

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.

Acknowledgement

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Caveat

The outcome of this workshop is the result of expert consultation which may not necessarily reflect the views of Contracting Parties to the OSPAR Commission.

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Report of the OSPAR workshop on MSFD biodiversity descriptors: comparison of targets and associated indicators

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Executive Summary

OSPAR has a role in coordinating the Marine Strategy Framework Directive (MSFD) (2008/56/EC) implementation process within the North East Atlantic region. Within OSPAR, this work is overseen by the Intersessional Correspondence Group on the Marine Strategy Framework Directive (ICG-MSFD) within the scope of the OSPAR Coordination Group (CoG). The Intersessional Correspondence Group for the Coordination of Biodiversity Assessment and Monitoring (ICG-COBAM) is the main delivery group within the OSPAR framework for coordination in relation to the biodiversity aspects of the MSFD. The workshop was organised as part of ICG-COBAM's programme of work on MSFD, under the lead of ICG-MSFD.

The terms of reference, endorsed by the OSPAR Coordination Group, set out the purpose of the workshop: to undertake a comparison and analysis of indicators and associated targets for MSFD biodiversity descriptors 1, 2, 4 and 6 between OSPAR Contracting Parties also involved in the implementation of the MSFD and to identify where common indicators could be identified. Hosted by the Netherlands, the three-day workshop brought together sixty-six technical and policy experts from nine Contracting Parties.

The workshop resulted in summary reports and detailed analyses per ecosystem component, with proposed indicators, associated targets, relevance to different subregions and agreement on species/metrics and targets. From the results it was concluded that there are some promising commonalities between proposed indicators, especially relating to abundance, biomass and by-catch of key species, and area and quality of predominant and listed habitats. Other potential common candidates require further investigation. During the workshop a number of actions were identified that would need to be undertaken in order to take forward the work started by the workshop. These actions relate to the facilitation of further expert discussions, the need for scientific research, and operationalisation of indicators for monitoring. These actions are presented in the report.

Récapitulatif

OSPAR joue un rôle dans la coordination du processus de mise en œuvre de la Directive cadre « stratégie pour le milieu marin » (MSFD) dans la région de l'Atlantique du Nord-Est. Ces travaux sont supervisés, au sein d'OSPAR, par le Groupe intersessionnel par correspondance pour la Directive cadre « stratégie pour le milieu marin » (ICG-MSFD) dans le cadre du Groupe de coordination OSPAR. Le Groupe intersessionnel par correspondance pour la coordination de l'évaluation et de la surveillance de la biodiversité (ICG-COBAM) est le principal groupe travaillant, dans le cadre d'OSPAR, dans le sens de la coordination des aspects biodiversité de la MSFD. L'atelier a été organisé dans le cadre du programme de travail de l'ICG-COBAM quant à la MSFD, piloté par l'ICG-MSFD.

Le mandat, entériné par le Groupe de coordination OSPAR, détermine l'objectif de l'atelier, à savoir entreprendre une comparaison et une analyse des indicateurs et des cibles correspondantes pour les descripteurs 1, 2, 4 et 6 sur la biodiversité de la MSFD parmi les Parties contractantes OSPAR et déterminer lorsque des indicateurs communs peuvent être identifiés. Cet atelier de trois jours, accueilli par les Pays-Bas, a réuni soixante-six experts techniques et politiques représentant neuf Parties contractantes.

L'atelier a produit des comptes rendus et des analyses détaillées par composante d'écosystème, comportant des indicateurs proposés, des cibles correspondantes, la pertinence pour diverses sous-régions et convenant d'espèces/métriques et cibles. Les résultats permettent de conclure qu'il existe quelques points communs prometteurs entre les indicateurs proposés, en particulier en ce qui

concerne l'abondance, la biomasse et les captures accessoires des espèces clés ainsi que la zone et la qualité des habitats prédominants et figurant sur la liste. D'autres candidats communs potentiels devront faire l'objet de considérations supplémentaires. L'atelier a déterminé un certain nombre de mesures à prendre afin de faire progresser les travaux qu'il a amorcés. Il s'agit de faciliter des discussions supplémentaires parmi les experts, de recherches scientifiques et de la mise en œuvre d'indicateurs pour la surveillance. Ces mesures sont présentées dans le présent rapport.

Background and aims of the workshop

According to the Marine Strategy Framework Directive (MSFD) (2008/56/EC), EU Member States have to determine Good Environmental Status (GES) for their marine waters (Art. 9) and establish environmental targets and associated indicators in order to guide progress towards achieving GES (Art. 10). Marine strategies for achieving GES across regions and subregions need to be coherent, coordinated and have common approaches (Art. 5.2). The Directive sets out an ambitious timeline with these outputs from Member States required in 2012.

OSPAR is coordinating the MSFD implementation process within the North-East Atlantic region. The MSFD coordination within OSPAR is facilitated by an Intersessional Correspondence Group on the Marine Strategy Framework Directive (ICG-MSFD) that brings together national policy leads of MSFD implementation, overseen by the OSPAR Coordination Group. Issues of biodiversity are managed by the Biodiversity Committee (BDC), within which the Intersessional Correspondence Group on Coordination of Biodiversity Assessment and Monitoring (ICG-COBAM) is the main delivery group within the OSPAR framework for coordination in relation to the biodiversity aspects of the MSFD. Outcomes of the work of ICG-COBAM are reported to BDC and fed into the work of ICG-MSFD.

Good Environmental Status is defined in MSFD Article 3.5 and is elaborated by 11 descriptors of GES (MSFD Annex 1). GES should be assessed according to the procedure given by Article 9, which includes criteria and indicators for each descriptor in the EC Decision on criteria for GES¹.

Currently sets of species and habitats are being selected within EU Member States under Article 10 of the MSFD, taking account of the guidance in the EU Commission Decision 2010/477/EU and aiming at delivery by 2012. Presentation of preliminary results by some Contracting Parties in ICG-COBAM(2) 2011 showed a significant risk of diverging choices. CoG(1) 2011 recognised a short-term need to improve comparability of these proposals between countries, in order to fulfil the MSFD requirement of regional coordination for 2012 products and in the next assessment cycle.

For this reason the Netherlands proposed to organise and host a workshop to facilitate exchange of approaches between countries in order to improve consistency. The Terms of Reference for the workshop were endorsed by CoG (2) 2011 at their meeting on 26-27 October 2011 (Annex 2).

The purpose of the workshop was to undertake a comparison and discussion on the state aspects of biodiversity and identify where there may be commonalities in setting targets and associated indicators for the MSFD biodiversity descriptors 1, 2, 4 and 6 (see box 1). This has been achieved by:

- Exchange of information on the state of affairs and approaches being followed to select indicators and targets in the participating Contracting Parties, acknowledging that progress will differ between countries;
- Identification of aspects where consistency can be improved, moving towards common sets of indicators for MSFD subregions;

¹ Commission Decision of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters (2010/477/EU).

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- Special focus on the coordination of selecting representative species and habitats, and
- Proposing next steps to meet short term (2012 products) and medium term (2014 and beyond) coordination needs.

It was the intention of the workshop to deliver the following results:

- Insight in similarities and differences between indicators/metrics and targets (between member state and per subregion) by finalizing a (preliminary) output table, with a focus on state aspects.
- A plan for future steps for dealing with differences: how can these be reduced, how Contracting Parties will deal with these, including agreeing arrangements for future actions;
- Insights into the possibility of a common and generic set of indicators that would be applicable across subregions, and, if possible, a first proposal for a common and generic set of indicators (per subregion);
- Insight into the possibility of conducting joint monitoring by subregion.

The chair indicated that the workshop would not aim to consider *scale* and *monitoring issues* specifically, although they were relevant to the discussions.

Box 1: Qualitative descriptors for determining good environmental status (EU Directive 2008/56/EC, Annex 1)

- Descriptor 1: Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
- Descriptor 2: Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
- Descriptor 4: All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
- Descriptor 6: Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

Approach and organisation of the workshop

The workshop was hosted by the Netherlands at Silver Tower in Amsterdam from 2-4 November 2011. The workshop was prepared by Lisette Enserink (Chair, NL), David Connor (Convenor of ICG-COBAM, EC), Emily Corcoran (OSPAR Secretariat), Jane Hawkrige, Ian Mitchell and John Weinberg (UK), Ingo Narberhaus (DE), Laurent Guérin (FR), Peter Heslenfeld, Sandra van der Graaf and Corinne van Everdinck (NL). Kylie Bamford (UK) represented ICG-MSFD. The workshop was facilitated by Rob Bonte and Lucie Terwel from Royal Haskoning. Marieken van der Sluis (IMARES) carried out an inventory and initial analysis of nationally selected indicators.

The workshop engaged 66 technical and policy experts from nine Contracting Parties and five Observer organizations. The OSPAR Secretariat was also in attendance. The participant list is at Annex 1.

The endorsed terms of reference are presented at Annex 2. The three-day workshop programme (Annex 3) comprised presentations (including setting the context, introducing the pre-workshop analysis, the experience and approach (CORESET) taken by HELCOM and an introduction to the commonalities and differences between nationally selected indicators), interactive sessions, plenary and subgroups.

Preparation

The workshop was preceded by an inventory of the indicators for Descriptors 1, 2, 4, and 6 that are currently being identified for preliminary selection by Contracting Parties. Indicators were summarized in tables for each ecosystem component including indicator type (e.g. state, pressure), target, subregion, relation to Commission Decision Indicators, and an initial analysis of commonalities and differences between Contracting Parties. These tables formed important input to the workshop. In advance of the workshop, the preparation team 'transformed' the Tables into draft output tables per ecosystem component that would be used by the participants to analyse commonality of indicators and targets and to record the results of this analysis in a manner that would be comparable across groups. The Output Table mapped the indicators and targets that had been proposed at a national level against the Commission Decision Criteria and indicators.

The Output table template is embedded here for reference:



During the workshop subgroups were asked to consider the following questions for each ecosystem component:

- Which other commission decision indicators is the proposal applicable to?
- Relevant to which subregions?
- Is there agreement within the group on the selection of species/habitats for the proposed metric?
- Could the group agree on the proposed parameter/metric?
- Could the group agree on the proposed target?
- The overall agreement within the group as to the suitability of the metric as a candidate for use across the region or a subregion.

Subgroups

The workshop was arranged around subgroups, structured according to the ecosystem components of functional species groups and predominant habitat types. These subgroups came together in plenary sessions at various stages to share progress, insights and challenges. The subgroups were as follows (their composition is presented at Annex 5):

- Mammals and reptiles;
- Birds;
- Fish, Cephalopods and Pelagic habitats;
- Rocks and biogenic reef habitats;
- Sediment habitats (this group was combined with the rock group for the first day);
- Non indigenous species
- Food webs (this subgroup was established in response to a need identified during the workshop).

Each subgroup was requested to consider the following issues (see annex 6 for further details):

- To analyse the targets and indicators proposed by Contracting Parties and presented in the compiled synthesis, and to record the outcomes of the subgroup analysis in a common Output Table;
- Where possible to elaborate common and comparable indicators;

- Identification and analysis of opportunities for cooperation in MSFD subregions;
- Species selection (per subregion);
- Discussion of a common and generic set of indicators/metrics and target;
- Consider the possibilities for joint monitoring;
- Consider actions and arrangements needed to take further steps.

