



OSPAR Coordinated Environmental Monitoring Programme (CEMP)

(OSPAR Agreement 2016-01)¹

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¹ This replaces Agreement 2010-01. Updated 2020 (CEMP Appendices removed and published in the OSPAR Assessment Portal (OAP))

² The CEMP Appendices are published in OAP:

<https://oap.ospar.org/en/ospar-monitoring-programmes/cemp/cemp-appendices/>

OSPAR Coordinated Environmental Monitoring Programme (CEMP)

Section I – Programme overview

1. Introduction

1.1. Monitoring and assessment are well-established functions of the OSPAR Commission that inform and guide efforts to protect the marine environment of the North-East Atlantic. Higher-level strategic planning of this work is set out in the OSPAR Joint Assessment and Monitoring Programme (JAMP), including the requirements for thematic and holistic assessments, such as the Intermediate Assessment 2017 and the Quality Status Reports. The Coordinated Environmental Monitoring Programme (CEMP) is the part of OSPAR's monitoring and assessment work where Contracting Parties seek to coordinate the operation of monitoring, data collection and assessment activities with the aim of facilitating the development of common and coherent assessments that address the questions identified in the JAMP.

1.2. OSPAR has a long history in monitoring and assessment stretching back to the 1980s through the JAMP and the forerunner to this broader CEMP, and separate programmes for riverine inputs and direct discharges (RID), atmospheric inputs (CAMP) and radioactive substances. Starting with a focus on pollution from land-based sources and its effects, OSPAR's needs for monitoring and assessment have expanded considerably to include a wide range of pressure and state indicators for marine ecosystems. The CEMP takes in all of OSPAR's existing regular monitoring and assessment work in support of the North East Atlantic Environment Strategy and its thematic strategies, as well as new monitoring and assessment that is being developed for biodiversity.

1.3. This CEMP agreement explains the overall aims and concepts that apply within the CEMP and the scope and characteristics of the six CEMP thematic monitoring programmes (themes). The CEMP Appendices set out details of the agreed monitoring and assessment approaches for each component of these themes including the approaches to be applied to realise coordination of monitoring and assessment.

2. Background

2.1 For the purposes of the OSPAR Convention Annex IV Article 1 (<http://www.ospar.org/convention/text>), 'monitoring' is defined as the repeated measurement of:

- a. the quality of the marine environment and each of its compartments, that is, water, sediments and biota;
- b. activities or natural and anthropogenic inputs which may affect the quality of the marine environment;
- c. the effects of such activities and inputs.

2.2 The OSPAR JAMP sets out that, "The monitoring data and information generated by OSPAR through its coordinated environmental monitoring activities form the basis for assessment of the state of the OSPAR maritime area". These include the Intermediate Assessment 2017 and the Quality Status Report. Such data

and information should be “gathered in accordance with agreed OSPAR guidelines and procedures” and thus be “comparable across the breadth of the OSPAR maritime area”.

2.3 OSPAR develops monitoring and assessment within the scope of these definitions to support work towards the strategic objectives of the North-East Atlantic Environment Strategy, which are reflected in the themes under the JAMP and the corresponding thematic programmes of the CEMP. In terms of the “policy-cycle” at Figure 2, the JAMP involves the “identification of information needs” and the overall approaches that will be used to address them. The CEMP specifies those information needs more precisely and sets out common approaches for the implementation of “data collection and monitoring” and “data analysis – assessment”.

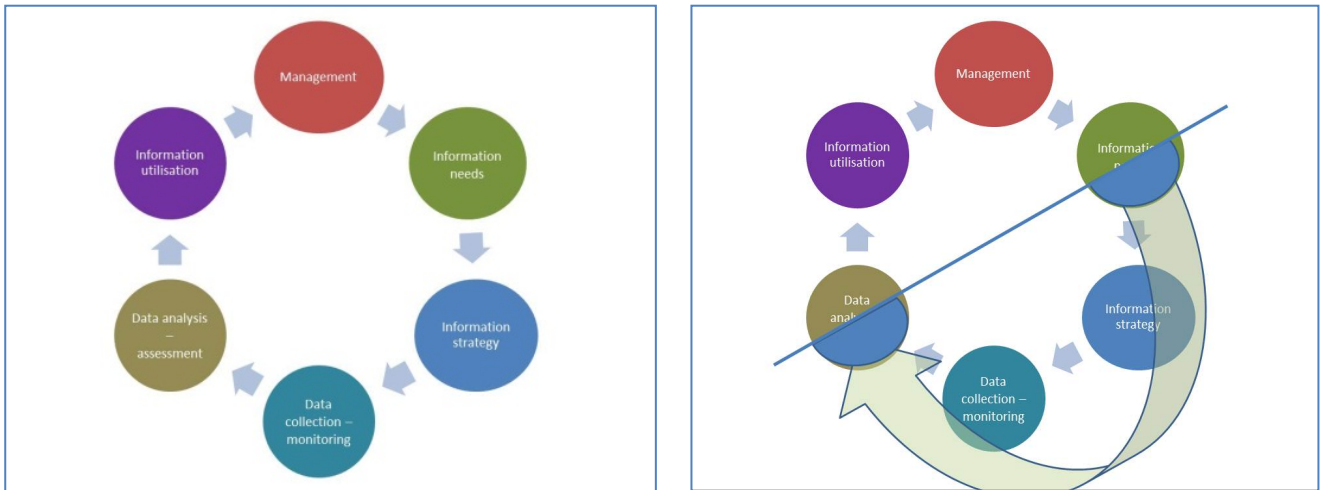


Figure 2: A stylised policy/ management cycle. The OSPAR CEMP complements the JAMP and implements the part of the cycle that goes from ‘information needs’ to ‘Data analysis – assessment’.

2.4 The scope of the CEMP encompasses a range of different issues, data types and assessment approaches. The overall programme is therefore designed with a degree of flexibility to accommodate both the specificities of the different issues and practical differences in the way that monitoring and assessment have already been developed. The programme includes both monitoring data from direct measurements (e.g. litter or hazardous substances) as well as data derived from monitoring through modelling and/or aggregation of parameters (e.g. for noise or certain biodiversity indicators). Furthermore the programme includes regular data and information collection from other organisations for use in OSPAR assessments. The CEMP covers assessment procedures by specifying assessment tools such as criteria or data aggregation procedures. Arrangements and timetables for the development of assessments are set out in the JAMP.

2.5 Where relevant, the CEMP also aims to help Contracting Parties who are EU Member States deliver the requirements of EU marine legislation. The EU Marine Strategy Framework Directive states in Article 8.2 that when Member States make an initial assessment of their marine waters they:

“... shall take into account, or use as their basis, other relevant assessments such as those carried out jointly in the context of Regional Sea Conventions, so as to produce a comprehensive assessment of the status of the marine environment”.

