



Report of the OSPAR/MSFD workshop on approaches to determining GES for biodiversity



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. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

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. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, 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 et la Suisse et approuvée par la Communauté européenne et l'Espagne.

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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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. 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. The workshop was organised as part of ICG-COBAM's programme of work on MSFD. The purpose of the workshop was to explore the ways in which GES could be defined for biodiversity descriptors and to consider various approaches to setting associated state targets, with a view to recommending options for the most appropriate ways forward.

Hosted by the Netherlands, the two-day workshop brought together sixty-six policy and technical experts. In its results the workshop presents expert analyses comparing the approaches to setting of baselines and establishing of targets across a range of functional species groups (seabirds, fish and cephalopods, mammals and reptiles) and predominant habitat types (pelagic, sediment, rock and biogenic reefs). Following these analyses in working groups, the workshop discussed what the results meant in terms of: i) determining GES, ii) methodologies for developing ecological baselines, and iii) state target setting.

The workshop concluded that the European marine environment is not an unperturbed state, with the pressures of man having wide reaching effects, with consequences for how to measure baselines and set targets for achieving the goal of GES. A mixture of approaches is required in order to establish a baseline from which GES can be determined for different species and habitat groups.

A number of questions were raised during the workshop, which warrant further debate as this process is taken forwards. These are presented within the report.

Récapitulatif

OSPAR tient un rôle dans la coordination de la procédure de mise en oeuvre de la MSFD dans la région de l'Atlantique de Nord-Est. Dans le cadre d'OSPAR, le Groupe intersessionnel par correspondance sur la coordination de l'évaluation et de la surveillance de la biodiversité (ICG-COBAM) constitue le groupe principal de livraison chargé de la coordination par rapport aux aspects biodiversité de la MSFD. L'atelier a été organisé dans le cadre du programme des travaux de l'ICG-COBAM sur la MSFD. L'objet de l'atelier était d'explorer les différentes façons de définir le GES pour les descripteurs de biodiversité ainsi que d'examiner diverses approches pour établir des cibles pour les états associés, dans le but de recommander des options représentant les meilleures marches à suivre.

Organisé par les Pays-Bas, l'atelier qui s'est tenu sur deux jours a réuni soixante-six experts stratégiques et techniques. Parmi les résultats obtenus, l'atelier présente des analyses d'experts, en comparant les différentes approches aux références et aux modalités et en établissant des cibles auprès d'une gamme d'espèces fonctionnelles (oiseaux de mer, poissons et céphalopodes, mammifères et reptiles) et les types prédominants d'habitat (pélagique, sédiment, roche et récif biogène). Suite aux analyses en groupes de travail, l'atelier a discuté de la signification de ses résultats en termes de : i) détermination du GES, ii) des méthodologies afin d'établir des références écologiques, et iii) l'établissement de cible par état.

L'atelier a conclu que l'environnement marin européen n'a pas été épargné, avec les profondes répercussions résultant des pressions de l'homme et les implications quant au calcul des données de référence et des cibles afin de parvenir aux objectifs du GES. Une série de diverses approches est

nécessaire afin d'établir une base à partir de laquelle le GES peut être déterminé pour différents groupes d'espèces et d'habitat.

Un nombre de questions a été soulevé durant la réunion. Celles-ci méritent d'être débattues plus avant tandis que cette procédure avance. Elles figurent dans le 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 indicators in order to guide progress towards achieving GES (Art. 10). Marine strategies for achieving GES across regions and sub-regions 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 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. The workshop was organised as part of ICG-COBAM's programme of work on MSFD.

Good Environmental Status is defined in MSFD Art. 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. This workshop was convened to explore the ways in which qualitative and quantitative aspects of GES could be developed for the biodiversity-focused descriptors (1, 4 and 6):

- D.1 Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species and in line with prevailing physiographic, geographic and climatic conditions;
- D.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;
- D.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.