It could be important to note, that, due to a lack of expert or participants, “pelagic habitats”, “turtles” and “cephalopods” were not examined. “NIS” suffered from a lack of both participants and proposed indicators/targets, to be significantly conclusive.

Results of the workshop

Presentations

1. The workshop started with an introduction setting the context and scope by David Connor (Chair of ICG-COBAM, European Commission) and Lisette Enserink (the Netherlands). This reflected on the following points:
 - The workshop results would be incorporated in the *OSPAR Advice Manual for MSFD Biodiversity Descriptors* which would then be available to Contracting Parties before the end of December 2011. This advice manual contains terminology, basic information and approaches to define indicators and targets. The manual intends to facilitate improved understanding and commonality between Contracting Parties.
 - The advice manual will be spread amongst coordinating groups within OSPAR and will also be shared at EU level via CIRCA (including other regions).
 - The results of the workshop provides a snap shot of the state of progress by the Contracting Parties in terms of the identification of targets and indicators for the biodiversity indicators, and provide an insight in potentials for commonality and consistency across regions and subregions. The results (output tables) will be preliminary and not finalized. There will be time for further iteration to refine the detail of indicators up to 2014.
 - Indicators can relate to state, impact, pressure and to operational measures; it is important to consider the relationship between GES and pressures from human activities. Currently, many indicators purely focus on state, rather than on pressures.
 - Indicators should:
 - Reflect measurable aspects of state (or pressure, or activity)
 - Link, if possible, to specific impacts or pressures
 - Have threshold values that define desired quality
 - Be common across regions or subregions
2. Following the introduction to the workshop, Ulla Li Zweifel (Sweden) introduced the experience of countries bordering the Baltic Sea to develop a core set of indicators and targets for the HELCOM-region. Some highlights of this presentation include:
 - HELCOM has decided to develop a core set of indicators that support the Baltic Sea Action Plan as well as the implementation of the MSFD. These include indicators for biodiversity;

- The indicators should reflect the state of a functional group or habitat type and respond to (or reflect) human impact;
 - There is common agreement about 18 core indicators and 22 candidate indicators.
 - The approaches and principles used to define GES differ, depending on type of indicator and data available.
3. Finally, Marieken van der Sluis (IMARES, the Netherlands) presented the results of an inventory she carried out about commonalities and differences between nationally selected indicators. General findings:
- The ultimate aim is to enhance commonalities and trend to a common set of indicators. Currently, there are many differences between Contracting Parties;
 - The distribution and abundance criteria have the highest consistency. Within the North Sea region there might be some consistency in the indicators but not in the species on which these indicators are based. Discussion on suitable habitats and species is needed.
 - The type of indicators proposed by Spain, Portugal and France differ significantly from those proposed by the North sea countries. Spain and France propose an alternative approach (operational indicators) for all ecosystem components. This proposal requires some clarification.
 - There seem to be differences in the interpretation of Commission Decision terminology. This requires attention during subgroup discussions.

All presentations made at the workshop have been made available on the OSPAR website (workshop folder).

The results of each of the seven subgroups are presented in Annex 6 appendices A-F. The summary reports present the key points of discussion, conclusions and actions that would need to be taken in order to continue the work towards common indicators. Each subgroup recorded the results of their analysis of the proposed national indicators and targets using the standard output table presented in Chapter 3. These output tables are embedded in the relevant Appendices to Annex 6.

Discussion

This section of the report highlights the main subjects of discussion raised during the workshop, distilling both the common issues raised in the subgroups and those raised in plenary.

Definitions of terms

- Some discussion arose about definitions and understandings, e.g. about the term 'distributional range' and 'pattern' and about the definition of water birds/waders/shorebirds/seabirds.
- In some cases the purpose of a proposed indicator was not clear. Clarity of purpose and setting a target that contained a clear measure of progress towards good environmental status were considered to be important features. Many of the targets were based on trends, and did not set clear limits as to when GES would be achieved;
- Many terms (e.g. native versus non-indigenous, established versus observed, levels and nature of impacts, etc.) for Descriptor 2 (Non-indigenous species) are confusing and should be discussed and agreed prior to the elaboration of common indicators, targets and monitoring issues.

Gaps in coverage

- No targets and indicators had been proposed for cephalopods.
- No targets or indicators were proposed for Environmental Impact of Non Indigenous Species (NIS).
- Whilst pelagic habitat indicators had been proposed by Contracting Parties there was not the expertise in the group to adequately consider these in the time available. It was therefore agreed that a pelagic habitat group should be convened following the workshop to give proper consideration to indicators and targets identified for pelagic habitats, as well as the questions raised by the Fish working group.
- During the plenary discussion, it was recognised that a by-catch indicator for turtles has been proposed by both Spain and Portugal, but this did not reach the subgroup for discussion (due to an administrative error). Following the workshop these proposals were added to the output spreadsheet of the mammal and reptiles subgroup (enclosed with this report).
- Discussion about indicators and targets for missing components. It was suggested to focus on what we have now but leave this item open for future.

Level of detail in relation to time schedule

The level of detail should be defined according to short (2012 reporting), middle (2014, monitoring needs) and long term (2018, GES revision) issues. The deadline for defining GES, indicators and targets is July 2012. The development of monitoring programmes to start measuring progress towards targets will however, only be due for implementation in 2014. It was therefore noted that there is the possibility to continue to refine and develop indicators between 2012 and 2014 to ensure they are fit for purpose. Therefore, it was considered to be important to define the level of detail that is needed for the initial deadline in 2012.

It was proposed that it would be helpful to develop a specification/ criteria for acceptable level of detail for first round indicators and targets, and clarification of the level of confidence that is needed for this round of targets and indicators. This has been identified in a set of general actions articulated in Chapter 7.

Commonalities

The participants found different levels of commonality across the targets/indicators put forward by Contracting Parties, for the different Commission Decision criteria. The most promising common candidates are indicators relating to abundance, biomass and by-catch. It was acknowledged that the specific species to be used in the indicators would vary from subregion to subregion.

Those relating to population demonstrated a range of ideas and may require further investigation to understand which approach would be the most comprehensible to the end user (policy makers). Relative abundance indicators present some more complex theoretical differences and may need more detailed investigation and review. The most significantly different approach was that proposed by Spain (more operational indicators). However, this was mainly due to a different interpretation of the scope of the workshop. Other CPs use similar pressure and operational indicators but had not submitted them for the preparation of this workshop.

Monitoring

Participants identified a need for more work to clarify methodologies for monitoring including surveys design to ensure commonality.

Once a common set of regional indicators is developed it is essential to develop coordinated international monitoring programmes, building on the two Small Cetacean Abundance in the North Sea surveys (SCANS, see <http://biology.st-andrews.ac.uk/scans2/>) and the Cetacean Offshore Distribution and Abundance in the European Atlantic survey (CODA, see <http://biology.st->

andrews.ac.uk/coda/). Additionally, the Joint Cetacean Protocol (JCP, see Annex I) provides a mechanism to collate and analyse effort related sightings data from a wide variety of sources (e.g. governmental organisations, non-governmental organisations, academic institutions and marine renewable energy companies) to estimate spatio-temporal patterns of species abundance, thereby enabling robust transboundary reporting..

It was apparent that there is huge diversity in the characteristics of the different subregions within the North East Atlantic, which in turn will affect sampling strategy and the necessary sample strata.

Necessity of a break out group on food webs

During the workshop it became clear that an additional break out group was required to consider indicators and targets relating to food webs (Descriptor 4). The rationale was discussed during the break out session (see appendix F). The working group defined a need for a working document describing the issues particular to the development of targets and indicators to deliver this descriptor. This document could then be used as a basis for further discussions in, for example, ICG-COBAM. The food web group also felt that an expert group on food webs would be needed to discuss and develop targets & indicators for this descriptor. A proposal was made that such an expert group under OSPAR could be in some way associated with the HELCOM food web expert group, who are at a similar stage of development .

Contracting Parties that are also Member States should raise with the European Commission difficulties experienced in developing suitable targets & indicators, and knowledge gaps for the descriptor of food webs. Knowledge gaps on food webs may be addressed and covered by future frame work calls of the European Commission research projects. It is feasible that a project could be built on delivering (regionally and subregionally optimised) indicators and targets for D4.

Non Indigenous Species (NIS)

Some Contracting Parties have proposed management measures as targets for NIS (2.1.1) with underpinning indicators based on reducing the risk of introduction through pathways and vectors. Some Contracting Parties are currently unsure if this approach will be accepted by the Commission.

Most indicators proposed by Contracting Parties are very vague. Further specification will be necessary to ensure consistency between the proposed indicators.

There were a number of discussions about including efforts from international agreements and obligations (e.g. IMO) when defining indicators and targets, or whether these should be considered during the development of management measures.

Defining the scope of the NIS descriptor was a discussion point. There is currently a mix of targets and indicators either covering both NIS and INIS (invasive non indigenous species), or only NIS.

Need for Scientific advice

The subgroups identified a large number of knowledge gaps that require expert advice and possibly new research. In some cases groups identified ICES as the most appropriate source of expert advice, and began formulating requests. (see Outstanding issues and questions). Further discussion is needed with the OSPAR Secretariat and ICES to discuss the feasibility of these requests and the capacity for ICES to address these in the timescales required to adhere to the MSFD deadlines through standard or fast track processes. It was also indicated that in some cases ICES may not be the most appropriate source of advice, particularly where there is not an established expert group, and so it may be appropriate for Contracting Parties to nominate experts to an expert grouping within the context of OSPAR. The OSPAR Secretariat recalled the process for requesting advice from ICES through OSPAR. OSPAR negotiate an annual work plan for the delivery of advice from ICES. The work plan for 2013 will be negotiated in the current meeting cycle and agreed in June 2012 for delivery

in June 2013. It is however possible for MSFD related work that a fast track process can be explored. In the first instance, subgroups that felt it appropriate to seek advice from ICES were requested to develop terms of reference and forward these to the OSPAR Secretariat by the 21 November so that these could be considered at ICG COBAM 28-30 November 2011.

Workshop conclusions

This chapter sets out the main conclusions of the workshop:

1. A number of strong candidates for common indicators/targets were identified, especially abundance, biomass and by-catch of key species, and area and quality of predominant and listed habitats. For some ecosystem components (like fish), there are also commonalities for distributional range and pattern.

The common indicators are often generic in their description, allowing for subregionally operationalised indicators and targets to be developed in future e.g. the choice of sensitive indicator species and metrics which are relevant to the subregion and responsive to pressures for that particular subregion.