And in Article 11:

“On the basis of the initial assessment made pursuant to Article 8(1), Member States shall establish and implement coordinated monitoring programmes ... Monitoring programmes shall be compatible within marine regions or sub-regions and shall build upon, and be compatible with, relevant provisions for assessment and monitoring laid down by Community legislation, including the Habitats and Birds Directives, or under international agreements.

“Member States sharing a marine region or sub-region shall draw up monitoring programmes and shall, in the interest of coherence and coordination, endeavour to ensure that:

“(a) Monitoring methods are consistent across the marine region or sub-region³ so as to facilitate comparability of monitoring results;

“(b) Relevant transboundary impacts and transboundary features are taken into account”

3. Aim and scope of the CEMP

3.1. The aim of the CEMP is to deliver comparable data from across the OSPAR maritime area, and to use these data to prepare coherent assessments that address the specific questions identified in the JAMP.

3.2. The CEMP is divided into the following themes reflecting the different issues that OSPAR is addressing under its thematic objectives, as set out in the JAMP:

a. Theme A: Cross cutting Components (under CoG)

- Monitoring and assessment related to ocean acidification.

b. Theme B: Biodiversity and Ecosystems

- Biodiversity and ecosystem monitoring and assessment (**under BDC**)

- Human activity and pressure monitoring and assessment (**under EIHA**)

c. Theme E: Eutrophication (under HASEC)

- Eutrophication monitoring and assessment.

d. Theme H: Hazardous Substances (under HASEC)

- Contaminants and their biological effects monitoring and assessment.

e. Theme O: Offshore Oil and Gas Industry (under OIC)

- Monitoring and assessment related to the offshore oil and gas industry, focused on produced water from offshore installations.

f. Theme R: Radioactive Substances (under RSC)

- Environmental and pressure data and assessments related to radioactive substances

3.3. Each theme is composed of a number of components as set out at Section II, Detailed CEMP Themes. The details of monitoring and assessment for each component are set out in the CEMP Appendices, Section III.

³ (Sub)regions under the Marine Strategy Framework Directive broadly coincide with the OSPAR Regions

3.4. Monitoring and assessment under the CEMP have both temporal and spatial aspects. Temporal trend monitoring programmes are programmes designed to detect long-term trends in populations, habitat states, human pressures, substance concentrations or effects in the maritime area. The optimal frequency of assessment will depend on the pressure or state characteristics being monitored and other details such as whether monitoring is in open water or sediment of contaminants or biodiversity. Spatial programmes provide information on the spatial variability of relevant pressure or state indicators across the OSPAR Convention area or its regions. In some cases spatial programmes are used to support area-based classifications.

3.5. These temporal and spatial requirements are closely related. An assessment may lead to recommendations for the development of a temporal trend programme from a spatial survey or vice versa. For example:

- a. If an area of concern is identified in a spatial programme, a temporal trend programme may be implemented at a limited number of representative sites;
- b. If a temporal trend changes unexpectedly, a spatial programme may be used to investigate the sources of any environmental pressure, the causes, or the extent of the problem.

3.6. Where possible, monitoring of state or impact indicators is linked to pressure monitoring, so as to facilitate understanding of the association between changes in anthropogenic activity and the marine environment as well as assessment of the efficacy of measures taken.

4. Development and coordination of the CEMP

Coordination

4.1. For coordinated monitoring and assessment of a component of the CEMP to be fully realised the following coordination tools should be in place:

- Monitoring and/or data collection guidelines;
- Coordinated arrangements for data submission and management;
- Quality assurance tools;
- Assessment criteria and, where relevant, procedures for aggregation or integration of data prior to assessment;

4.2. As a general principle, work to develop these coordination tools for each component should be taken forward by the relevant thematic committee, so that its monitoring and assessment are coordinated. The inclusion of components within the CEMP where certain coordination tools are lacking is thus intended to:

- i. stimulate the development of the tools needed for coordinated monitoring;
- ii. provide an early warning to Contracting Parties to prepare and implement relevant monitoring;
- iii. signal OSPAR's aim to realise coordinated monitoring as a basis for comparable assessment.

4.3. Where documentation of CEMP monitoring guidelines, quality assurance methodologies and assessment tools has been adopted it is published on the OSPAR website. A full list of CEMP guidelines is at Section IV.

4.4. Monitoring and assessment of components of the CEMP can be qualified and made subject to clearly defined and agreed conditions. The purpose is to provide the necessary flexibility to answer specific needs and purposes for coordinated monitoring of those components under the JAMP. Thematic Committees

responsible for managing each CEMP theme may develop tailored conclusions on the need for development of all coordination tools, taking into account the possibilities for producing comparable assessments. Any such conclusions are detailed in each thematic section.

4.5. Development of monitoring and assessment of a component of the CEMP, therefore, involves the following coordination steps:

- development of a strategy on how a component should be developed;
- development of the precise objectives (e.g. the statistical approach) of the monitoring and assessment and relevant assessment units;
- development of monitoring and/or data collection guidelines;
- development of quality assurance tools;
- development of assessment tools, including assessment criteria and, where needed, aggregation or integration procedures;
- planning of activities in space and time;
- identification of gaps in coverage that need to be filled;
- development of arrangements for submission and management of data;
- clarity on what are the essential elements and arrangements needed to assess any parameter and, where needed, arrangements to assess data that are not fully harmonised between Contracting Parties;
- common assessment organised by the appropriate OSPAR thematic committee, including evaluation of whether the programme met its goals and how it should be further developed.

4.6. In order to quickly track progress of the development of components of the CEMP as the coordination of monitoring and assessment becomes more fully developed the following dashboard icons are used on each of the CEMP Appendices to show their level of progress:

				
Information collection development need	Monitoring guidelines development need	Assessment criteria development need	Quality assurance tools development need	Fully coordinated CEMP component

4.7. These needs are as follows:

- Information collection needs developing: where the CEMP component does not involve a coordinated monitoring programme but is made up of information and monitoring coming in from other sources; this indicates development needs related to improving the collection of information and data from these sources.
- Monitoring guidelines need developing: where new coordinated monitoring is needed and there are no agreed guidelines, including on data collection.
- Assessment criteria need developing: assessment criteria and, as relevant, guidance on the assessment unit/scale (temporal and spatial), baseline or reference level have yet to be agreed;
- Quality assurance tools need developing: quality assurance procedures for the monitoring, analysis and data flow yet to be developed and agreed.