The purpose of the workshop was to explore the ways in which GES could be defined for biodiversity descriptors and to consider various approaches to setting associated state targets, with a view to recommending options for the most appropriate ways forward. This would be achieved by:

- a. assessing the feasibility of defining the desired condition of biodiversity (to meet GES) in qualitative and quantitative terms (sometimes referred to as 'state targets');
- b. reviewing possible approaches to setting baselines (reference points), against which GES should be assessed;
- c. reviewing possible approaches to setting state targets; and identifying circumstances where alternative approaches may be used (e.g. impact and pressure based targets);
- d. learning from experience gained in the application of other environmental Directives and Conventions, in particular considering and documenting:
 - (i) existing approaches to setting baselines and assessing their usefulness to meet MSFD needs;

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

- (ii) existing targets and their underlying methodology and assessing their usefulness to meet MSFD needs;
- e. recommending, where possible, approaches to setting baselines and targets for the MSFD biodiversity descriptors and highlighting relevant issues that need further consideration.

Approach and organisation of the workshop

The workshop was hosted by the Netherlands at the LEF Future Centre of Rijkswaterstaat (Ministry of Infrastructure and Environment²) in Utrecht from 23–24 November 2010. The workshop was chaired by Mr David Connor, convener of ICG-COBAM, and organized by Amelia Curd, Laurent Guérin (France), Ingo Narberhaus (Germany), Lisette Enseink, Peter Heslenfeld (Netherlands), Annabelle Aish, Jane Hawkrigge and Hayley Miles (UK). The workshop was facilitated by Maureen Jenkins, Winfried Laane and Claudia van der Pol from the LEF Future Centre process facilitation team.

Sixty-six policy and technical experts participated (Annex 1), representing 10 contracting parties. Three observers, one other regional seas convention and the OSPAR Secretariat were in attendance.

The two-day workshop programme (Annex 2) comprised a mix of context setting, highlighting the goals of the MSFD and drawing experience of target setting from different policies, as well as interactive sessions, plenary and working groups. The workshop benefitted from the facilitation staff and innovative facilities of the LEF Centre.

The following background documentation was made available to participants in advance of the workshop:

- 01. – Final programme of the OSPAR/MSFD workshop on approaches to determining GES for biodiversity;
- 02. – MSFD terminology (version 6);
- 03. – Comparison of high-level biodiversity aspirations across international obligations;
- 04. – Review of target-setting approaches;
- Info.01. – Commission Decision on criteria and methodological standards on good environmental status of marine waters. (2010/477/EU)

The scope of the workshop was set out by the chair and is presented at Annex 3. The participants were requested to:

- a. review current approaches for setting baselines and state targets;
- b. assess and recommend approaches to determining GES (state target setting) for the biodiversity descriptors;
- c. consider how to go forward with this process within the framework of the OSPAR Convention.

The chair indicated that the workshop would not aim to specifically consider the following issues, although they were relevant to the discussions:

- a. sub-region/sub-division boundaries;
- b. the categories of functional species groups and predominant habitat types;

² Formerly known as Ministry of Transport, Public Works and Water Management

- c. specific values for GES or targets;
- d. identification of specific indicators.

The initial focus of the workshop was on technical issues regarding MSFD terms, linkages between Articles 9 and 10 and a review of different approaches to setting baselines and targets. This served to build a common understanding amongst participants as a starting point for workshop discussions. This first session also appraised target-setting approaches that have been adopted under other European environmental policies (e.g. Habitats Directive, Water Framework Directive, OSPAR, HELCOM, Common Fisheries Policy) drawing on lessons learnt from their experiences. The presentations given are available on the OSPAR website.

The main approaches to setting baselines and targets for state (document 04 – Review of target-setting approaches) were outlined as follows:

- a. for baselines:
 - i. use of reference conditions/reference state (based on current conditions of sites considered to be in reference state, historical data or modelling);
 - ii. use of a baseline condition set at a specified date in the past;
 - iii. use of a baseline condition set as 'current' state (e.g. date of inception of a policy).
- b. for targets:
 - iv. use of directional/trend-based targets (either purely a direction of change or incorporating a rate of desired change from a baseline);
 - v. use of baseline value as the target;
 - vi. use of deviation (in absolute value terms or percentage change terms) from a specified given baseline;
 - vii. use of limits or thresholds (in relation to a specified baseline);

Participants then explored and evaluated, in sub-group and plenary sessions, a range of operational and hypothetical options, with a view to reaching agreement (where possible) on the approaches that might be suitable for MSFD application.

