33.0%						
	Offshore Bottlenose dolphin	North-East Atlantic	28.3%	37.5%	34.2%						
	Coastal Bottlenose dolphin	Coastal East Scotland	60.8%	38.9%	0.0%						
		Coastal West Channel	40.2%	59.8%	0.0%						
		Coastal Normandy and Brittany	55.7%	42.9%	1.4%						
	White-sided dolphin	single unit	59.8%	40.2%	0.0%						
	White-beaked dolphin	single unit	59.8%	40.2%	0.0%						
Baleen whales	Minke whale	North-East Atlantic	26.9%	33.0%	40.1%						
	Fin whale	NW	94.2%	5.8%	0.0%						
Deep-diving toothed cetaceans	Risso's dolphin	not defined	NA	NA	NA						
	Long-finned pilot whale	not defined	NA	NA	NA						
	Beaked whales	not defined	NA	NA	NA						
	Sperm whale	not defined	NA	NA	NA						

b)

Functional group	Species	AU	Greater North Sea	Celtic Seas	Bay of Biscay and Iberian Coast	M4		M6		Inte-gration species level (M4 & M6)	Inte-gration functional group
			% overlap	% overlap	% overlap	per AU	Aggre-gation Celtic Seas	per AU	Aggre-gation Celtic Seas		
Small toothed cetaceans	Harbour porpoise	West Scotland and Ireland	0.0%	100.0%	0.0%						
		Celtic and Irish Seas	6.1%	64.1%	29.4%						
	Common dolphin	North-East Atlantic	26.9%	40.1%	33.0%						
	Offshore Bottlenose dolphin	North-East Atlantic	28.3%	37.5%	34.2%						
	Coastal Bottlenose dolphin	Coastal West Scotland and Hebrides	0.0%	100.0%	0.0%						
		Coastal East Scotland	60.8%	38.9%	0.0%						
		Irish Sea and coastal Wales	0.0%	100.0%	0.0%						
		West coast of Ireland	0.0%	100.0%	0.0%						
		Coastal West Channel	40.2%	59.8%	0.0%						
		Coastal Normandy and Brittany	55.7%	42.9%	1.4%						
	White-sided dolphin	single unit	59.8%	40.2%	0.0%						
	White-beaked dolphin	single unit	59.8%	40.2%	0.0%						
Baleen whales	Minke whale	North-East Atlantic	26.9%	33.0%	40.1%						
	Fin whale	EI + F	0.0%	100.0%	0.0%						
		Sp	5.7%	29.7%	64.5%						
Deep-diving toothed cetaceans	Risso's dolphin	not defined	NA	NA	NA						
	Long-finned pilot whale	not defined	NA	NA	NA						
	Beaked whales	not defined	NA	NA	NA						
	Sperm whale	not defined	NA	NA	NA						

c)

Functional group	Species	AU	Greater North Sea	Celtic Seas	Bay of Biscay and Iberian Coast	M4		M6		Inte-gration species level (M4 & M6)	Inte-gration funcation al group
			% overlap	% overlap	% overlap	per AU	Aggre-gation BoB & Iberian	per AU	Aggre-gation BoB & Iberian		
Small toothed cetaceans	Harbour porpoise	Celtic and Irish Seas	6.1%	64.1%	29.4%						
		Iberian Coasts	0.0%	0.0%	100.0%						
	Common dolphin	North-East Atlantic	26.9%	40.1%	33.0%						
	Offshore Bottlenose dolphin	North-East Atlantic	28.3%	37.5%	34.2%						
	Coastal Bottlenose dolphin	Northern Spain	0.0%	0.0%	100.0%						
		Southern Galician Rias (Spain)	0.0%	0.0%	100.0%						
		Coastal Portugal	0.0%	0.0%	100.0%						
		Coastal Portugal (Sado Estuary)	0.0%	0.0%	100.0%						
		Gulf of Cadiz	0.0%	0.0%	96.9%						
	Striped dolphins	not defined	NA	NA	NA						
Baleen whales	Minke whale	North-East Atlantic	26.9%	33.0%	40.1%						
	Fin whale	Sp	5.7%	29.7%	64.5%						
Deep-diving toothed cetaceans	Risso's dolphin	not defined	NA	NA	NA						
	Long-finned pilot whale	not defined	NA	NA	NA						
	Beaked whales	not defined	NA	NA	NA						
	Sperm whale	not defined	NA	NA	NA						