- Fully coordinated CEMP component: all coordination tools (as outlined in §4.1) are in place, monitoring implemented.

4.8. The relevant thematic Committee will review the development of each component for which it is responsible and give guidance on the implementation of coordinated monitoring by Contracting Parties. Contracting Parties may opt out from monitoring full CEMP components, when certain conditions are met, as defined in Annex 1.

4.9. The OSPAR committee responsible for each theme should periodically consider the inclusion of new monitoring or assessment activities as components of the CEMP. The relevant Committee should organise a review of the case for inclusion in order to reach conclusions on the need for coordinated monitoring across the OSPAR maritime area or in specific OSPAR Regions. Where possible, the generic decision tree (Annex 2) should be used to guide this review.

5. Implementation of the CEMP

Contracting Parties

5.1. Contracting Parties should implement monitoring of the fully coordinated components of the CEMP and other components where agreed by the thematic Committees. Contracting Parties are encouraged to implement monitoring for other components on a voluntary basis using those tools that have been developed so as to prepare for coordinated monitoring. Implementation is achieved through ongoing or specific national programmes coordinated within that country, national programmes coordinated on a regional or Convention-wide basis and programmes carried out by one or more supplier/contractor on behalf of the OSPAR Commission and paid for by Contracting Parties (including one-off surveys).

5.2. The current content of the national monitoring programmes of individual Contracting Parties, and work being developed in the context of the EU MSFD Common Implementation Strategy, should be taken into account in updating information on implementation in the CEMP Appendices.

5.3. Contracting Parties may opt out from monitoring of fully coordinated CEMP components, when certain conditions are met as defined in Annex 1. The justification provided by a Contracting Party for opting out of part of the CEMP should always be presented to the relevant thematic Committee.

5.4. On a regular basis, Contracting Parties should review their monitoring and assessment activities to identify if they should be participating in a particular OSPAR monitoring and assessment activity under an OSPAR theme. Where a Contracting Party has opted out of implementing monitoring for a CEMP component, the Contracting Party in question should review the situation at least every six years and report the outcome to the relevant thematic Committee or OSPAR's Coordination Group (CoG), as appropriate.

Secretariat

5.5. For each meeting of the relevant OSPAR thematic Committee or CoG, the OSPAR Secretariat should produce a summary of issues for consideration by that Committee in progressing its elements of the CEMP. This should include any updates on the development of coordination tools, organisation of assessments scheduled under the JAMP and implementation of CEMP monitoring. The Secretariat should ensure that the Appendices to the CEMP are up-to-date, working with the relevant Committee and their working groups. These actions serve four important purposes:

- a. to identify the extent of the existing coordinated monitoring programme; that is, the CEMP as implemented;
- b. to identify the gaps in monitoring activities for which it should be possible to design and initiate monitoring activities; i.e. the parts of the CEMP due for implementation;
- c. to finalise the aspects of the CEMP components which are still in development, for example consolidation of indicators, elaboration of monitoring guidelines, quality control procedures, assessment tools or data storage arrangements.
- d. to ensure that assessments are progressed in accordance with the JAMP.

OSPAR thematic Committees

5.6. OSPAR thematic Committees should ensure that the implementation of relevant components of the CEMP is reviewed annually in order to make arrangements necessary for progressing implementation. The Secretariat's summary and the updated CEMP Appendices should be used to guide this review. This consideration should track the progress of the programmes, e.g. monitoring and data submission, quality assurance, collating data, producing assessment reports and initiating new programmes, as and when opportunities arise.

5.7. Thematic Committees should ensure that assessments of monitoring data include a review of the need for any changes in the monitoring of CEMP components and ensure communication of any recommendations to Contracting Parties and, as appropriate, to the Coordination Group and OSPAR. On the basis of the results of an assessment, the decision can be: to continue; to discontinue; or, to change the programme in terms of the parameters measured, the frequency of measurements or the sampling locations. Continuation of some long-term time-series may be of value regardless of the results of the assessment if, for example, they have value as a reference time-series.

5.8. Where a thematic Committee concludes that coordinated, Convention-wide or Region-wide monitoring of a component of the CEMP should be discontinued, it should prepare advice to OSPAR. This should explain the relative costs and benefits of continuing and discontinuing monitoring, taking into account the value of the data collected for further interpretation of temporal and spatial trends and environmental quality status. Where appropriate, the Committee should identify options for reducing monitoring efforts as well as discontinuation. In decisions as to whether to exclude a component from the CEMP, the thematic Committee should be guided by the justification requirements for opting out within that theme. A final decision on excluding a component from the CEMP should be agreed at OSPAR level.

Data storage, handling and scientific assessments

5.9. Assessments based on monitoring data critically depend on practical mechanisms for handling and managing data. It is important that data handling requirements are dealt with in a way that maximises efficiency and reduces costs. The OSPAR Data and Information Management Strategy (ODIMS) and Data and

Information Management System have been designed to deliver this. The data centres for handling CEMP data may be found at national centres (e.g. beach litter <http://www.mcsuk.org/ospar>), at ICES (<http://www.ices.dk/marine-data/Pages/default.aspx>), and in European/Global initiatives such as EMODnet (<http://www.emodnet.eu>) as well as at the Secretariat (<http://www.ospar.org/data>). These centres provide scientific support and processing of data. OSPAR will therefore work to develop and strengthen the roles of these collaborating centres.

5.10. Linking observed changes in state and changes in pressures as well as other independent changes, for example changes in water temperature and in species, may require comparison of data held by OSPAR's data centres with data from other data centres. Data system compatibility will be fundamental in the future for a wide-range of data types. OSPAR will work closely with collaborating centres to ensure that data compatibility and transferability are possible (see link to Data and ODIMS).

Section II – Detailed Themes

6. Theme A – Cross-Cutting Components

6.1. This theme of the JAMP is concerned with integrating the work under the other themes into a wider perspective, alongside more general studies of the seas. Ocean Acidification is a new component where monitoring is being developed. Other components will be included if the need arises.

Theme A components

A1 Parameters related to Ocean Acidification (Appendix A1);

- Measurements of ocean chemistry, e.g. carbonates
- Measurements of pH
- Measurements of impacts on biota

7. Theme B – Biodiversity and Ecosystems

7.1. The Biodiversity Theme of the JAMP covers both the state of ecosystem components and pressures from human activities. Monitoring and assessment under the Biodiversity and Ecosystem Theme of the CEMP (Theme B) has the aim of providing information on:

- a. the status of biodiversity components of marine ecosystems and how these change in space and time (monitoring under the management of the Biodiversity Committee - BDC);
- b. the extent, intensity and duration of human activities and pressures and how these change in space and time (monitoring under the management of the Environmental Impact of Human Activities Committee - EIHA).