The workshop was arranged around six working groups, covering the range of functional groups of species and predominant habitat types that had been identified previously by ICG-COBAM. The six working groups were as follows (their composition is presented at Annex 4):

Species	Habitats
Seabirds	Pelagic
Fish and cephalopods	Sediment
Mammals and reptiles	Rock and biogenic reefs

The working groups were requested to consider the following issues, within the context of their species or habitat groups:

- a. advantages and disadvantages of current and potential approaches for setting state targets (as qualitative and quantitative elements of the determination of GES), including the setting of baselines;
- b. whether existing European/OSPAR biodiversity target setting methodologies are suitable for MSFD needs (*i.e.* in the light of the GES descriptor objectives and their broader biodiversity and geographical scope), and what alternative approaches could be taken;
- c. where multiple state target-setting approaches may be necessary (*e.g.* across species functional groups or predominant habitat types);
- d. whether other approaches (*e.g.* setting impact or pressure targets) should be considered for the biodiversity descriptors.

The working groups came together in plenary sessions at various stages to share progress, insights and challenges.

Results of the workshop

Presentations on the experiences of other Directives/Conventions highlighted certain commonalities in terms of the lessons learned:

- a. indicators and targets should be as simple as possible, pragmatic and provide the necessary information required for assessment and management;
- b. in addition to understanding population size and distribution, or habitat extent and distribution, it is also important to assess the condition or health of species and habitats as part of Good Environmental Status (all aspects are criteria in the Commission Decision (2010/477/EU));
- c. in order to assess the biodiversity status of each functional group and predominant habitat type, it is likely to be necessary to select specific species and habitats which can best represent each group or habitat type and which preferably are supported by sufficient data and are particularly sensitive to one or more anthropogenic pressures. The special habitats and species which are subject to community legislation or international conventions are also to be assessed; some of these may also be used to contribute to the assessments of the functional groups and predominant habitats in which they occur;
- d. the MSFD process should, wherever possible, be based on sound science and the precautionary approach;
- e. using a combination of approaches to determining the baseline, against which to set targets, was felt to be the most robust approach. Expert judgement plays an important role in determining baselines and setting targets but it is important that the provision of expert judgement is transparent;
- f. harmonisation of targets and baselines across Contracting Parties can be challenging, but is needed to reflect biodiversity's ecological rather than administrative patterns of distribution;
- g. harmonisation of monitoring methods is not necessary, provided that results are comparable;
- h. setting of targets needs to allow for flexibility and evolution over time as knowledge gaps are filled and assessment and management concepts refined;

- i. it is important to define the threshold, in both qualitative and quantitative terms, at which Good Environmental Status is met, as use of only trend-based targets gives no clear indication of when good status is achieved.

The results from the working groups were recorded using matrix templates to ensure consistency in the discussion between the groups and provide an audit trail for any recommendations of the group.

Summaries from each of the six working groups are given in Annex 5 appendices A-F, providing the main findings from each of the working groups and setting out recommendations to ICG-COBAM regarding the development of advice on the methods for setting baselines and targets for GES descriptors 1, 4 and 6. The working groups also identified priorities for next steps and any gaps.

An overview of the findings of the working groups with respect to the most appropriate approaches to setting baselines is presented at Annex 6.

Discussion

The main discussion points arising in plenary sessions can be grouped into three topics:

- i) determining GES,
- ii) methodologies for developing ecological baselines, and
- iii) state target setting. The plenary discussions are summarized here.

Defining Good Environmental Status

It was acknowledged that determining GES for biodiversity is particularly challenging. The state of the marine environment in Europe has changed significantly over the last few hundred (or even thousands) of years to an environment where evidence of human activity is now almost ubiquitous. In addition, the goal for GES on biodiversity needs to accommodate a level of human activity which is sustainable as well as ongoing climatic variation. GES therefore should relate to a current or future state (according to prevailing physiographic, geographic and climatic conditions) which remains resilient in the light of sustainable use and dynamic ecosystem changes rather than a past state which does not reflect ongoing climatic changes and ecosystem dynamics.