2. A number of other indicators were identified as potentially useful common indicators, but further development would be needed before they could be put forward. The Commission's acceptance of some proposed targets and indicators by Contracting Parties may need to be investigated.
3. In addition to coordination for the state indicators that were the focus of the current workshop, a full common set of indicators will also require more pressure and impact indicators and targets to more clearly link to future monitoring and measures.
4. A common set of criteria should be developed for selecting regionally appropriate species in implementing each indicator. Indicators should not be limited to declining or vulnerable species.
5. Some existing indicators fall under the Habitats Directive and can be directly applied in an MSFD context. Also, the targets used under HD can form a basis for targets under MSFD. However, HD targets may not be sufficient to achieve GES as defined in the MSFD, as they do not sufficiently address restoration aspects and some Contracting Parties have not yet achieved sufficient tools / coverage outside of Natura 2000 sites.
6. There are still gaps, with no indicators or targets developed (for example: deep sea and coastal fish species) and gaps in knowledge (i.e. food web interactions and subtidal rock, biogenic habitats and the definition of suitable baselines across Member States).
7. The OSPAR Framework is the appropriate mechanism to progress this work and it was considered necessary that arrangements are made to continue this work and take it forwards.
8. Non indigenous species: Contracting Parties did not propose targets for the Environmental Impacts of NIS. There is inconsistency regarding the scope of this Descriptor with regards to the inclusion of all NIS, rather than invasive NIS. The development of consistent targets and indicators was felt to be at a disadvantage, as there are no other directives/ targets to be used as references. Terminologies, the use of reduction targets and surveillance indicators proposed by CPs for NIS (abundance, occurrence, and distribution) may certainly need detailed expert discussion.
9. More attention should be paid to food webs. In order to have a proper ecosystem-based management as the MSFD aims at, we need not only focus on structure of systems (abundance/ distribution), but also on the actual *functioning/dynamics of the ecosystem*. Descriptor 4 is the most suitable descriptor for this.

10. Discussions with the EC should take place with regards to difficulties in developing suitable targets & indicators, and knowledge gaps for the descriptor of food webs. Knowledge gaps on food webs may be addressed and covered by future research framework calls of the EC. A project could be built on delivering (regionally and subregionally optimised) indicators and targets for D4.

Overarching issues and next steps

Summary of action points identified by workshop participants

(NB each working group specified ecosystem relevant actions in the working group summaries Annex 6 A-G)

Action	By whom	Lead	when
Finalize Biodiversity Advice Manual / develop management summary for ICG-MSFD/CoG.	NL + Drafting Group	NL + Drafting group	Before deadline of ICG MSFD
Review and validate the outputs of the workshop across OSPAR including by Contracting Parties that were not able to participate in the Workshop	ICG-COBAM ICG-MSFD OSPAR Biodiversity Committee	NL	28-30 November 2011 13-14 December 2011 16-20 February 2012
Facilitate the continuation of expert groups from this workshop	ICG-COBAM	?	COBAM (3) 2011
Develop a clear work programme that reflects the outcomes and priorities of the workshop	ICG-COBAM	Convenor	COBAM (3) 2011
Consider how Contracting Parties can contribute to achieving the COBAM workplan	OSPAR Contracting Parties	CP HODs	COBAM (3) 2011; BDC 2012
Develop a strategy to prioritise requests through ICES relating to the outputs of the workshop	Expert participants - to formulate clear ToR/ Requests to ICES; OSPAR Secretariat to help facilitate communication with ICES Secretariat as appropriate Contracting Parties to facilitate access to ICES subgroups bilaterally as appropriate	COBAM	Strategy to be developed by the end of 2011

Engagement/ linking with other technical expert groups (e.g. those established through other Regional Seas Conventions, associated with other Directives)	CPs of ICG-COBAM and ICG-MSFD with the support of the OSPAR Secretariat	?	ASAP
Take forward research on Pressure-Impact Causality	TBC – should this be a request to ICES, or elsewhere? Are Contracting Parties already taking this forward? E.g. via ICG-Cumulative effects	NL/ICG-C?	Ongoing.
Compile ongoing projects in CPs over FP7 programmes. Make use of the work of ICG-Cumulative Effects (ICG-C) that compiles already existing projects on methods for pressure mapping.	ICG-COBAM	?	?
Develop a specification/ criteria for acceptable level of detail for first round indicators and targets. What level of confidence is needed for this round of targets and indicators, what is the level of certainty?	ICG COBAM/ ICG MSFD UK to share criteria?	?	ICG-COBAM (3) 2011/ ICG MSFD (4) 2011
Agree which potential common indicators and targets should be prioritised for further development	OSPAR Contracting Parties who are Member States	CP HODs	ICG-MSFD (4) 2011

Workshop close

The workshop closed at 12.30 4th November 2011. The chair extended thanks to the Government of the Netherlands for their kind hospitality, to the organizing committee, the facilitation team and the participants for their commitment to work together on some difficult issues.

Annex 1 – List of participants

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Report of the OSPAR workshop on MSFD biodiversity descriptors, comparison of targets and associated indicators

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Report of the OSPAR workshop on MSFD biodiversity descriptors, comparison of targets and associated indicators

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Annex 2 – Terms of Reference

Terms of Reference of an OSPAR workshop on MSFD biodiversity descriptors: comparison of targets and associated indicators

Objective of the workshop

1. The workshop will facilitate comparison of indicators and associated targets for MSFD biodiversity descriptors (1, 2 4 and 6) between OSPAR Contracting Parties that implement the EU Marine Strategy Framework Directive. It will focus on nationally selected:

- a. representative species and habitats,
- b. and related indicators and targets,

for these MSFD indicators and associated targets with the aim to identify areas where comparability can be improved and propose steps forward to meet short term (2012 products) and medium term (2014 and beyond) coordination needs. The workshop will be prepared under the lead of ICG MSFD and in cooperation with ICG COBAM. The results of the workshop will be shared with the EU through WG GES.

Rationale and background

2. Sets of species and habitats are currently being defined within EU Member States under Article 10 of the MSFD, taking account of the guidance in the EU Commission Decision 2010/477/EU and aiming at delivery by 2012. Presentation of preliminary results by some Contracting Parties in ICG COBAM(2) 2011 showed a significant risk of diverging choices. CoG(1) 2011 recognised a short-term need to improve comparability of these sets between countries, in order to fulfil the MSFD requirement of regional coordination for 2012 products and in the next assessment cycle. A proposal by the Netherlands to organise and host a workshop to facilitate exchange of approaches between countries in order to improve comparability was welcomed. OSPAR 2011 subsequently agreed upon the workshop. The workshop will build on recent work by ICG COBAM².

Background materials to set context for the workshop

3. The workshop preparation team³ will prepare an inventory of national sets of species and habitats and related targets that are nominated or identified to operationalise indicators under the biodiversity descriptors. This inventory will be carried out in September/October 2011, involving all OSPAR Contracting Parties implementing the MSFD. It will use the latest version of the EU WG DIKE reporting format for Article 10, thereby generating experience in using this format. For the analysis and comparison of indicators and metrics this reporting format will be modified where necessary.

4. The results of the inventory will be analysed in order to identify similarities and differences between countries sharing a subregion and reported in a background document for the workshop. The

² Relevant products: 1. OSPAR/MSFD workshop on approaches to determining GES for biodiversity, held on 23-24 November 2010 in Utrecht, the Netherlands (OSPAR publication n° 468), and 2. OSPAR's MSFD advice manual on biodiversity (OSPAR 11/3/3-Add.1).

³ The preparation team consists of Lisette Enserink (lead), David Connor (ICG-COBAM chair), Emily Corcoran (OSPAR Secretariat), Jane Hawkrigde, Ian Mitchell and John Weinberg (UK), Ingo Narberhaus (DE), Laurent Guérin (FR), Peter Heslenfeld, Sandra van der Graaf and Corinne van Everdinck (NL). Kylie Bamford (UK) represents ICG MSFD.

Netherlands intends to put out the main work to a contractor, who will receive assistance from the UK (Region II and III), France and Spain (Region II, IV).

Workshop design

5. The preparation team will further develop the workshop design. It will include the following elements:

- a. presentation of the inventory described above;
- b. presentations on:
 - national approaches to defining representative species and habitats;
 - lessons learnt in cooperation between neighbouring countries, e.g. in the Irish Sea and the Bay of Biscay and Iberian Coast;
 - (sub)regional cooperation (indicator core sets) by HELCOM [and HARMONY];
 - explanation of quality and quantity aspects of GES (*cf.* Common understanding document of WG GES).
- c. further analysis of the inventory and development of recommendations/next steps to improve comparability between countries sharing a subregion and to address the need for coordination. This work will most effectively be carried out in subgroups and per ecosystem component (functional group), taking account of the requirements under descriptors 1, 4 and 6.
- d. workshop conclusions, including common understanding of the current level of coordination for biodiversity indicators within OSPAR Regions and potential next steps for short and medium term products.

Workshop output

6. Report on conclusions of the workshop and potential next steps for coordinated development of indicators and targets for descriptors 1, 2, 4 and 6 (by end of November/early December 2011). This report will contain a Table reflecting the state of play with respect to the level of coordination of defined indicators for the Commission Decision indicators.

Practical arrangements

7. 2½ day workshop to be held from 2 November 9 am to 4 November 12 am.

8. Meeting venue: Zilveren Toren Amsterdam, which is next to Amsterdam Central Station, see <http://www.regardz.nl/locaties/event-centers/regardz-zilveren-toren-amsterdam-centrum.aspx>. Current arrangements are based on 70 participants.

9. Full representation across OSPAR Contracting Parties (including European Commission) would be sought. In particular:

- national policy leads on MSFD (ICG MSFD);
- national project managers for the development of indicators and targets for biodiversity descriptors;
- environmental scientists/ecologists with marine biodiversity expertise that are involved in this work;
- representatives of HOD, CoG, BDC and ICG-COBAM.

Participation

10. In accordance with OSPAR Rules of Procedure, all Contracting Parties and Observers will be invited to participate in the Workshop on MSFD biodiversity descriptors: comparison of targets and associated indicators.

Annex 3 – Workshop programme

This annex reflects the initial workshop programme. During the workshop the programme was adapted to the respond to the progress of the workshop, including:

- More emphasis on the parallel sessions;
- Reduced sessions in plenary;
- Postponing the the harvest/ collation of results to Friday morning.
- No subregional subgroups took place (only ecosystem component groups, which in turn considered the subregions).
- The habitat subgroup was subdivided into a) rock and biogenic reef habitats and b) sediment habitats.
- Two more subgroups were formed on Thursday: non indigenous species and food webs.