7.2. Monitoring under Theme B includes:

- a. monitoring of OSPAR Common Indicators, which are subject to the agreements of the OSPAR Commission on implementation of Common Indicators; and
- b. other monitoring and data collection that has been agreed for the purposes of the implementation of the Biodiversity and Ecosystems thematic strategy and the Strategy for the Joint Assessment and Monitoring Programme (JAMP). These types of monitoring have usually been the subject of a specific OSPAR instrument (Recommendation or other agreement) setting out the scope of the programme.

7.3 Coordinated monitoring is not yet in place in the case of many biodiversity features or recently recognised pressures, such as underwater noise. OSPAR Contracting Parties are therefore endeavouring to improve the coordination of approaches for data collection through the development of OSPAR Candidate Indicators. This includes the development of coordination tools, such as monitoring guidelines, quality assurance procedures and assessment routines.

Theme B components - under the management of the Biodiversity Committee

- BB1 Mammals – M3, Abundance and distribution of seals (Appendix BB1-M3);
- BB2 Mammals – M4, Cetacean abundance and distribution (Appendix BB2-M4);
- BB3 Mammals – M5, Grey seal pup production (Appendix BB3-M5);
- BB4 Birds – B1, Marine bird abundance (Appendix BB4-B1);
- BB5 Birds – B3, Marine bird breeding success/failure (Appendix BB5-B3);
- BB6 Fish – FC1, Fish abundance (Appendix BB6-FC1);
- BB7 Fish – FC2, Proportion of large fish (LFI) (Appendix BB7-FC2);
- BB8 Benthic Habitats – BH2, Condition of benthic habitat defining communities (MMI) (Appendix BB8-BH2);
- BB9 Benthic Habitats – BH3, Physical damage of predominant and special habitats (Appendix BB9-BH3);
- BB10 Pelagic Habitats – PH1/FW5, Plankton lifeforms (Appendix BB10-PH1/FW5);
- BB11 Pelagic Habitats – PH2, Plankton biomass and/or abundance (Appendix BB11-PH2);
- BB12 Pelagic Habitats – PH3, Plankton diversity index (Appendix BB12-PH3);
- BB13 Non-Indigenous Species – NIS3, Trends in arrival of new non-indigenous species (Appendix BB13-NIS3);
- BB14 Food Webs – FW2, Production of phytoplankton (Appendix BB14-FW2);
- BB15 Food Webs – FW3, Size composition in fish communities (Appendix BB15-FW3);
- BB16 Food Webs – FW4, Changes in average trophic level of marine predators (Appendix BB16-FW4);
- BB17 Habitat Mapping Database (Appendix BB17);
- BB18 Marine Mammal Bycatch (Appendix BB18-M6)
- BB19 Mean maximum length of demersal fish and elasmobranchs (Appendix BB19-FC3).

Theme B components - under the management of EIHA committee

- BE1 Marine litter on beaches (Appendix BE1);
- BE2 Marine Litter on the sea floor (Appendix BE2);
- BE3 Plastic Particles in fulmar stomachs (Appendix BE3);
- BE4 Impulsive underwater noise (Appendix BE4);
- BE5 Dumped conventional and chemical munitions (Appendix BE5);
- BE6 Offshore Renewable Energy Developments (Appendix BE6);
- BE7 Dumping of wastes and other matter (Appendix BE7).

8. Theme E – Eutrophication

8.1. The OSPAR Eutrophication Monitoring Programme⁴ is an integral part of the OSPAR Eutrophication Strategy. OSPAR has developed a common assessment framework to assist Contracting Parties to identify, in a consistent way, areas where anthropogenic nutrient inputs may cause pollution. This also enables periodic assessment of the eutrophication status of the OSPAR maritime area and the progress made towards the Strategy's objective. The framework provides the basis for enabling Contracting Parties to assess and classify the eutrophication status of their maritime waters under the Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime Area ("Common Procedure", agreements 2005-3 and 2013-8).

8.2. Progress in reducing nutrient inputs is regularly assessed by OSPAR, based on national implementation reporting by Contracting Parties.

8.3. The monitoring and assessment procedures associated with the eutrophication monitoring programme incorporate a certain degree of flexibility addressing sub-regions of the maritime area with different levels of risk (i.e. problem areas, potential problem areas and non-problem areas with regard to eutrophication) and different characteristics (stratified/non-stratified water bodies, rocky/non-rocky shores etc.). National monitoring programmes are designed to maximise the possibility for using the same monitoring for the EU Water Framework Directive and the EU Marine Strategy Framework Directive for those Contracting Parties bound by these instruments.

8.4. OSPAR has already agreed within the context of the CEMP and the Riverine and Direct Discharges⁵ and the Comprehensive Atmospheric Monitoring Programme⁶ that eutrophication components are to be monitored on a mandatory basis, subject to clearly defined and agreed conditions. These agreements continue to apply in the CEMP. Opt-out provisions do not apply to these components, given that Contracting Parties had already considered opt-out possibilities before commitment to the monitoring. It should be noted that this would not preclude OSPAR deciding on the need for continuing Convention-wide or Region-wide monitoring, based on advice from HASEC.

Theme E components

Marine environmental quality

- E1 Nutrients in seawater (Appendix E1)⁷ to be monitored on a mandatory basis as a requirement of the Eutrophication Monitoring Programme (Agreement 2005-4, revised in 2013);
- E2 Direct and indirect eutrophication effects (Appendix E2)⁸ in problem and potential problem areas to be monitored on a mandatory basis as a requirement of the Eutrophication Monitoring Programme.

⁴ Where the Eutrophication Monitoring Programme is in operation it forms part of the CEMP.

⁵ Agreement 2014-04 (Replaces agreement 1998-05)

⁶ Agreement 2015-04 (Replaces Agreement 2001-7)

⁷ (For the purposes of OSPAR, nutrients covers: NH4-N; NO2-N; NO3-N; PO4-P; plus temperature and salinity, and includes SiO4-Si in potential problem and problem areas with regard to eutrophication)

⁸ For the purposes of OSPAR, eutrophication effects cover: Phytoplankton chlorophyll; Phytoplankton species composition; Macrophytes; Oxygen; Benthic communities. Monitoring is a requirement of the Eutrophication Monitoring Programme. Monitoring of eutrophication effects in non-problem areas is discretionary.