GES is required by the Directive to be determined at the level of the marine region or sub-region (Art 3.5). ICG-COBAM has given initial thought to scales relevant to biodiversity assessment. For an ecosystem-based approach it is anticipated that scales will need to vary depending on which aspects of biodiversity are being assessed (e.g. cetaceans and other mobile species at broader scales than habitats), but that these should be kept simple (a few nested scales) and appropriate for management purposes. MSFD represents an opportunity to adopt ecologically-relevant scales to facilitate the ecosystem-based approach required by the Directive. It is, however, important to recognise that whilst GES is to be determined at a regional or sub-regional level, MSFD responsibilities and obligations lie at a Member State level. Discussion is required with regard to the possibility of applying a combination of jurisdictional and ecological assessment scales, although this was not within the scope of the current workshop.

Baseline methodology

There was particular discussion regarding two of the proposed approaches for determining a baseline:

- a. concerns were raised over the use of the term “unimpacted” in the context of defining reference conditions, given that describing a truly ‘unimpacted’ state presents multiple conceptual and data challenges. It was acknowledged that historical data and modeling could legitimately be used to help define reference conditions, but these approaches

would not necessarily provide indisputably 'unimpacted' reference values. Equally, there are currently few, if any, marine areas in which human activities have had no influence (presently or historically). As an alternative to 'unimpacted', workshop attendees therefore preferred the concept for reference condition as 'a state at which the anthropogenic influences on species and habitats are considered to be negligible';

- b. bearing in mind the issues above, the use of reference conditions was considered the most appropriate baseline method for seabed habitats. The definition of GES should accommodate a level of deviation from such reference values, in terms of quality and the proportion of seabed habitats in such state, particularly to accommodate continued sustainable uses of the marine environment;
- c. for species groups and the pelagic system, past (e.g. first year of monitoring or catch records) or current state was considered more practical as a baseline than reference conditions. Participants considered the definitions of 'unimpacted' or 'minimally impacted' state were impractical to use as there was insufficient knowledge and a long history of human impact, including hunting and fishing;
- d. the issue of a 'moving baseline', where the baseline is reset to match the current state at the end of each assessment period, was considered inappropriate. Moving baselines may mask gradual deterioration of ecosystem components and fail to trigger necessary management action.

Target setting

Workshop participants discussed possible interpretations of Art. 9 and Art. 10 of the Directive, with regards to the balance of focus on developing state, impact and pressure targets. Some Parties felt that the Directive text was not always consistent in the separation of the two tasks of determining GES according to Art. 9 and of setting environmental targets according to Art. 10. According to a proposal by Germany, GES according to Article 9 focuses on state targets whereas the environmental targets according to Article 10 describe reductions and/or limits for pressures relating to possible measures to be taken in future. However, participants agreed to focus on the workshop objective of reviewing options for state target-setting for the biodiversity descriptors, as there was consensus that this was required by the Directive, whether under either article 9 or article 10. Nevertheless, a pragmatic approach, including impact and pressure targets, would be useful in situations where state targets are difficult to monitor or response to human pressure is unknown. The decision as to the weight of the emphasis on pressure, impact and state targets will be a matter for Member States.

Environmental status covers a gradient of quality from unimpacted to destroyed/lost elements of biodiversity and is affected by the level of pressures exerted on the marine environment. The chair introduced some of the challenges in assessing where on this gradient the boundary between good and not good status might lie, given heterogeneous pressures, the potential for cumulative impacts, a high degree of interconnectedness of biodiversity and the multiple ways of evaluating habitats' and species' status. Target setting needed to relate to pressures on the environment and ultimately to the activities that could be managed to reduce the adverse effects of pressures.

It was agreed that targets may have to evolve in the context of changing climatic variables.

It was noted that in the context of targets for species, increases in population sizes in almost all cases indicate that a better state is being achieved. There might be some exceptions to this rule, as some increases are due to anthropogenic pressures (e.g. opportunistic species).

Targets need to be practical and simple, preferably identifying species and habitats for which there is adequate available information. Data and information gaps and needs regarding other, less well

known species and habitats as well as ecosystem processes, should be identified so as to feed into the further development of targets.