Day 1: Wednesday November 2nd 9.00 – 17.30	
Exchange of Biodiversity indicator and target selection in OSPAR Contracting Parties	
<i>This day is structured according to “Ecosystem components” to allow for in-depth exchange of ideas by experts across the OSPAR-region.</i>	
9.00-9.30	Welcome by host (Lisette Enserink, the Netherlands) <i>Exposition: Sharing ideas about the future of the Marine Environment</i> All participants will be invited to bring an item, picture, or write a word that symbolizes their desired future of the Marine Environment. Attached is a nametag. In ten rounds of one minute they are invited to ask others about the meaning of their item. After this session they are asked in a plenary meeting, to share what they have heard. The exposition will be placed in a central part of the meeting venue so it can be visited during the workshop.
9.30-9.50	Presentation 1: General introduction to the workshop by David Connor (Chair of ICG-COBAM, European Commission) and Lisette Enserink (the Netherlands)
9.50-10.10	Presentation 2: Successful cooperation in the HELCOM-region by Ulla Li Zweifel (Sweden)
10.10–10.45	Presentation 3: Commonalities and differences between nationally selected indicators by Marieken van der Sluis (IMARES, the Netherlands)
10.45-11:00	Break and break up in parallel subgroups
11.00 – 12.45	Session A of parallel sessions on elaborating common or comparable indicators into 4 subgroups. Subgroups are structured according to Ecosystem Components: <ul style="list-style-type: none"> • Birds • Mammals and Reptiles • Fish, Cephalopods and Pelagic habitats • Benthic habitats
12.45- 14.00	Lunch Break
14.00 – 15.45	Session B of parallel workshops

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15.45 – 16.15	Short Break
16.15 – 17:00	Harvest and breakout definition session <ul style="list-style-type: none"> - Delivery of the results of the parallel subgroups by the rapporteurs - Choosing issues for the special breakout sessions for tomorrow morning
Day 2 : Thursday November 3rd 9.00 – 17.00	
Analysis of opportunities for cooperation in MSFD subregions	
9.00-12.00	Continuation of Ecosystem Component subgroups and breakout sessions on “special issues” We expect some – if not all – ecosystem component groups to continue their discussion, as well as new groups to discuss overarching issues. The participants split up in 3 to 6 groups for in depth sessions on special issues. Some of these are predefined by the organizers, others are selected on the basis of requests of the participants. These issues are content (indicators, targets)-oriented. Process-oriented workshops are scheduled for Thursday-afternoon.
12.00-12.30	Explanation of the afternoon programme
12.30 – 13.30	Lunch
13.30 – 15.00	Session 1 of follow up workshops. In the afternoon we will work in subregional subgroups, participants can subscribe for: A: Region II – Greater North Sea with Region III – Irish Sea B: Region IV – Bay of Biscay with Region Y – Wider Atlantic Main issues per Region to be discussed are: <ul style="list-style-type: none"> • Species selection • Towards a core set of indicators/metrics and targets • Possibilities for joint monitoring
15.00	Break
15.30 – 17.00	Session 2 of follow up workshops
Day 3: Friday November 4th 9.00 – 12.00	
Harvesting and further steps	
9.00-10.30	Harvest per ecosystem component Four or five plenary presentations on “where are we now” per ecosystem component in terms of <ul style="list-style-type: none"> • potential ‘core’ indicators and targets • representative species and habitats In these presentations the issues of comparability, coordination needs, and dealing with subregional commonalities and differences will be highlighted.
10.30–11:00	Break
11:00-11.45	Harvest from subregional subgroups The reporters of the subregional subgroups present the outcomes. These are discussed in a plenary session.
11.45-12.00	Closing session: arrangements for follow-up: actions, deadlines, people.

Annex 4 – Composition of subgroups

Mammals and reptiles	
Naomi Matthiessen (chair)	UK
Moniek Löffler (rapporteur)	NL
Richard Czeck	DE
Jan Haelters	BE
Eunice Pinn	UK
Isabelle Rombouts	FR
Martine van den Heuvel-Greve	NL
Rick Wortelboer	NL
Ulla Li Zweifel	SE
Birds	
Participants	
Ian Mitchell (chair)	UK
Peter Heslenfeld (rapporteur)	NL
Sagrario Arrieta	ES
David Michael Fleet	DE
Sandra van der Graaf	NL
Julie Percelay	FR
With short input from:	
Rob Gerits	NL
Jan Haelters	BE
Tonny Niilonen	DK
Mr. Stevenick	Concawe
Ulla Li Zweifel	SE
Fish, cephalopod and pelagic habitats	
Jane Hawkridge (chair)	UK
Emily Cocoran (Rapporteur)	OSPAR Secretariat
Kylie Bamford (Day 1)	UK
Arjen Boon (Day 1)	NL
Sabine Christiansen	WWF
Leonie Dransfeld	IE
Cristina Garilao	FishBase
Simon Greenstreet	UK
Laurent Guérin (day 2)	FR

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Claus Hagebro	ICES
Theo Prins (Day 1)	NL
Anne Britt Storeng	NO
Fran Velasco	ES
John Weinberg	UK
Hakan Wennhage	SE
Ulla-Li Zweifel (Day 1)	SE/HELCOM
Rock and biogenic reef habitats	
All members of the sediment habitats group were also members of the rock & biogenic reef habitats group on day 1	
Ingo Narberhaus (Chair)	DE
Hayley Miles (Rapporteur)	UK
Juan Bellas	ES
Vera Coelho	Seas At Risk
Bill Sanderson	UK
sediment habitats group	
David Connor (Chair)	EC
Lisette Enserink (Rapporteur)	NL
Jan Haelters	BE
Alexander Schroeder	DE
Tonny Niilonen	DK
Laurent Guérin	FR
Pat Duggan	IE
Sagrario Arrieta	ES
Juan Bellas	ES
Arjen Boon	NL
Oscar Bos	NL
Frank van den Ende	NL
Anne Britt Storeng	NO
Hans Nilsson	SE
Matt Frost	UK
David Mallon	UK
Hayley Miles	UK

Food webs	
Martine van den Heuvel-Greve (chair)	NL
Arjen Boon	NL
Sabine Christiansen	WWF
Vera Coelho	Seas at Risk
Simon Greenstreet	UK
Laurent Guérin	FR
Jan Haelters	BE
Tonny Niilonen	DK
Theo Prins	NL
Isabelle Rombouts	FR
Rick Wortelboer	NL
Peter Heslenfeld	NL
Lucie Terwel	NL
Ulla Li Zweifel	SE
Non indigenous species	
Kylie Bamford (Chair)	UK
Marieken van der Sluis (rapporteur)	NL
Saa Henry Kabuta	NL
Malin Werner	SE

Annex 5 – Summary of workshop purpose and aims

The purpose of the workshop was to in depth compare and discuss the MSFD biodiversity descriptors 1, 2, 4 and 6 (see box 1). This has been achieved by:

- Exchange of information on the state of affairs and approaches followed to select indicators and targets in the participating Contracting Parties, acknowledging that progress will differ between countries;
- Identification of areas where comparability can be improved, moving towards Indicator core sets for MSFD subregions;
- Special focus on the coordination of selecting representative species and habitats (article 10 of the MSFD), and
- Proposing next steps to meet short term (2012 products) and medium term (2014 and beyond) coordination needs.

Desired outcome of the workshop

- Insight in similarities and differences between indicators/metrics and targets (between member state and per subregion) by finalizing a (preliminary) output table.
- A plan for future steps for dealing with differences: how can these be reduced, how Contracting Parties will deal with these, including agreeing arrangements for future actions;
- Insights into the possibility of a common and generic set of indicators that would be applicable across subregions, and, if possible, a first proposal for a common and generic set of indicators (per subregion);
- Insight into the possibility of conducting joint monitoring by subregion.

Annex 6 – Working group summaries

The workshop was divided into seven subgroups. Five subgroups were structured according to the ecosystem components and started on Wednesday (mammals and reptiles, fish, birds, sediment habitats, rock and biogenic reef habitats). On Thursday the habitats group split into the sediment habitat and rock & biogenic reef group. Two more subgroups were formed focusing on considering commonality in indicators and targets for non-indigenous species (D2) and food webs (D4).

Each working group was requested to consider the following issues:

- to analyse the targets and indicators proposed by Contracting Parties and presented in the compiled synthesis, and to record the outcomes of the working group analysis in a prepared common Output Spreadsheet;
- where possible to elaborate common and comparable indicators;
- identification and analysis of opportunities for cooperation in MSFD subregions;
- species selection (per subregion);
- discussion of a common and generic set of indicators/metrics and target;
- Consider the possibilities for joint monitoring;
- consider actions and arrangements needed to take further steps.

Input for the subgroups

In advance of the workshop, the organising committee coordinated the collation and preliminary analysis of national information. OSPAR Contracting Parties, particularly those implementing the MSFD were invited to submit an inventory of their national targets and indicators for biodiversity descriptors, 1, 2, 4 and 6. The template for Contracting Party Submissions is embedded here for reference.

The results of the inventory were analysed in order to identify similarities and differences between countries sharing a subregion. The results of this inventory were presented during the workshop by Marieken van der Sluis, IMARES (contractor, the Netherlands). Tables of proposed indicators/targets proposed by France were delivered too late to be included in this inventory, but they were presented, and discussed in some subgroups, during the workshop. The final version of this analysis is embedded here:

Output spreadsheets

The tables resulting from the inventory formed important input for the workshop. In advance of the workshop, the preparation team 'transformed' the tables into draft output tables per ecosystem component that would be used by the participants to analyse commonality of indicators and targets and to record the results of this analysis in a manner that would be comparable across groups. The Output table mapped the indicators and targets that had been proposed at a national level against the Commission Decision Criteria and indicators. The table looked at:

- proposed indicators
- associated targets
- target origin

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- proposed by which contracting party
- other Commission Decision indicators for which the suggestion was originally proposed

The working group needed to consider the following in order to populate the remaining columns of the table as well as to give their comments and reasons:

- Which other commission decision indicators is the proposal applicable to?
- Relevant to which subregions?
- Is there agreement within the group on the selection of species/habitats for the proposed metric?
- Could the group agree on proposed parameter/metric?
- Could the group agree on the proposed target?
- The overall agreement within the group as to the suitability of the metric as a candidate for use across the region or a subregion. The output table template is embedded in chapter 3 of the report.

The subgroups used the output table to record the outcomes of group discussion, conclusions and outstanding questions. It is important to note in this respect that these tables present the current state of development for Contracting Party indicators and targets, this is a preliminary result which must be considered the start of an ongoing process.

The summary outputs of each of seven subgroups, including the output tables are presented as appendixes A-F to this annex, providing the main findings from each of the subgroups.

Mammals and reptiles

Key discussion points

1. The group identified a significant number of areas of commonality across the targets/indicators put forward by Contracting Parties – including range and abundance of seals and cetaceans, number of pups, and bycatch rates. Many of the indicators and targets were combined into groups and discussed together.
2. The most significantly different approach was that proposed by Spain which focussed on targets associated with marine protected areas, speed limits for ships and distance for whale watching operations.

The output table is embedded here:

By-catch

3. A significant number of Contracting Parties are proposing by-catch indicators and targets (for short-beaked common dolphin, harbour porpoise, grey and harbour seals). These targets and indicators were grouped for discussion and it was generally agreed that there was strong potential to develop common by-catch targets/indicators at a regional level. It was acknowledged that the specific species to be used in the indicator would vary from subregion to subregion.
4. Some debate about the suitable target thresholds for by-catch – this still needs to be resolved. For porpoises there was general agreement about the approach, but debate about whether to use 1.7% or 1% of best population estimate (OSPAR uses 1.7%, ASCOBANS uses 1.7% as an interim level with the ultimate aim of reducing to 1%). It was also noted that Portugal has proposed a different approach – reducing the rate of by-catch by 30%. Similar issues in relation to common dolphins.
5. Discussion about monitoring methodologies for by-catch – some differences across Contracting Parties were identified, with UK assessment of by-catch based on observers on commercial vessels, Netherlands and Belgium based on monitoring of strandings, and Sweden based on information reported by fishing vessels. The potential to use CCTV information on vessels in the future was noted (CFP may end up requiring this).
6. It was noted that by-catch indicators are also relevant to Commission Decision indicator 4.3.1 – however it was felt that by-catch is not actually a particularly good indicator of food web status.
7. Finally – both Spain and Portugal put forward by-catch targets for turtles which did not get passed on to the group for consideration due to an administrative error. These could reasonably be added to the common regional by-catch target/indicator proposed by the group.