Pressures on the marine environment:

E3 Riverine Inputs and Direct Discharges as a requirement of the Riverine Inputs and Direct Discharges Monitoring Programme (RID) (Agreement 2014-04, applicable from 1 January 2015). The following determinands are to be monitored on a mandatory basis:

- ammonia expressed as N
- nitrates expressed as N
- orthophosphates expressed as P
- total N
- total P
- suspended particulate matter (SPM)
- salinity (in saline waters)

E4 Atmospheric inputs to the Marine Environment as a requirement of the Principles for the Comprehensive Atmospheric Monitoring Programme (CAMP) (Agreement: 2015-04).

The following nutrient determinands are to be measured on a mandatory basis in precipitation:

- ammonium (NH_4^+)
- nitrate (NO_3^-)

The following nutrient determinands are to be measured on a mandatory basis in air:

- in gaseous phase: NO_2 , HNO_3 , and NH_3
- in aerosol phase: ammonium (NH_4^+) and nitrate (NO_3^-)

The following nutrient determinand should be carried out on a voluntary basis in air:

- NO

9. Theme H – Hazardous Substances

9.1. OSPAR's monitoring work on hazardous substances comprises monitoring and assessment of the sources and pathways of contaminants and their concentrations and effects in the marine environment.

9.2. OSPAR has already agreed within the context of the CEMP and the Riverine Inputs and Direct Discharges Monitoring Programme and the Comprehensive Atmospheric Monitoring Programme that certain components for hazardous substances are to be monitored on a mandatory basis, subject to clearly defined and agreed conditions. These agreements continue to apply in the CEMP. Opt-out provisions do not apply to the components that are already monitored on a mandatory basis in 2015, given that Contracting Parties had already considered opt-out possibilities before commitment to the monitoring. It should be noted that this would not preclude OSPAR making decisions on the need for continuing Convention-wide or Region-wide monitoring based on advice from HASEC.

9.3. Certain Theme H components have been categorised as 'Pre-CEMP'. These are components included in the CEMP on the basis of agreements to include in the former-CEMP programme (adopted in 2010 and amended in 2014). Monitoring guidelines, quality assurance tools and/or assessment tools are currently lacking for these components and monitoring of these components is voluntary on a temporary basis, pending the development of those requirements. When HASEC recognises that all three of these requirements for coordinated monitoring are in place, the status will become mandatory. Contracting Parties undertake to support the development of the necessary tools as the basis for coordinated monitoring. These components will be subject to the opt-out provisions set out in Annex 1 once their status becomes mandatory.

Theme H components

Marine environmental quality:

The following components of Theme H of the CEMP are to be measured on a mandatory basis:

- H1 heavy metals cadmium, mercury and lead in biota and sediment (Appendix H1);
- H2 polychlorinated biphenyl (PCB) congeners CB 28, CB 52, CB 101, CB 118, CB 138, CB 153, and CB 180 in biota and sediment (Appendix H2);
- H3 polycyclic aromatic hydrocarbons (PAHs) anthracene, benz[a]anthracene, benzo[ghi]perylene, benzo[a]pyrene, chrysene, fluoranthene, ideno[1,2,3-cd]pyrene, pyrene and phenanthrene in biota and sediment (Appendix H3);
- H4 tributyl tin (TBT)-specific biological effects and TBT in sediment or biota (Appendix H4). Monitoring of TBT concentrations in the marine environment in either sediments or biota should be carried out in parallel with monitoring of TBT-specific biological effects;
- H5 brominated flame retardants hexabromocyclododecane (HBCD) and polybrominated diphenylethers (PBDEs) BDE 28, BDE 47, BDE 66, BDE 85, BDE 99, BDE 100, BDE 153, BDE 154 and BDE 183 in biota and sediment, and BDE 209 in sediment (Appendix H5);

The following components are currently categorised as pre-CEMP and are measured on a voluntary basis on a temporary basis, pending the development of the required coordination tools:

- H6 planar PCB congeners CB 77, CB 126 and CB 169 in biota and sediment. Monitoring of those congeners in sediment should be undertaken only if concentrations of marker PCBs as referred to under 10.4b and Appendix 3 are 100 times higher than the Background Assessment Concentration (Appendix H6);
- H7 alkylated PAHs C1-, C2-, and C3-naphthalenes, C1-, C2- and C3-phenanthrenes, and C1-, C2- and C3-dibenzothiophenes and the parent compound dibenzothiophene in biota and sediment (Appendix H7);
- H8 perfluorooctanesulphonic acid (PFOS) in sediment, biota and water (Appendix H8);
- H9 polychlorinated dibenzodioxins and furans in biota and sediment (Appendix H9). Monitoring of polychlorinated dibenzodioxins and furans should be undertaken only if levels of marker PCBs as referred to under Appendix 3 are e.g. 100 times higher than the Background Assessment Concentration or, when it is known, as an area with high concentrations of polychlorinated dibenzodioxins and furans (hot spots);
- H10 PAH and metal-specific biological effects (Appendix H10);
- H11 general biological effects (Appendix H11);

Pressures on the marine environment

- H12 Riverine Inputs and Direct Discharges to the marine environment as required by the Riverine Inputs and Direct Discharges Monitoring Programme (RID) (Agreement 2014-04 applicable from 1 January 2015).

The following determinands are to be monitored on a mandatory basis:

- total mercury (Hg)
- total cadmium (Cd)
- total copper (Cu)

- total zinc (Zn)
- total lead (Pb)

The following determinands are recommended for monitoring on a voluntary basis:

- hydrocarbons, in particular PAHs and mineral oil;
- PCBs congeners CB 28, CB 52, CB 101, CB 118, CB 153, CB 138 and CB 180;
- γ -HCH (lindane)
- total organic carbon (TOC)

H13 Atmospheric inputs to the marine environment as required by the Comprehensive Atmospheric Monitoring Programme (CAMP) (Guidance for the Comprehensive Atmospheric Monitoring Programme (CAMP) (Agreement 2015-04).

The following determinands are measured on a mandatory basis in precipitation:

- arsenic
- cadmium
- chromium
- copper
- lead
- mercury
- nickel
- zinc
- γ -HCH (lindane)

The following determinands are measured on a voluntary basis in precipitation:

- PCB-congeners CB 28, CB 52, CB 101, CB 118, CB 138, CB 153 and CB 180
- the following PAHs: phenanthrene, anthracene, fluoranthene, pyrene, benz[a]anthracene, chrysene, benzo[a]pyrene, benzo[ghi]perylene, indeno[1,2,3-cd]pyrene

The following determinands are measured on a voluntary basis in air:

- arsenic
- cadmium
- chromium
- copper
- lead
- mercury
- nickel
- zinc
- γ -HCH (lindane)
- PCB-congeners CB 28, CB 52, CB 101, CB 118, CB 138, CB 153 and CB 180
- the following PAHs: phenanthrene, anthracene, fluoranthene, pyrene, benz[a]anthracene, chrysene, benzo[a]pyrene, benzo[ghi]perylene, indeno[1,2,3-cd]pyrene

H14 Annual reporting on mercury losses from the Chlor-Alkali Industry⁹.