2.2 Description of the assessment units being applied

For the OSPAR QSR 2023, integrated assessments are conducted on the spatial scale of the Assessment Units (AU) defined for seals and cetaceans (see Appendix). These AUs are species-specific and may be nested within a single or spanning several OSPAR Regions. This varying overlap may complicate the aggregation of assessment results within a criterion before integration within- and between-species.

2.3 Presentation of results

The output of the integrated assessment is presented for each OSPAR Region in a comprehensive table displaying the status of each species by criterion, the overall status of each species after integration of criteria and the overall status of the species group after integration from species status (see example in **Tables 5 and 8**).

2.4 Confidence assessment

Because of the general low number of species for which there are enough data to calculate the indicators and to assess against the threshold values, on top of the low number of assessed species per species group, the one-out-all-out (OOAO) rule was assessed as the only relevant option during a dedicated expert workshop, organised by OMMEG in February 2022. While individual indicators discuss data quality and include confidence intervals in their assessments of species, OOAO in effect means that the confidence in individual assessments carry over to the integrated assessment.

3 Change Management

Applicability and validity of the integration methods will be reviewed and developed further by experts in OMMEG. If necessary, this will be done on request from ICG-COBAM or BDC, who in turn decide on the acceptance of the proposals. Common integration methods for assessments by other OSPAR biodiversity groups, HELCOM and ICES will be sought.