Distribution (range and pattern) and abundance of seals and cetaceans

8. Distribution and abundance of grey and harbour seals and a range of cetaceans (including harbour porpoise and short-beaked common dolphin) were also put forward as proposed targets and indicators by a significant number of Contracting Parties and these targets and indicators were discussed as a group.
9. It was generally felt that it should be possible to develop common regional targets/indicators for seals and cetaceans. However, there is a need for more work to clarify monitoring methodologies and surveys to ensure commonality (e.g. especially for seal monitoring). Distributional range will be impacted by anthropogenic activity. Considerably more work needed

on development of the actual target and baseline (historical baseline thought to be most appropriate). Need a better definition for the term 'distributional range' and current data availability - pattern within range is more important for most countries than range per se.

10. It was also noted that monitoring of cetaceans and seals differs, as seals are counted on land and cetaceans at sea. For seals extensive knowledge is available for numbers on land, however a knowledge gap is behaviour and pattern of seals at sea. Some information is gathered with tagged animals although for cetaceans there is a good basis for common monitoring with international SCANS and CODA surveys.

Seal and cetacean population condition

11. A number of potentially common indicators for seal and cetacean condition were identified and discussed (e.g. seal pup survival, PCB contamination, condition based on post mortem analysis of strandings/by-catch) – but all of these were felt to require further work.
12. Following the meeting the Netherlands have indicated that a possible indicator of population condition could also be the pup production ratio of seals (if a population is healthy the ratio pup:adult is higher than when a population is under stress), however caution is needed in areas with recovering populations. For example, in the Wadden Sea (NL, DE, DK) the population is increasing and as a consequence pup/adult ratios are high. When the population becomes more stable, pup/adult ratio will fall, however, this will not indicate declining status, but rather a maturing population. This will need to be taken into consideration.

Monitoring coordination

13. It was thought to be essential to develop coordinated international monitoring programmes to support any common regional indicators e.g. building on SCANS/CODA and the Joint Cetacean Programme work (See Annex I). Monitoring coordination – building on SCANS/CODA surveys and the Joint Cetacean Protocol (see Annex I) to facilitate the development of robust and accurate transboundary reporting.

Conclusions

The group made the following conclusions:

14. A number of strong candidates for common indicators/targets were identified, including:
 - a. Indicators of seal and cetacean by-catch (species would vary depending on the area).
 - b. Indicators of grey and harbour seal distribution (pattern and range) and abundance.
 - c. Indicators of cetacean distribution (pattern and range) and abundance.
 - d. Indicators of seal pup production.
15. Following the discussion during plenary, it was recognised that a bycatch indicator for turtles has been proposed by both Spain and Portugal although this did not reach the group for discussion. These proposals could reasonably be incorporated into the generic bycatch indicator (6a) and, as such, have been added to the output spreadsheet.
16. All these indicator groups need further development before specific common indicators could be put forward. In particular, more detailed expert discussion is needed in relation to baselines, targets and monitoring metrics (see follow-up actions below).
17. A number of other indicators were identified as potentially useful common indicators, but further development would be needed before they could be put forward, for example:
 - a. Indicators of seal pup survival.
 - b. Indicators of contamination in cetaceans (e.g. PCBs and other contaminants).
 - c. Other indicators of condition, based on post mortem examination of strandings.

18. It was particularly difficult to identify potential common indicators for seal and cetacean *population condition*:
 - a. Sweden and Denmark have useful proposals for seal pregnancy rates and seal and harbour porpoise blubber thickness, but these are primarily based on monitoring of *hunted* seals, which is not done in other countries.
 - b. Most countries base assessment of cetacean condition on post mortem examinations of stranded or by-caught animals - this is a biased sample and is often only done on a project basis, rather than as part of long-term monitoring programmes.
 - c. Despite the difficulties of using information from strandings/by-catch post mortems, there is potential for a more coordinated approach to this kind of assessment across different countries (using existing protocols as a basis).
19. A number of countries had proposed using marine mammal abundance and other parameters and indicators of food web status. The group concluded that marine mammal indicators are not necessarily particularly useful in this context because most marine mammals are opportunistic feeders, and because the feeding strategy of the same species will not be the same in different areas. So although the indicators and targets proposed fit the Comm Decision criteria, they were not representative indicators of the food web.
20. The group concluded that coordinated international monitoring is essential in relation to the vast majority of marine mammal indicators. More work will be needed to develop clear international monitoring programmes and protocols. For cetaceans this can build on the SCANS/CODA surveys and work under the Joint Cetacean protocol (see annex I). For seals, more work is needed as this has tended to be done on a country by country basis. The trilateral (NL, DE, DK) Wadden Sea Seal management Plan and the Trilateral Monitoring and Assessment Programme are good examples of international cooperation in this field.
21. Further discussion needed with Spain and France in relation to the more operational indicators put forward by these countries. The group was unable to draw firm conclusions in relation to these indicators.
22. The group was also unable to conclude whether there was systematic coverage of pressures with the exception of by-catch in the proposed set of indicators. For example, no specific indicators were put forward for the impacts of noise. Contracting Parties need to cross reference by-catch objectives and other potential pressure descriptors with work being undertaken for D11.

Actions

Key follow-up actions identified are:

What	When	Who
Further expert discussion/advice to establish appropriate baselines and targets for by-catch, distribution, abundance and pup production	By early/mid 2012?	ICES WGMME? ICES WGBYC?
Further development of potential common indicators for seal and cetacean population condition	By 2014?	ICES WGMME?
Development of clear international monitoring programmes and protocols for cetaceans and seals (building on SCANS/CODA /JCP for cetaceans, and TMAP for seals)	By 2014?	ICES WGMME?

23. The ICES Working Group on Marine Mammal Ecology (WGMME) and the ICES Working Group on by-catch and protected species (WGBYC) were suggested as the most appropriate groups to take these actions forward. The ICES WGMME is due to meet in March 2012 and already has discussion of indicators on its agenda.
24. Further discussion is needed with the OSPAR Secretariat and ICES to discuss the feasibility of WGMME and WGBYC taking this work forward in the short term, but a potential way forward is set out below:
 - a. Develop a draft ToR for ICES WGMME and WGBYC in relation to this work (Eunice Pinn (UK), Naomi Matthiessen UK)
 - b. OSPAR/Contracting Parties to make a request to ICES to take these actions forward via WGMME and WGBYC (Action: OSPAR Secretariat/relevant Contracting Parties)
 - c. Establish when Joint Cetacean Protocol analysis will be available to help with the development of baselines (Eunice Pinn (UK))
 - d. Ensure appropriate coordination between national MSFD leads and national ICES representatives (all Contracting Parties)
 - e. Consider setting up an email working forum with WGMME members ahead of the WGMME meeting in March 2012 to develop thinking ahead of that meeting (Eunice Pinn (UK)).
25. It was also noted that there is a significant amount of existing information which can be used to support baseline setting – this should not be forgotten. It was also suggested that even working on this timescale, the work would come very late for national finalisation of GES targets and indicators, but would certainly still be useful for monitoring.

Birds

Key discussion points

1. The group reviewed indicators and targets submitted by Belgium, the Netherlands, Germany, Denmark, Sweden, Norway, Spain and Portugal and the United Kingdom. Denmark's targets were not submitted electronically and are therefore not included in the bird outputs spreadsheet. However, the targets and indicators proposed by Denmark were similar to those recommended by the group as a common set. Details of France's targets were submitted after the workshop.

The output table is embedded here:

2. Inclusion of targets reflecting the general status of the marine environment without necessarily having a direct connection to the impacts of pressures.
3. Definitions: what is a seabird, what is a waterbird?
4. Possible criteria for the selection of species to constitute indicators of GES.
5. Inclusion of species that breed on land but feed at sea, and the pressures on those species on land and at sea. In B, NL, D and DK there are (almost) no cliffs. But cliff-nesting species are present in these waters (e.g. guillemots migrate with their juveniles to Dutch waters).
6. Inclusion of species groups e.g. passage migrants in the Wadden Sea.
7. Discussion on using vulnerable species as indicators compared to using as wide a range of species as possible.
8. Inclusion of an indicator on bird mortality due to depredation by non-native mammals on island seabird colonies.
9. Inclusion of an indicator on by-catch of birds and the feasibility of monitoring by-catch.
10. Spain's proposed operational indicators. These were considered by the group to be reasonable indicators and targets for monitoring the extent of measures to be applied by Spain in order to achieve GES. But the group agreed that the state targets and indicators currently being developed by Spain (not submitted to the workshop) would be more analogous to those recommended by the group as a means of describing GES for birds.
11. Exclusion of EcoQOs on oiled guillemots, litter in fulmar stomachs and pollutants in bird eggs: these targets relate to pressures under D8 Contaminants and D10 Litter and not to biodiversity state or impacts.
12. Metrics of distributional range and pattern.
13. Inclusion or exclusion of the Wadden Sea could have an effect on the consistency of the assessments of GES across Netherlands and Germany (relates to difference in national policy on whether or not coastal waters such as the Wadden Sea should be included in GES assessment). It should be noted however that the Wadden Sea is not classified as a transitional water according to the WFD definition: "Transitional waters are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows."

14. Discussion on suitability of EcoQO on seabird population trends and EcoQO on kittiwake breeding success as MSFD targets.