H15 Discharges, emission and losses of Chemicals for Priority Action: Agreement 2004-14 (updated in 2006) on Monitoring Strategies for OSPAR Chemicals for Priority Action sets out how OSPAR implements the

⁹ Supported by OSPAR Reporting Format on Mercury Losses from the Chlor-Alkali Industry (Agreement: 2003-5)

suite of agreed monitoring strategies for these specific hazardous substances or groups of hazardous substances. In so far as these monitoring strategies are able to cover CEMP, RID and CAMP elements, they also address, where relevant and practicable, other sources of data and information e.g. from the European Monitoring and Evaluation Programme, OSPAR reports on dumping and placement of wastes or other matter, implementation reports of existing OSPAR and EU measures, reports from specific industries, production and sales figures, EU Water Framework Directive material, one-off surveys, etc.¹⁰.

10. Theme O – Offshore Oil and Gas Industry

10.1. OSPAR's monitoring with regard to the offshore oil and gas industry takes place in support of the application of a risk-based approach to the management of produced water discharges from offshore installations.

10.2. Furthermore, Contracting Parties report annually to the Offshore Industry Committee (OIC) data on discharges, spills and emissions from offshore oil and gas installations, using a common reporting format (Agreement 2012-08¹¹) and procedure for sampling and analysis (Agreement 2006-06¹²). OIC prepares periodic assessments of the impact of discharges, emissions and spills of substances from offshore sources, which cause or are likely to cause pollution. This includes preparation of assessments on specific issues, such as assessments of the impacts of oil and chemicals and cutting piles. The assessments are based on the annual data collection, on research, and on data and information from other sources.

10.3. Monitoring of environmental impacts of discharges from the offshore oil and gas industry is carried out under national monitoring programmes. However, this is guided by the OSPAR Guidelines for Monitoring the Environmental Impact of Offshore Oil and Gas Activities (Agreement 2004-11). OSPAR also has a harmonised reporting format to compile environmental monitoring data and information related to offshore oil and gas activities (Agreement: 2006-07).

Theme O Components

- O1 total amount of produced water and displacement water discharges from offshore installations;
- O2 total amount of dispersed oil (aliphatic oil) discharged to the sea from produced water and displacement water;
- O3 total amount of dissolved oil content (as represented by BTEX components¹³) in produced water and displacement water;
- O4 offshore chemicals discharged from offshore installations; (Appendix O1)
- O5 emissions to air; (Appendix O1)
- O6 accidental spills of oil and chemicals; (Appendix O1)
- O7 discharges of Organic Phase drilling Fluids (OPF) and cuttings, and;
- O8 discharges of radioactive substances in produced water (Appendix R2).

¹⁰ OSPAR Background Documents for Chemicals for Priority Action contain more detailed monitoring strategies.

¹¹ Revised data collection format for the Annual OSPAR Report on Discharges, Spills and Emissions from Offshore Oil and Gas Installations (Replaces 2005-14)

¹² Oil in produced water analysis – Guideline on criteria for alternative method acceptance and general guidelines on sample taking and handling (replaces agreement 2005-16)

¹³ BTEX means Benzene, Toluene, Ethylbenzene, Orthoxylene, Metaxylene and Paraxylene

11. Theme R – Radioactive Substances

11.1. The Radioactive Substances Committee has developed two principal data streams for assessing progress against the Radioactive Substances Strategy; the reporting of discharges from the nuclear and non-nuclear sector and the reporting of environmental concentrations of indicator radionuclides associated with the nuclear and non-nuclear sectors.

11.2. The reporting of discharges is carried out through agreed reporting formats and guidelines for identified sub-sectors of the nuclear (OSPAR Agreement 2013-10, revised 2014) and non-nuclear sectors (OSPAR Agreement 2013-11) as appropriate by each Contracting Party. Sub-sectors of the nuclear sector for which discharge data are reported are nuclear power stations, nuclear fuel reprocessing plants, nuclear fuel fabrication and enrichment plants, research and development facilities and discharges from decommissioning and treatment/recovery of old radioactive waste. Sub-sectors of the non-nuclear sector for which discharge data are reported are oil/gas extraction (including on-shore), phosphate Industry, titanium-dioxide pigment manufacture, primary steel manufacture, rare earth element production, medical, universities and research centres and radio chemical production. Discharge data from the nuclear sector are not assigned to a particular OSPAR region but are reported to OSPAR per Contracting Party for each sub-sector. Discharge data from the non-nuclear sectors are assigned to one of the five regions of the OSPAR maritime area when reported by Contracting Parties.

11.3. The reporting of environmental concentrations of indicator radionuclides associated with the nuclear and non-nuclear sectors is carried out through agreed reporting formats and guidelines (OSPAR Agreement: 2005-8, revised 2011). Environmental concentrations are reported for seawater, fish, molluscs and seaweed where possible. Data on environmental concentrations reported to OSPAR is produced through Contracting Parties' own national monitoring programmes. Data on environmental concentrations are reported to OSPAR for 15 monitoring areas that generally represent subdivisions of the five designated regions of the OSPAR maritime area and that take into account prevailing ocean currents. RSC has, and continues, to work on coordinated reporting of data for its environmental concentration and discharge data streams.

Theme R Components

- R1 Monitoring for indicator radionuclides associated with the nuclear sector is carried out for ^3H , ^{137}Cs , ^{99}Tc and $^{239,240}\text{Pu}$, where possible, in seawater and for ^{137}Cs , ^{99}Tc and $^{239,240}\text{Pu}$, where possible, in biota (fish, molluscs and seaweed); (Appendix R1)
- R2 Monitoring of indicator radionuclides associated with the non-nuclear sector (oil and gas) is carried out for ^{210}Po , ^{210}Pb , ^{226}Ra and ^{228}Ra , where possible, in seawater and biota (fish, molluscs and seaweed); (Appendix R2)
- R3 Liquid discharges from nuclear installations reported as total-alpha, total-beta (excluding tritium), tritium and a suite of other individual radionuclides; (Appendix R3)
- R4 Liquid discharges from non-nuclear installations reported as total-alpha, total-beta and a number of individual radionuclides. (Appendix R4)

Annex 1: Opting out

Guidance to Contracting Parties wishing to present a case for opting out of elements of the Coordinated Environmental Monitoring Programme (CEMP)