4 References

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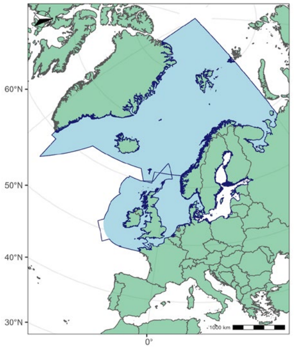
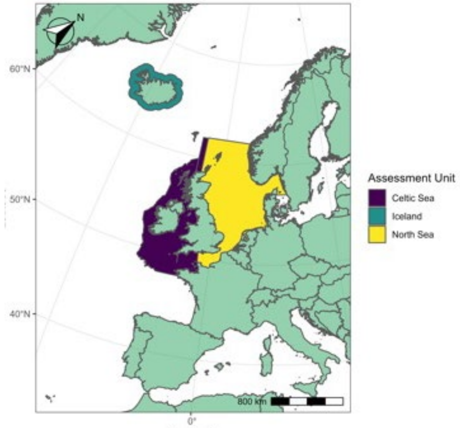
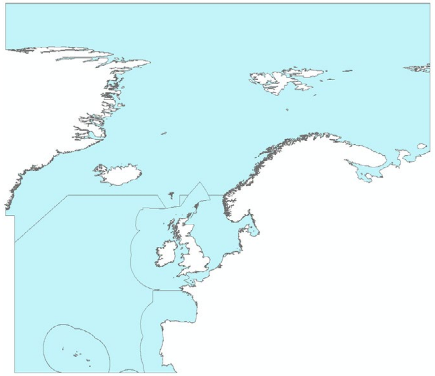
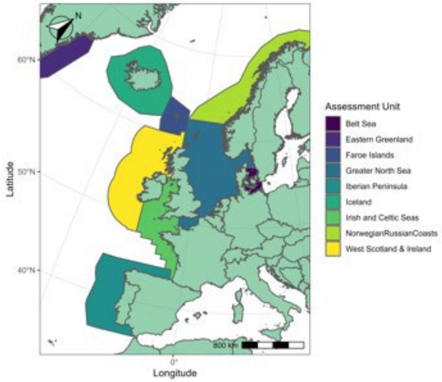
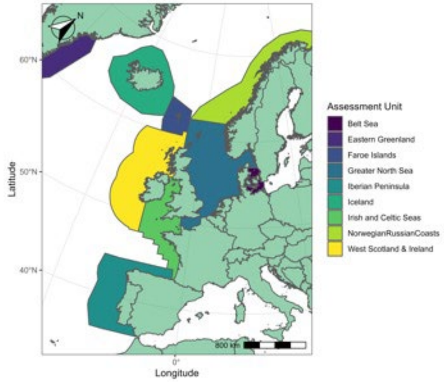
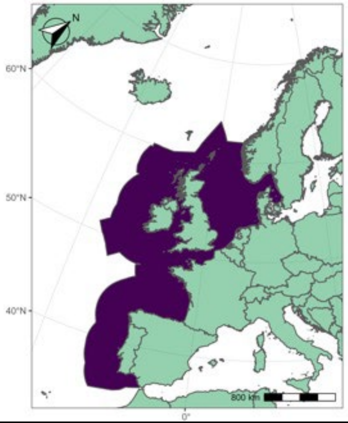
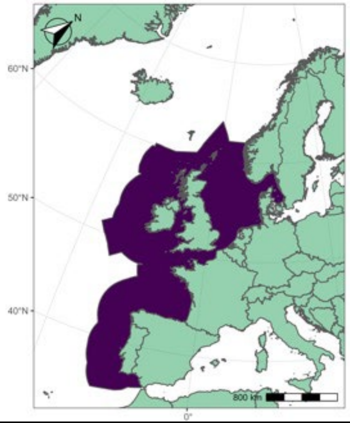
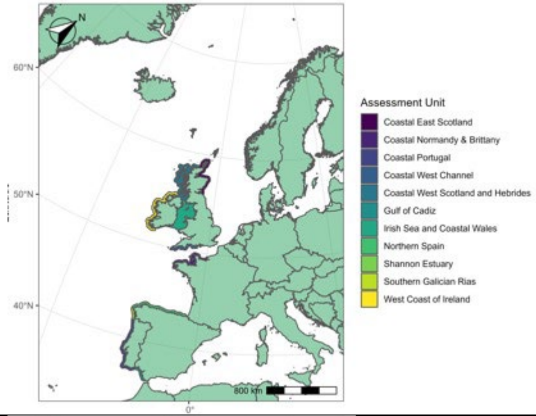
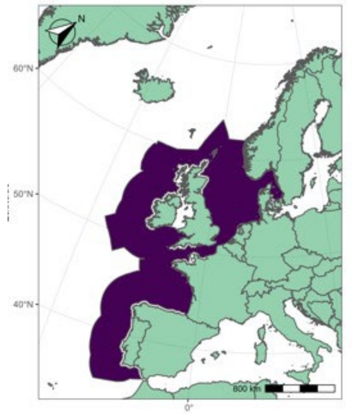
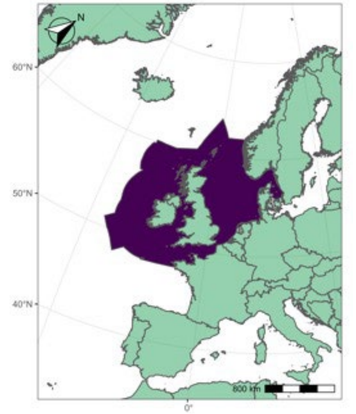
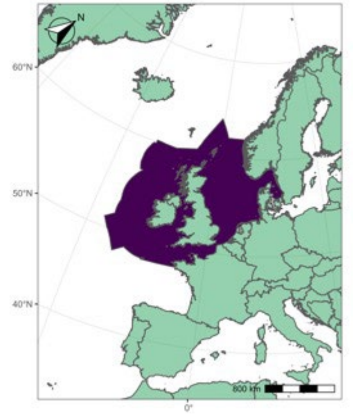
5 Appendix