Conclusions

The group made the following key conclusions:

15. A common set of criteria should be developed for selecting species to constitute each indicator. Indicators should not be limited to declining or vulnerable species.
16. The proposed indicators and targets for 1.1 Species Distribution contained common elements that were used to construct a generic indicator and target for each of 1.1.1 species distributional range and 1.1.2 distributional pattern. The new indicators cover all types of marine bird species including all appropriate functional groups at breeding colonies and at sea. Metrics for both indicators will vary with the type of data collected e.g. colony position and size for breeding seabirds, number of birds per unit area of sea for seabirds at-sea.
17. Use the draft EcoQO on seabird populations as a target for 1.2 Population Size, because it is easy to understand and data are generally available. It was originally designed for breeding seabird populations but should be adapted for other populations such as breeding waterbirds and marine bird species that breed outside Europe but migrate through or over-winter in European seas. There is currently an indicator for the EcoQO in OSPAR Region 3 only. An indicator for OSPAR Region 2 will be presented at BDC 2012.
18. Use the indicator and target proposed by the UK on kittiwake productivity under 1.3 Population Conditions. These are a modification of the draft EcoQO on Local sandeel availability to Black-legged kittiwakes: the original target of 0.6 chicks per pair is replaced by a variable target that takes into account variation in annual breeding success that is attributable to prevailing climatic conditions. The group also recommend a more generic seabird breeding success/failure indicator that provides a watching-brief over other species and can be used in the Bay of Biscay, wider Atlantic and parts of the North Sea where kittiwake do not breed. Further work is required to develop a target for such an indicator.
19. Land-based pressures that affect birds that depend on the marine environment for food (such as depredation at breeding seabird colonies), should be included in indicators and targets under MSFD (as is eutrophication under D5, which originates from land-based sources). A target was proposed under 1.3 to restore or maintain key island seabird colonies free of non-native or invasive predatory mammals.
20. Recommend a common set of indicators (see below) and targets (see spreadsheet):
 - For criterion 1.1 Species Distribution
 - 1.1.1 Distributional Range: Distributional range of breeding and non-breeding marine birds
 - 1.1.2 Distributional Pattern: Distributional pattern of breeding and non-breeding marine birds.
 - For criterion 1.2 Population Size: Species-specific trends in relative abundance of non-breeding and breeding seabird and waterbird species in all functional groups (cf. draft EcoQO on seabird population trends).
 - For criterion 1.3 Population Condition:
 - Breeding success/failure of a selection of waterbird and seabird species

- Annual breeding success of kittiwake (where applicable)
 - Non-native/invasive mammal presence on island seabird colonies
 - Mortality of seabirds from fishing (by-catch) and aquaculture (where applicable)
- For criterion 1.7 Ecosystem structure: suggest using indicators for 1.2.
- For criteria 4.1/4.3 (productivity & abundance/distribution of key species groups):
 - Suggest using indicators for 1.1 and 1.2 and 1.3

Actions

Note below we attribute some tasks to a 'European marine bird expert group'. This may equate to the ICES Working Group on Seabird Ecology (WGSE) or could be a web forum of experts nominated by each Contracting Party, which may contain members of WGSE. The web forum may be a more expedient way of developing certain indicators and targets but would require complete 'buy-in' by all Contracting Parties. WGSE is well established and its advice is well respected amongst Contracting Parties. WGSE could potentially be used to validate or sign-off recommendations developed via the expert forum.

Action	When	Who
<i>EcoQO on seabird population trends</i>		
OSPAR contracting parties should adopt the EcoQO on seabird population trends and establish a reporting mechanism	at BDC 2012	all OSPAR Contracting Parties
EcoQO on seabird population trends should be adapted to include breeding waterbirds and non-breeding populations all marine birds	by 2014	JNCC (UK) project to apply EcoQO to breeding waterbirds and non-breeding shorebirds (completion by Apr 2012). Further work needed by other Contracting Parties to adapt to at-sea aggregations of marine birds.
<i>Definitions</i>		
Develop selection criteria to be considered when selecting species (UK example – see below).	immediately	European marine bird expert group
Develop a consistent definition of waterbirds and seabirds among MS	immediately	European marine bird expert group
Further discussion is needed between Contracting Parties on whether or not to include aggregations of shorebirds and waterbirds occurring in coastal waters such as the Wadden Sea	immediately	Delegations from Germany and the Netherlands

Report of the OSPAR workshop on MSFD biodiversity descriptors, comparison of targets and associated indicators

<i>Further development of indicators and targets</i>		
Develop a generic indicator and target of distributional range and of distributional pattern that covers all types of marine bird species including all appropriate functional groups.	due for completion April 2012	JNCC (UK) is contracting out a project looking at developing indicators of distributional range and pattern in Marine Birds (except at sea distributions.)
Model survival rates to estimate quantitative targets for adult survival or mortality to feed into indicators of bycatch or productivity.	Long-term (before 2018)	?
Develop targets for kittiwake breeding success indicator	by 2014	UK – JNCC contracting project to develop UK targets from existing monitoring data time series. Suggest FR, NO, DE, DK do the same.
Look to see if the 'breeding success of kittiwakes' indicator can be applied to other species so as to include waters of countries where Kittiwakes are not present as breeding birds	immediately	European marine bird expert group
Investigate systematic monitoring of seabird bycatch and model mortality rates to set targets (some countries could extend or modify existing by-catch monitoring for cetaceans. NB but fishing methods can be different from those that catch most seabirds e.g. long-line fisheries). Implementation depends on progress of EU action plan on Seabird Bycatch.	2014-2018	all Contracting Parties
For countries that apply the non-native/invasive mammal indicator, select key islands for the targets and monitor mammal presence/absence	by 2014	All Contracting Parties with important island seabird colonies

Fish, cephalopod and pelagic habitats

Key discussion points

The group first reviewed the inventory of targets and indicators, as provided by contracting parties and summarised by IMARES (NL), to arrive at a series of questions that would guide subsequent discussions. The group noted that no targets and indicators had been proposed for cephalopods. Whilst pelagic habitat indicators had been proposed by Contracting Parties there was not the expertise in the group to adequately consider these in the time available. The group did however review the proposed indicators, and questions raised in relation to each of the indicators were recorded in the pelagic output table. It was therefore agreed that a pelagic habitat group should be convened post the workshop to give proper consideration to pelagic issues, and the questions raised. Questions raised by the Fish group were included into the pelagic output table for forwarding to the expert group, when this is convened. The pelagic output table with questions is embedded here:

This summary focuses on the discussion and analysis of Contracting Party proposals for fish indicators and targets under each of the Commission Decision indicators. The fish output table is embedded here (Selected core indicators are highlighted in green):

The group considered the proposed indicators and targets according to the Commission Decision Criteria, first looking at species distribution (1.1) and population size (1.2), as these appeared to have the most potential for commonalities, then looking at indicators for population condition (1.3). For indicators on population condition, there were a number of different proposals with multiple options. The main consideration on the indicators was the relevance, and the ease of communication of the metric. The group then considered the fish community indicators for 1.7, where one indicator was readily agreed upon, while for other proposals, there are still some theoretical differences to be reconciled. Initially, each proposal was considered and questions and clarifications sought. These are recorded in column U of the output table for fish. During the group's deliberations, the following key discussion points were noted:

1. In identifying indicators it is important to be able to determine the main driver of change, some indicators are not responsive enough to anthropogenic pressures;
2. The group found different levels of commonality across the indicators proposed by the Contracting Parties for the different Commission Decision criteria. Indicators relating to species distribution and population size were the most promising; those relating to population condition demonstrated a range of ideas and may require further investigation to understand which approach would be the most comprehensible to the end user (policy makers); among the indicators describing the fish community, there was broad agreement on the large fish indicator, some of the other proposals present more complex theoretical differences and may need more detailed investigation and review.

3. In some cases it was possible for the group to bring together the sense of several proposed indicators by developing text for a generic indicator. These generic indicators could be applicable and would then need to be tailored in order to be operational by subregion.
4. There is huge diversity in the characteristics of the different subregions within the North East Atlantic, which in turn will affect sampling strategy and the necessary sample strata. The group agreed that these differences mean that one size does not fit for all subregions, for example in the west of the region, the sampling strata become much larger and cover a greater depth range than for the North Sea.
5. In some cases the purpose of a proposed indicator was not clear, clarity of purpose and setting a target that contained a clear measure of progress towards good environmental status were considered to be important features. Many of the targets were based on trends, and did not set clear limits as to when GES would be achieved.
6. The group also discussed practicality of the indicator and how usable it would be.
7. A long discussion was held concerning which species should be used as indicator species. There was a proposal to select species that are in "long term decline" (e.g >25 years) however given that fisheries had reached its peak in the mid 1980s, this time period would already constitute a heavily disturbed, and possibly recovering situation, and not a sustainable historic baseline. In recovery, the opportunistic species will decline, with slower growing species increasing in numbers, therefore careful consideration should be given to the species selected and what the indicator is tracking. It is also important, that the indicator reflects the time series available in order to ensure the provision of supporting data sets.

Key conclusions

1. The group agreed that common and generic indicators were the most suitable approach to take to be able to ensure coherence across subregions and regions. Such indicators would need to be robust, but with sufficient flexibility to adapt to different subregions;
2. There were commonalities for the indicators proposed for some of the Commission Decision criteria. The fish group was able to identify 4 common and generic indicators.
 - a. An indicator for species distributional range (C1.1.1)
 - b. An indicator for species distributional pattern (C1.1.2)
 - c. An indicator for population abundance/biomass (C1.2.1)
 - d. An indicator for the size composition of the fish community (C1.7.1)
3. These four indicators were developed by the group on the basis of national proposals in a way that could be relevant and acceptable across subregions/regions according to the selection of appropriate species.
4. More work is required to operationalize the four common and generic indicators.
5. A number of additional indicators were identified as having potential as common and generic indicators, with some proposals for further work.
 - a. It was felt there is good potential for 1.3.1 (population demographics), analogues of population demographic indicators from D3 to be applied to D1 non-commercial species e.g.:
 - i. Proportion of mature fish in the populations of all species sampled adequately in international and national bottom-trawl groundfish surveys
 - b. Several proposals for indicators describing the fish community 1.7.1 were considered to have potential, but need more theoretical consideration and further testing with different regional data sets. e.g:

- i. Mean maximum length of demersal fish and elasmobranchs
 - ii. Conservation status of elasmobranch and demersal bony fish species (IUCN) (Calculations based on Piet et al 2007)
 - iii. Size diversity index according to Rochet & Benoit (submitted)
 - iv. Threat indicator: Composite index according to Dulvy et al (2006)
 - v. Fish relative abundance, Hills N1 indicator of species diversity whereby metrics need to be constructed for different size categories to capture trophic cascade issues
6. In addition to the categories provided, the group defined the use of a new class of indicator evaluation for column Q of the output table. The use a notation of “2” with no text was assigned by the group for indicators that were felt to be contained within (ie a subset of) the generic and common indicators that were developed by the group.
7. The group agreed that there are still gaps, with no indicators or targets developed for example: deep sea and coastal species; some functional groups; size based indicators specific for non-commercial species; and genetics. In other cases, indicators for several functional groups may already be available through the implementation of other directives and could eventually be considered (e.g. Germany has some indicators for selected anadromous species in the context of the Habitats Directive).
8. The OSPAR Framework is the appropriate mechanism to progress this work and it was considered necessary by the group that arrangements are made to continue this work and take it forwards.

Follow up actions

The fish group agreed to the following actions. These actions were also sent forward to ICG-COBAM for consideration within the OSPAR Framework.

Action	When	Who
Immediate follow up was arranged to ensure the finalization of the output table for the fish group by written procedure.	4 Nov 11	Fish group
Check all the indicators against the GES targets to ensure relevance that could not been checked during the meeting	ASAP	Fish group (lead TBC)
Follow up development of criteria and protocols for regional species selection	?	Contracting Parties?
Revise indicators on the basis of WKBIOD discussions <ul style="list-style-type: none"> • Target setting needs to be related to species selection. 	By 2012 deadline	Contracting Parties?