General

1. In applying this guidance, Contracting Parties should take into account:
 - a. OSPAR Recommendation 2014/18 on the Strategy for the Joint Assessment and Monitoring Programme (JAMP) and OSPAR Agreement 2014-2, which states that “Monitoring and assessment, based on scientific knowledge, of the seas is the indispensable basis for the management of human activities in our seas. This programme describes the strategy, themes and products that OSPAR Contracting Parties are committed to deliver, through collaborative efforts in OSPAR, over the period 2014-2021”;
 - b. This guidance is based on and aims to be consistent with the ‘Guidance to Contracting Parties wishing to present a case for opting out of part(s) of CEMP’ in previous versions of the CEMP;
 - c. For the differing sections of the CEMP, differing degrees of commitment to monitoring activity will have been established historically in the different OSPAR themes. This guidance does not change such commitments.
2. Where alternative national monitoring approaches are delivering data that can be reasonably integrated into the development or assessment of a component of the CEMP, these do not require an opt-out.
3. Opt-outs will not apply retrospectively to existing CEMP parameters under Themes E and H of the CEMP. It should be noted that this would not preclude OSPAR making decisions as a whole on suitability of ongoing monitoring of any of the parameters, including those under the Themes E and H in the future.
4. The approach OSPAR will apply for all parameters/indicators, apart from existing Themes E and H parameters, is that Contracting Parties should present to the relevant Committee or the Coordination Group (CoG) their intentions for implementation of components of the CEMP as adoption of them arises, or on any subsequent change in circumstances. Such decisions on implementation should be accompanied by a justification for partial implementation of the CEMP, but should not be subject to approval by the Committees. Noting also that not all components of the CEMP will apply to all OSPAR regions. The justification prepared by Contracting Parties should take into account the following guidance:

Justifications

5. The approach OSPAR takes to opt-outs from monitoring commitments is underscored by a risk-based approach. The following justifications have been identified to date, for opting out of elements of the CEMP:
 - i. for pressure/input monitoring, the pressure/input in question has not occurred and is unlikely to occur in all, or a specified part, of the maritime area where the Contracting Party has responsibility and the pressure /input is unlikely to cause transboundary impacts;
 - ii. for biodiversity/ecosystem monitoring the concern identified by OSPAR related to the species or habitat is not present or is unlikely to be present in all, or a specified part, of the maritime area where the Contracting Party has responsibility;

- iii. the particular approach for monitoring adopted elsewhere in OSPAR is not proportionate to the risks/pressures that occur in the Contracting Party's waters. An alternative monitoring strategy should be proposed in this case;
 - iv. monitoring may impose excessive costs in terms of financial/human resources in relation to the risks/damage involved;
 - v. the problem in question occurred in the past but is now no longer a problem or concern in all, or a specified part, of the maritime area where the Contracting Party has responsibility;
6. Contracting Parties should, as appropriate, set out information to explain in more detail the justifications above.

Review

7. For every situation where a Contracting Party has opted out of implementing part of the CEMP, the Contracting Party in question should review the situation at least every six years.
8. The outcome of this review should be reported to the relevant thematic Committee.

Annex 2: Decision tree

Decision tree for considering whether a component should be included in the CEMP

1. The CEMP aims to set out simply and comprehensively all the monitoring that is carried out by OSPAR through its Contracting Parties that delivers OSPAR common assessments. However in order for a new monitoring component to be included in the CEMP the following requirements need to be met:
 - a. the monitoring component should be identified under the North-East Atlantic Environment Strategy (NEAES) or EU Marine Strategy Framework Directive (MSFD);
 - b. a background study (e.g. background document, or equivalent process) has been undertaken for the component that highlights:
 - the state, pressure or impact of the component to be monitored;
 - that the component is considered to be an issue for a significant part of the OSPAR maritime area and/or by a number of Contracting Parties; or
 - that it is a key indicator of the state of the marine environment.
 - c. a monitoring or data collection approach has been developed and has concluded that monitoring in the marine environment is required and has indicated the most appropriate parameters to be measured;
 - d. proven, widely available and cost effective monitoring techniques exist for generation of data e.g. proven techniques for the analysis of the parameter in the chosen matrices.
2. If one or more requirements are not met, the component should not be included.
3. Where information is not sufficient to conclude whether or not a component meets any of the criteria set out in §1, the question of its inclusion should be revisited in the light of the collation of further information by the appropriate subsidiary body or lead country.
4. For monitoring and assessment of a component to be fully coordinated it needs to have in place the following coordination tools:
 - (i) Technical guidelines for monitoring;
 - (ii) Coordinated arrangements for data submission and management;
 - (iii) Quality assurance;
 - (iv) Assessment tools.
5. Progress in the development of these tools will be identified on each CEMP Appendix through the use of dashboard icons as outlined in §4.6 of the CEMP. It should be noted that for some CEMP elements due to the nature of certain issues it may take time, or in some case may not be possible, to fully develop all tools. The CEMP will therefore represent a continuum of monitoring from CEMP components where coordination tools are fully developed to those newly added and where coordination tools are under development.

Section III – CEMP Appendices

The meeting of the Coordination Group in November 2019 agreed to make the CEMP Appendices available on OAP (CoG(2) 19/7/1, §5.3).

<https://oap.ospar.org/en/ospar-monitoring-programmes/cemp/cemp-appendices/>

List of CEMP Appendices

CEMP Appendix A1 for ocean acidification

CEMP Appendix BB1: Abundance and distribution of seals (M3)

CEMP Appendix BB2: Cetacean abundance and distribution (M4)

CEMP Appendix BB3: Grey seal pup production (M5)

CEMP Appendix BB4: Marine bird abundance (B1)

CEMP Appendix BB5: Marine bird breeding success/failure (B3)

CEMP Appendix BB6: Fish abundance* (FC-1)

CEMP Appendix BB7: Proportion of large fish (LFI)* (FC-2)

CEMP Appendix BB8: Condition of benthic habitat defining communities (MMI)* (BH2)

CEMP Appendix BB9: Physical damage of predominant and special habitats* (BH3)

CEMP Appendix BB10: Plankton lifeforms (PH-1/FW-5)

CEMP Appendix BB11: Plankton biomass and/or abundance (PH-2)

CEMP Appendix BB12: Plankton diversity index (PH-3)

CEMP Appendix BB13: Trends in arrival of new non-indigenous species (NIS3)

CEMP Appendix BB14: Production of phytoplankton (FW2)

CEMP Appendix BB15: Size composition in fish communities (FW3)

CEMP Appendix BB16: Changes in average trophic level of marine predators (FW4)

CEMP Appendix BB17: Habitat mapping database

CEMP Appendix BB18: Marine mammal bycatch (M6)