<table>
<tr><th>Integrated assessment (species group)</th><th>Illustration of assessment unit boundaries for integrated assessment</th><th>species</th><th>Seal Abundance and Distribution (M3) cf. D1C2</th><th>Grey seal pup production (M5) cf. D1C3</th><th>Marine mammal by-catch (M6) cf. D1C1</th></tr>
<tr><td rowspan="2">Seals

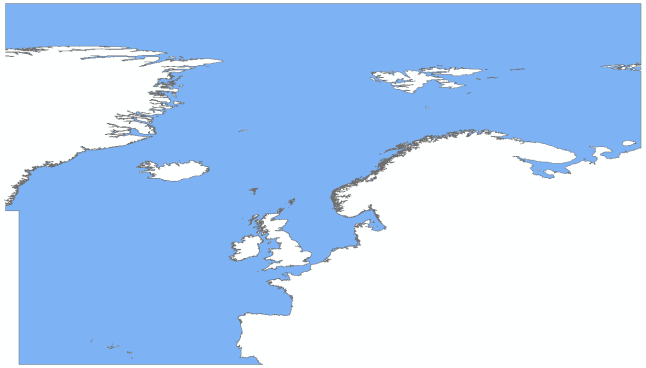
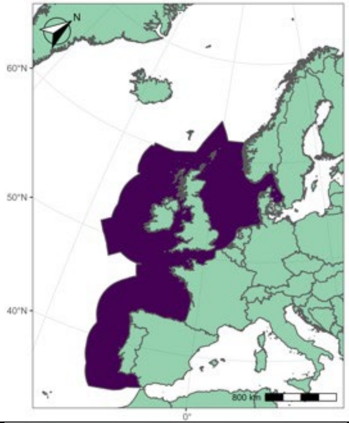
Assessment units (x3 i.e. OSPAR Region I, MSFD subregions Greater North Sea, Celtic Seas)</td><td rowspan="2"></td><td>Grey seal</td><td></td><td></td><td></td></tr>
<tr><td>Harbour seal</td><td></td><td></td><td></td></tr>
</table>

Integrated assessment (species group)	Illustration of assessment unit boundaries	Species	Abundance and distribution of marine mammals (M4) cf. D1C2	Marine mammal by-catch (M6) cf. D1C1
Small toothed cetaceans		Harbour porpoise		
		Common dolphin		

Integrated assessment (species group)	Illustration of assessment unit boundaries	Species	Abundance and distribution of marine mammals (M4) cf. D1C2	Marine mammal by-catch (M6) cf. D1C1
		Bottlenose dolphin - coastal		
		Bottlenose dolphin - offshore		

Integrated assessment (species group)	Illustration of assessment unit boundaries	Species	Abundance and distribution of marine mammals (M4) cf. D1C2	Marine mammal by-catch (M6) cf. D1C1
		White-beaked dolphin		
		White-sided dolphin		
		Striped dolphin	**NA**	
		Killer whale	**NA**	

Integrated assessment (species group)	Illustration of assessment unit boundaries	Species	Abundance and distribution of marine mammals (M4) cf. D1C2	Marine mammal by-catch (M6) cf. D1C1
Deep-diving toothed cetaceans		Sperm whale	**NA**	
		Long-finned pilot whale	**NA**	
		Short-finned pilot whale	**NA**	
		Risso's dolphin	**NA**	
		Beaked whales	**NA**	

Integrated assessment (species group)	Illustration of assessment unit boundaries	Species	Abundance and distribution of marine mammals (M4) cf. D1C2	Marine mammal by-catch (M6) cf. D1C1
Baleen whales		Minke whale		
		Fin whale