Report of the OSPAR workshop on MSFD biodiversity descriptors, comparison of targets and associated indicators

<p>Need trial assessments based on indicators in the output table by different regions and different surveys</p> <ul style="list-style-type: none"> • Develop standard protocols for trend detection methods; • Assess cross correlation between indicators; • Relate trends to pressure trends. 	<p>2014</p>	<p>Contracting Parties by subregion</p>
<p>Promote subregional coordination for delivery of these targets and indicators</p>	<p>On going</p>	<p>ICG-MSFD; COBAM; Contracting Parties</p>

Benthic habitats

Rock and biogenic reef habitats

Key discussion points

The rock and biogenic reef habitats group began by reviewing the analysis of Contracting Party indicators which had been carried out by IMARES (NL). Several concerns were raised regarding lack of detail in the proposals (especially the targets and thresholds), and it was noted that much of what had been proposed seemed to be based on existing indicators and targets. A more focused discussion around CP proposals for targets and indicators under each of the Commission decision indicators then followed. The key points are as follows:

1. It is preferred that a baseline of reference conditions is used for setting targets for benthic habitats (as per the OSPAR advice manual); however, with the current availability of data, this is not possible for many habitats. A future research requirement is for reference conditions to be determined for rock and biogenic reef habitats. In terms of range and extent, it needs to be decided if it is desirable to aspire to recover previously destroyed and declined habitat types, particularly biogenic reefs.
2. Within the region, there is a wide variation in the types of rock and biogenic reef habitats which occur, for example, in UK waters there are very deep water rocky habitats which are not found in other subregions and the specific forms of biogenic reefs vary in different biogeographic areas. This is important to bear in mind when determining a list of common indicator and targets for the OSPAR region.
3. It is not currently known how indicators of distributional range and pattern will be measured. This is an area which needs some further thought and coordination across CPs e.g. to determine if latitude / longitude is the appropriate metric to monitor range etc.
4. The utility of pressure and impact indicators under criterion 1.6 (and 6.2) was discussed and it was agreed that in areas where it is more impractical to monitor state indicators to assess condition (e.g. in large scale areas and the deep sea), it may be very useful to supplement information on condition with information on potential impact / vulnerability. This would be achieved through the use of spatial analysis tools to overlay pressure exposure maps onto habitat maps (with associated sensitivity information) to create an indicator of impact/vulnerability. Outputs would require some ground-truthing.
5. There is a lack of understanding with regard to the relationship between rock and biogenic reef habitats and food web interactions. In future, improved understanding could contribute to targets and indicators under D4.
6. The Spanish proposal for increases in numbers of marine protected areas (SCIs) was discussed and it was concluded that these were essential targets for reef habitats, however, they should be addressed as “operational targets” relating directly to management measures. These measures may be suitable for helping to achieve the state and pressure targets for GES proposed in the common indicator set.
7. It is not clear at present whether an indicator and target is required for rock and biogenic reef habitats which addresses Commission Decision criterion 1.7 on ecosystem structure. Alternatively, this target may need to be a higher level aggregation across more biodiversity components to give an ecosystem level overview.

The output table is embedded here (Selected core indicators are highlighted in yellow):

Key conclusions

8. The rock and biogenic reef habitats group have identified 9 potential common indicators for the OSPAR region covering all of the main Commission Decision criteria and addressing all key issues for these habitat types. The common indicators identified by the group are, in the majority of cases, generic in their description, allowing for subregionally operationalised indicators and targets to be developed in future e.g. the choice of sensitive indicator species and metrics which are relevant to the subregion and responsive to pressures for that particular subregion.
9. Despite this, some gaps in knowledge have been identified such as detailed ecological understanding (for subtidal rock and biogenic habitats), food web interactions and the definition of suitable baselines.
10. All of the rock and biogenic reef habitats considered within this group fall under habitat type 1170 (reefs) of Annex I of the Habitats Directive; therefore, many of these existing indicators can be directly applied in an MSFD context. Also, the targets used under HD can form a basis for targets under MSFD. However, HD targets may not be sufficient to achieve GES as defined in the MSFD, as they do not sufficiently address restoration aspects and some CPs have not yet achieved sufficient tools / coverage outside of Natura 2000 sites.
11. The indicators identified as suitable under criterion 1.6 are also generally applicable under criterion 6.2 on benthic community condition and also, partly, for criterion 6.1 on physical damage to habitat types.
12. At this stage only state targets (primarily) have been considered as the workshop was focused on GES and biodiversity state. A full common set of indicators will require more pressure and impact indicators and targets to address the requirements of Article 10 of the Directive.

Sediment habitats

The subgroup on sediment habitats started discussion only on Thursday, in order to divide the workload of the benthic habitats group. To facilitate comparison, proposed indicators/metrics were clustered according to their main feature in the following classes: species distribution, sensitive species (in the community), (habitat) distribution, (habitat) extent, (habitat) pattern, community (condition), listed species, abiotic (condition), pressure and measure. The group identified 13 potential common indicators. Due to time shortage, the group labelled 37 proposed indicators as 'still to be considered'. Many indicators in the Commission Decision overlap and so a number of the proposed indicators (as well as ones still to be considered) were relevant for several Decision indicators.

The habitat types fell generally into two groups: those which are 'predominant' and those which are 'special' according to Annex III Table 1 of the Directive. In some cases it was considered helpful to treat these differently, especially for targets where the Habitats Directive targets were proposed for Annex I types for some criteria. Due to lack of time, there was no consideration of the OSPAR list habitats, which also fall into the 'special' category. Regarding predominant habitats, there was considered a need to further specify these in some cases (e.g. identify sub-types for particular indicators) in order to define more precisely the indicator metric and threshold value and to address particular pressures.

Outcomes per indicator:*Habitat distribution and extent*

- For indicator 1.4.1 (habitat distributional range) and indicator 1.5.1 (habitat extent or area) two groups of relevant habitats have been proposed by MS: predominant habitats (e.g. defined as EUNIS level 3) and listed habitats under Annex 1 of the Habitats Directive. The group supported the idea to have (separate) targets for predominant and listed habitats. Decline in distribution was considered to relate primarily to habitats defined by [single] dominant species (e.g. biogenic reef types), because physically-defined habitats tend not to change in distribution. In this context EUNIS level 3 was considered not precise enough to detect decline in this criterion.
- Proposed targets for indicator 1.4.1 would be no decline and, where appropriate, an increase towards some historical level in the case of predominant habitats, and slight deviation from or increasing towards reference conditions in the case of listed habitats. Targets need further consideration to improve consistency. Decline has to be due to anthropogenic pressures.
- For indicator 1.4.2 (habitat distributional pattern) targets would be: stable or no decline. Need to consider wording in relation to Annex 1 of the Habitats Directive.
- For indicator 1.5.1 the group proposed a target for predominant habitats, *i.e.* no more than 15% loss from reference conditions, and Annex 1 habitats, *i.e.* stable or increase towards reference conditions.
- It was questioned whether there would be enough data to define reference conditions. For indicator 1.5.1 reference conditions can be practically assessed by determining the extent of infrastructure or other anthropogenic modifications.

Habitat condition and benthic condition

- Biological component
 - Indicator 1.6.1: Target was proposed: maintain proportion of typical species, including sensitive species where appropriate, within each habitat type, compared to reference conditions. This needs to be further specified, potentially using a similarity index to compare current community characteristics to reference conditions.
 - Indicator 1.6.2: Use of multi-metric indices (e.g. BEQI) to quantify relative abundance of sensitive and opportunistic benthic species was supported. Depending on the index, they need to relate to direct effects of pressures. Targets should be aligned with WFD. For sediment habitats, the sampling techniques (grabs, cores) often yield data on both species composition and their abundance – thus fulfilling indicator 1.6.1 also.
 - Indicator 6.2.3: Size-frequency distribution of selected species (e.g. bivalve spp.) would be a good indicator where pressure merely affects size range while species composition is not significantly affected. Target would be near-natural size spectrum where all size classes are represented.
- Abiotic component
 - Indicator 1.6.3 (physical, hydrological and chemical conditions): indicator is considered important, but not well-defined. Multiple parameters are needed, referring to sediment structure and dynamics. MS proposed several targets: structure, distribution and dynamics of sediment at the most slightly altered (UK) and natural water-flow and the relief at the most slightly altered, oxygen depletion rarely and short-term (DE).
 - Indicator 6.1.2 (extent of damage) target: area lost or damaged below GES should be less than 15% of the total area of the habitat. The group considered a 'no deterioration'

target was unacceptable in view of the current state of these habitats; a deviation from reference condition is preferred to a trend-based target because it provides a specific level to achieve and can be applied equally to all habitat types.

Physical damage

- Pressures:
 - Indicator 1.6.1 (condition of typical species/communities): level of intensity, frequency and area of pressure. This would apply to all pressure indicators and, if metrics are harmonised, allow for quantification of cumulative pressures.
 - Target for this indicator would be the level of impact of pressure that will meet the state-based target for habitat condition and extent.
- Indicators on physical state (D6) are rare and not well defined, but may be more effective an approach than indicators on benthic fauna because they are tightly linked to human activities/pressures. There is a need to seriously consider development of suitable physical state indicators.

The output table is embedded here (Selected core indicators are highlighted in yellow):

Key conclusions:

- *Positive outcomes:*
 - Identification of key topics and commonalities on parameters in proposed indicators is useful for GES (2012), but it has to be further detailed (metrics).
- *Gaps identified:*
 - Indicators on physical state (D6) may be more effective than indicators on benthic fauna (tightly linked to human activities) - seriously consider further development.
 - The monitoring needs have not been taken into account when developing common indicators: what happens if monitoring is very expensive or difficult?
 - How to measure and monitor spatial extent and distribution?
 - Subregional analysis for sediment habitats indicators is still lacking.
- *Application:*
 - An overview of all indicators, definitions, methods etc is needed (working title: 'OSPAR Indicator App.')
 - Compatible acquisition of data will allow development of common (sub)regional indicators, and facilitate refinement of the GES definition (2018)
 - The status of the common indicators needs to be defined, e.g. are they a menu of options or are all to be applied (where the relevant habitats exist)? The current set of indicators identified could be viewed as a 'high level' set, with more detailed indicators (specific to different habitat types and regions) defined as needed to support more local assessments.
 - Differing sizes of sea areas may determine suitability of indicators. Pressure-based indicators are more realistic for large areas while measuring state indices directly is effective for small areas. Both approaches can be integrated!

- In relation to the pressure 'sealing' there is a need to further define how far the proposed indicator could be applicable in different situations.

Follow up actions

These actions apply to rock & biogenic reef as well as sediment habitats. They have been forwarded to ICG-COBAM for consideration within the OSPAR Framework.