CEMP Appendix BB19: Mean maximum length of demersal fish and elasmobranchs (FC3)

CEMP Appendix BE1 – Marine litter on Beaches

CEMP Appendix BE2 – Marine litter on the sea floor

CEMP Appendix BE3 – Plastic particles in fulmar stomachs

CEMP Appendix BE4: Impulsive underwater noise

CEMP Appendix BE5: Dumped conventional and chemical munitions

CEMP Appendix BE6: Offshore renewable energy developments

CEMP Appendix BE7: Dumping of wastes and other matter

CEMP Appendix E1: Nutrients in seawater

CEMP Appendix E2: Direct and indirect eutrophication effects

CEMP Appendix H1 for mercury, cadmium and lead

CEMP Appendix H2 for PCBs

CEMP Appendix H3 for PAHs

CEMP Appendix H4 for organotins

CEMP Appendix H5 for Certain Brominated Flame Retardants (polybrominated diphenyl ethers + hexabromocyclododecane)

CEMP Appendix O1: Discharges, spills and emissions associated with the offshore oil and gas industry

CEMP Appendix R1: Environmental concentrations of radionuclides associated with the nuclear sector

CEMP Appendix R2: Environmental concentrations of radionuclides associated with the offshore oil and gas non-nuclear sector

CEMP Appendix R3: Liquid Discharges from Nuclear Installations (nuclear sector)

CEMP Appendix R4: Discharges of Radionuclides from the non-nuclear sectors

Components of the pre-CEMP:

Appendix H6: Planar PCBs in sediment and biota

Appendix H7: Alkylated PAHs in sediment and biota

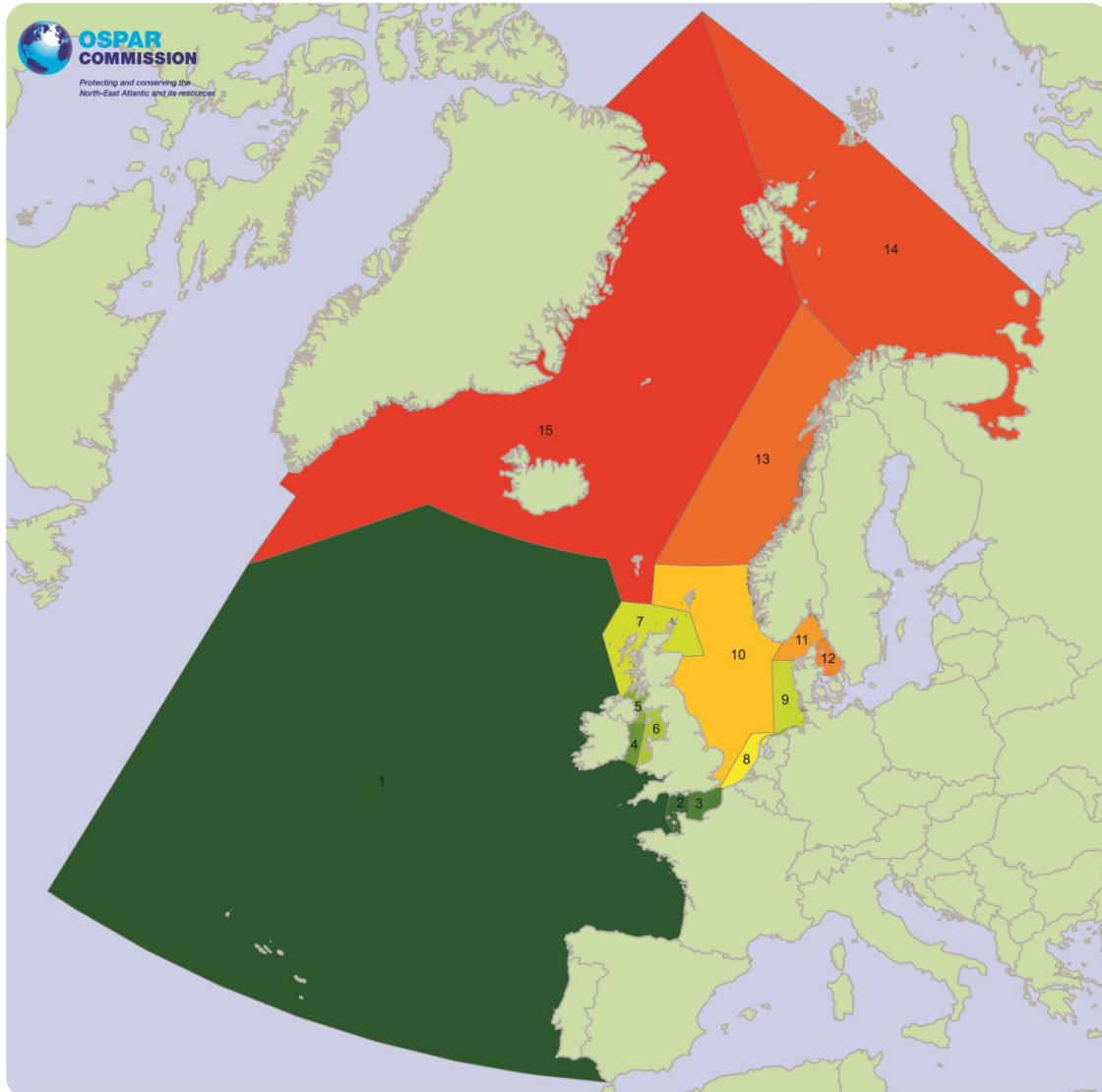
Appendix H8: Perfluorooctanesulphonic acid (PFOS) in sediment, biota and seawater

Appendix H9: Polychlorinated dibenzodioxins and furans in sediment and biota

Appendix H10: PAH and metal-specific relevant biological effects

Appendix H11: General biological effects

Annex 3: Regions identified for the establishment of baselines of concentrations radioactive substances



Region No.	Region Name
1	Wider Atlantic
2	Cap de la Hague Channel
3	Channel East
4	Irish Sea (Rep. of Ireland)
5	Irish Sea (Northern Ireland)
6	Irish Sea (Sellafield)
7	Scottish Waters (Dounreay)
8	North Sea South (Belgian and Dutch Coast)
9	German Bight
10	North Sea (NW, SE and Central)
11	North Sea (Skagerrak)
12	Kattegat
13	Norwegian Coastal Current
14	Barents Sea
15	Norwegian, Greenland Seas and Icelandic Waters

Section IV – CEMP Guidelines (some of these are currently called JAMP Guidelines)

Please see the OSPAR website:

<https://www.ospar.org/work-areas/cross-cutting-issues/cemp>