What?	When?	Who?
Develop overview of all indicators, definitions, methods etc. ('OSPAR Indicator App.')	2012-2013	ICG-MSFD, assisted by ICG-COBAM and other relevant groups
Develop a programme of work to operationalise several indicators, taking into account monitoring requirements and making them regionally specific (e.g. defining typical species for different regions). In some cases this could take a considerable amount of research, development, testing and validation. In particular, common to all the indicators is the issue of setting appropriate baselines for range, extent and condition aspects. In other cases less research needs to be done, e.g. using national lists of typical species of reefs under Habitats Directive reporting.	Ongoing from now until 2013 to inform monitoring programmes (national reports due by 2014)	Combination of workshop benthic habitats group (lead CPs) and ICG-COBAM
Organise compatible acquisition of data to facilitate development of common indicators per (sub)region	Ongoing from now until 2013 to inform monitoring programmes (national reports due by 2014)	Combination of workshop benthic habitats group (lead CPs) and ICG-COBAM
Finalise comparison of indicators for sediment habitats	Post Nov 2011 ICG-COBAM meeting	Benthic habitats workshop group to liaise / ICG COBAM
Cross check macrophyte indicators with relevant ones proposed for sediment habitats to ensure maximum commonality	Post Nov 2011 ICG-COBAM meeting	Benthic habitats workshop group to liaise / ICG COBAM
Investigate the rock and biogenic reef and sediments habitat relationship to the food web descriptor to see if a useful indicator can be developed.	Long-term - No immediate priority	Food web group to include benthic habitats representatives

Report of the OSPAR workshop on MSFD biodiversity descriptors, comparison of targets and associated indicators

<p>Clarify with the European Commission whether it is essential that indicators for criterion 1.7 are developed by July 2012 given the complexity of the task and current lack of ecological understanding</p>	<p>Urgently</p>	<p>David Connor to respond; issue briefly to be raised at ICG-COBAM</p>
<p>Identify and begin further research and development work to enable proposals to be put forward under Commission Decision criterion 1.7. No immediate priority for OSPAR common set of indicators.</p>	<p>Dependent on response to above action (likely before 2018)</p>	<p>Possibly ICES</p>
<p>Develop a common monitoring programme for benthic habitats across the sub-region (and region, where appropriate)</p>	<p>2013 (before 2014)</p>	<p>ICG-COBAM</p>

Food webs

Key discussion points

1. *Necessity of a break out group*

During the workshop it became clear that a special break out group on food webs was needed. The rationale was discussed during the break out session:

- In order to have a proper Ecosystem based management as the MSFD aims at, we need not only focus on structure of systems (abundance/ distribution), but also on the actual *functioning/dynamics of the ecosystem*. Descriptor 4 is the most suitable descriptor for this.
- Descriptor 4 is also suitable to *check compatibility of target values over different* descriptors and trade-offs between ecosystem services
- Most of currently proposed indicators for D4 are more suitable for biodiversity (abundance/distribution) and often already mentioned under e.g. D1/D3. *Additional criteria may be needed and developed that actually give an indication of food web GES*, going a step forward to what is currently described in the Commission decision.

2. *Analyses of currently proposed indicators for D4*

A table was developed at the workshop gathering all proposed indicators for D4 of the existing tables. In total 31 proposed indicators were identified of which 6 were exclusively mentioned for D4. Using post-its initial questions and comments regarding the (suitability of the) proposed indicators were collected. Due to the short available time further discussions on the proposed indicators were not possible.

The output table is embedded here:

3. *Working document / white paper on food webs*

The food web group defined a need for a working document or a white paper, describing the issues with descriptor 4 Food webs. This document can be used as a starting point or basis for further discussions e.g. in OSPAR ICG-COBAM. Contents of the document should be:

- Introduction to why this document is needed and what the expected output is
- Theoretical background on food webs (ICES-JRC task group 4)
- Criteria in European decision & linkages D4-D1 criteria, and possibly indicators & targets
- Overview of currently proposed indicators by countries (table)
- Analysis of currently proposed indicators and EC criteria (brief)
- Towards an extended, comprehensive food web approach
- Potential development of current indicators and suggestions for additional indicators
- What is needed to get this a step further (data availability/gaps, knowledge gaps)
- The way forward: expert group and discussion with the EC

The following volunteers for 'the white paper team' were identified during the meeting: Arjen Boon_(NL), Isabelle Rombouts (FR), Martine van den Heuvel-Greve (NL), Peter Heslenfeld (NL), Rick Wortelboer (NL), Simon Greenstreet (UK) and Theo Prins (NL). Ingo Narberhaus (DE) was identified as a possible valuable addition to the group, but will not be able participate due to time

constraints. Martine van den Heuvel-Greve (NL) and Arjen Boon (NL) volunteered to take a lead.

Length of the document should be limited for easy reading. The actual number of pages was not addressed during the meeting, and will be decided by the 'white paper team'. A '2 pager' will be drafted for discussion in OSPAR ICG-COBAM. The paper itself will be worked out later, also depending on the response of ICG-COBAM.

4. *Expert group on food webs*

The food web group felt that an expert group on food webs is needed to discuss and develop targets & indicators for this descriptor. This expert group fits best under OSPAR/HELCOM and should focus on:

- Developing a set of comprehensive new D4 indicators to be agreed upon for 2014 (monitoring requirements) and 2018 (revised targets and indicators)
- Looking also at cost-benefit analysis of new indicators and monitoring requirements

The indicators to be developed should cover for instance:

- Comparison of targets of indicators: e.g. predator-prey relationships
- Food web dynamics - rates rather than status measurements (as far as responsive to human pressure, to include eutrophication-, pollution- and climate-induced changes in ambient growth conditions, maybe reflecting also fishing impact on food webs)
- Trophic relationships (predator – prey relationships, production rate in relation to food availability)
- Ontogenic shifts (species and size spectra)
- Link with pressures
- Distinguish natural versus anthropogenic influences

5. *Discussion with the European Commission*

Discussions with the EC should take place with regards to difficulties in developing suitable targets & indicators, and knowledge gaps for the descriptor of food webs. Knowledge gaps on food webs may be addressed and covered by future frame work calls of the EC. A project could be built on delivering (regionally and subregionally optimised) indicators and targets for D4.

Actions

What	When	Who
Writing a '2 pager' of the working document	First draft: 21 November 2011	White paper team
Submission of the '2 pager' of the working document to OSPAR ICG-COBAM	21 November 2011	Peter Heslenfeld (NL)
Finalising the working document, including comments of OSPAR ICG-COBAM	Not determined yet	White paper team
Expert group	≥2012	To be determined at ICG-COBAM
Discussion with European Commission	ASAP	Member states

Non Indigenous Species (NIS)

Key discussion points

1. Some Contracting Parties have proposed management measures as targets for NIS (2.1.1) with underpinning indicators based on reducing the risk of introduction through pathways and vectors. Contracting Parties are currently unsure if this approach will be accepted by the Commission.
2. Most indicators proposed by Contracting Parties are very vague. Further specification will be necessary to ensure consistency between the proposed indicators.
3. There are some commonalities between Contracting Parties regarding the use of trend reduction indicators, which would require minor changes to ensure consistency.
4. There were a number of discussions about including efforts from international agreements and obligations (e.g. IMO) when defining indicators and targets, or whether these should be considered during the development of management measures.
5. Defining the scope of the NIS descriptor was a discussion point. There is currently a mix of targets and indicators either covering both NIS and INIS (invasive non indigenous species), or only NIS.

The Output file for NIS is embedded here:

Conclusions

6. All targets proposed by Contracting Parties were for COM indicator 2.1.1. (abundance, occurrence, distribution). The targets were all trend reductions targets, and would need further development before specific common indicators could be defined.
7. Key areas for clarification on COM 2.1.1 included:
 - a. Should targets be developed for all NIS, including those already established, or limited to newly-introduced species?
 - b. Should targets consider just consider NIS which are considered to be invasive NIS (IAS only)?
 - c. How can the impact of an existing IAS be reduced? What reduction is an acceptable level?
 - d. Is it cost effective or appropriate to set targets where species are already well established, and where eradication and/or the reduction of their impact is potentially impossible?
 - e. Is it possible to set trend comparison targets due to lack of baseline data and a full understanding of how NIS are introduced, where they occur, how abundant they are and factors influencing their survival?

- f. Will management based targets which address the risk of pathways and vectors of introduction be acceptable as a method of preventing the transfer of species?
- g. Is it possible to develop robust indicators and targets on the basis of numbers and distribution of IAS in subregional waters, due to the lack of sufficiently detailed knowledge of their current status?
- h. Should the management measures which are currently available at international level be considered as targets? E.g. IMO Ballast Water Management and the EU Regulation on alien species in aquaculture (708/2007/EC), which will prevent species with a high risk of environmental impact being introduced.

Comparison of Contracting Parties targets

1. *2.1. Abundance and state characterisation of non-indigenous species, in particular invasive species*
 - Trends in abundance, temporal occurrence and spatial distribution in the wild of non-indigenous species, particularly invasive non-indigenous species, notably in risk areas, in relation to the main vectors and pathways of spreading of such species (2.1.1)
2. Six trend-based targets have been put forward by CPs, however, questions arise regarding the scope/ambition of targets put forward, and if reliable data on abundance/distribution is actually available.
3. If such targets could be based on long-term monitoring at high-risk sites, for example, in selected marinas or ports, the achievement of such targets would be based on the number and frequency of monitoring. This information was not provided at the workshop and could potentially lead to inconsistencies across the sub-region.
4. One management measure was proposed as a target, with underpinning indicators based on reducing the risk of introduction through pathways and vectors. Given that only a proportion of these species become established and only some will be invasive (IAS) these measures maximise the potential to reduce adverse impacts and associated costs. CP's are currently unsure if this approach will be accepted by the Commission.
5. *2.2. Environmental impact of invasive non-indigenous species*
 - Ratio between invasive non-indigenous species and native species in some well-studied taxonomic groups (e.g. fish, macroalgae, molluscs) that may provide a measure of change in species composition (e.g. further to the displacement of native species) (2.2.1)
 - Impacts of non-indigenous invasive species at the level of species, habitats and ecosystem, where feasible (2.2.2).
6. One target was proposed under 2.2.1, which replicated those provided under 2.1., and one in regards to high risk species specific action plans. Two other proposals have been suggested including using surveillance indicators to gather data for COM 2.2.1 (Ratio of INIS/native species) and use of the Bio-Pollution Level Index (BPL) to establish the level of NIS impacts on the ecosystem component (COM 2.2.2), without targets attached to them.

Future Actions

What	When	Who
Further expert discussion/advice to establish appropriate baselines, scope, gaps and definitions for Descriptor 2 (in the form of a White Paper?)	By early/mid 2012?	Contracting Parties, responsible experts to be guided by ICES WGITMO (Working Group for Introduction and Transfer of Marine Organisms).
Ensuring a consistent network of NIS experts/policy leads, including Contracting Parties providing contact details. Arrange a meeting of NIS experts from all Contracting Parties	By late 2011?	Members of the NIS Working Group at the ICG-COBAM workshop (2-4 November 2011)
Investigate using ICES standing Working Group ITMO to investigate D2 issues	By late 2011?	
Raise D2 on the OSPAR and EU agenda	By late 2011/early 2012?	Through a COBAM white paper?
Further development of a potential common indicator on the abundance, occurrence and distribution of NIS/ invasive NIS	By early/Mid 2012?	Key NIS experts from the Contracting Parties, guided by ICES WGITMO?
Development of clear OSPAR/EU monitoring programmes and pathways management protocols for NIS/invasive NIS	By 2014?	OSPAR?