Workshop conclusions

Working groups

The working groups agreed that mixtures of approaches are required in order to establish a baseline from which GES can be determined

- a. for the species groups and the pelagic group, this comprises a baseline set as a past (B), or current state (C) in addition to expert judgment (D);
- b. for the sediment and rock habitat groups, the balance tended to lie with a combination of current or past reference conditions (Ai-iii) again combined with expert judgment (D).

Data availability and data quality is critical to being able to establish baselines and identify appropriate targets

General

Germany has been developing a paper through ICG-COBAM (workshop background document 02 – MSFD terminology (version 6)) on MSFD assessment terminology. This paper will help foster a common understanding of MSFD terms.

Workshop participants agreed that setting baselines for species and habitats should utilize a combination of methods, the selection of which depends on the particular topic and the availability of information. Member States should make best use of multiple information sources, including data on current state, past state, modeling (if appropriate) and expert judgment.

Workshop participants agreed that the European marine environment is not in a truly unimpacted state. The pressures put upon the oceans by man have wide reaching effects. The concept of truly unimpacted sites (*i.e.* sites where the state is equal to that found before any human impact was experienced) was therefore felt not to be helpful in moving forwards.

The target setting process, apart from being based on the given descriptors of Good Environmental Status and on the precautionary approach will also need to reflect on aspirations for the sustainable use of the marine environment (as set out within the MSFD).

It was clear from discussions at the workshop that establishing state targets for GES is challenging, and that impact and pressure targets may need to be used as a proxy for state in some cases. This could be particularly important in the context of defining population sizes for mobile species, where predator-prey dynamics and their high mobility provide long-term uncertainties over their population sizes in given areas.

The different species groups and habitat types of the marine environment are dynamic and inextricably linked. The targets that are set for GES cannot therefore be considered in isolation. In successfully progressing towards one particular target, there may be implications for other targets.

The overall concepts applied in the Water Framework Directive (2000/60/EC) and Habitats Directive (92/43/EEC) of defining good status as target values in relation to defined baselines (reference points) was considered appropriate for biodiversity application in MSFD. However, further consideration was needed on the basis for setting these baselines and on defining targets at acceptable levels of deviation from these baselines. For example, MSFD baselines should take account of distributions and abundances of species and habitats that have been lost in the past (*e.g.* Flat oyster bed habitats).

Using a baseline set at the current state would mask previous deteriorations in range, extent and condition of habitats and species.

Approaches used in some OSPAR EcoQOs (e.g. for the seabird group) were considered appropriate for the purposes of the MSFD, as they are easy to understand, pragmatic and supported by monitoring data. Species on the OSPAR List of threatened and declining species are in many cases less suitable for use as indicators for relevant functional groups within MSFD where they are scarce and thus difficult to monitor.

Without an articulation of GES it will be very difficult to set concrete state targets. It will, nevertheless be possible to recognise a degraded environment, and how steps might be taken to reduce impacts by managing the pressures;

It is anticipated that it will not be possible by 2012 to have a final, refined picture of GES, what it means and how progress towards GES can be measured. There is still a need to further evolve the thinking behind the concepts, and some information is not yet available. It is therefore conceivable, that by 2012, the initial assessment, set of GES characteristics, environmental targets and associated indicators will be a first attempt, with the opportunity for further development and refinement in the subsequent six-year reporting period. The perspective of the European Commission is that it is imperative to be as clear as possible as to the meaning of GES (*i.e.* the state-based targets) as this should not change significantly with time, but may be refined on the basis of new evidence.

Outstanding issues and questions

Plenary and group discussions during the workshop identified a number of outstanding issues and questions that need further consideration:

- a. there are still challenges in understanding what is meant by good environmental status - the concept of good cannot be entirely data based and also involves expert opinion. Further, what is meant by sustainable is context-specific and subject to different perspectives within society; its use in defining GES therefore needs further discussion;
- b. concern was expressed that the timeline for MSFD implementation is short, and that the need for additional scientific advice is urgent. Where possible it was requested that OSPAR advice should be made available soon in order to provide guidance to Contracting Parties, but where this was not possible advice should not be rushed. It was requested that the work of ICG-COBAM should not be constrained by the timings of meetings and that to ensure progress a high level of coordination is required between the technical and policy groups both in OSPAR as well as within Member States;
- c. further thought needs to be given to how issues transcend the species and habitat groups, where indicators for one group might be able to help fill gaps from other groups, or where the descriptor requires a high level overview;
- d. the monitoring and assessment of specific species and habitats under the Habitats Directive has the potential to contribute to MSFD needs. However, differing geographical scales (regional/sub-regional rather than national) and use of baselines and target levels needs further consideration;
- e. the question was raised as to whether implementing research would be considered an acceptable management measure under the MSFD. This was based on a concern where Member States would enter into a legal obligation if population targets were set for species, but may have limited ability to control the population size if causes for change

were unknown. If yes, then this could be an important tool for filling knowledge gaps that will enable setting and refining of objectives and indicators;

Next steps

The task of following up the results of this workshop lies with ICG COBAM, through using the outputs to develop generic advice on the determination of GES and associated targets for the biodiversity descriptors, including appropriate approaches to setting baselines and targets, and the balance of state, impact and pressure-based approaches. However, it will be for the Contracting Parties to decide, through ICG-MSFD and CoG, on the extent of subsequent cooperation and coordination in the application of the advice (*i.e.* in defining GES and targets for biodiversity). With this in mind, it may be appropriate for ICG-COBAM to consider three possible scenarios for these tasks:

- a. each Member State would follow their own direction, using the OSPAR advice as a basis for ensuring consistency across the region and sub-regions, with help to identify where there may be divergence and where such divergence might be a problem;
- b. where cooperation is more intensive, perhaps by using Contracting Party experts in a more collective approach to the determination of GES and target setting, and potentially seeking advice through ICES (such as use of their expert groups) either directly or in a review role;
- c. a combination of these approaches, depending on the subject.

It is hoped that there will be continued engagement of workshop experts in the process.

Reporting tasks and timetable

The report of the meeting was prepared by written procedure according to the following schedule:

- a. a draft report of the meeting was prepared by the Secretariat and organizing committee;
- b. each of the six working groups prepared a short summary of their work and conclusions to be annexed to the workshop report;
- c. the compiled report and annexes were circulated to all workshop participants for comment and finalization.

The report will be submitted to the next meetings of ICG-COBAM in January 2011 and ICG-MSFD. Participants felt that the outcomes would also be of use to other groups working on other MSFD descriptors.

Workshop close

The workshop closed at 16:00 on 24 November 2010. The chairman 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.

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Annex 1 – List of Participants

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Annex 2 – Workshop Programme

Day 1: Introductions, Lessons Learned and Working Groups

Time	Topic
9:00	Welcome Coffee
	Opening Presentations
9:30	Presentation 1 Introduction to MSFD/ GES, 2012 tasks, purpose of cooperation in OSPAR; scope of workshop (doing and not doing) – David Connor (Convenor of ICG-COBAM)
10:00	Presentation 2 Definitions of MSFD terms and the tasks of determining GES vs setting environmental targets – Ingo Narberhaus (DE)
10:15	Welcome to LEF <ul style="list-style-type: none"> • Introduction to the programme • Organisation of the days
10:30	Coffee break
11:00	Presentation 3 Options for target-setting/methods for determining GES – Annabelle Aish (UK)
11:15	Lessons Learned from other Directives, Conventions and Policies Five 5 min presentations: <ol style="list-style-type: none"> 1. OSPAR EcoQOs – Peter Heslenfeld (NL) 2. WFD – Angel Borja (ES) 3. HELCOM – Samuli Korpinen (HELCOM Secretariat) 4. Common Fisheries Policy – Gerjan Piet (NL) 5. Habitats Directive – Jochen Krause (DE)
11:45	Marketplace discussion at 5 tables—one table for each presenter
12:30	Lunch
13:30	Plenary Introduction to working groups and locations
13:40	Working Groups <ol style="list-style-type: none"> 1. Breakout into 6 working groups: <ul style="list-style-type: none"> ○ Seabirds ○ Mammals and reptiles ○ Fish and cephalopods ○ Rock and biogenic reef habitats ○ Sediment habitats ○ Pelagic habitats 2. Discuss and document pros and cons of current and potential approaches for setting state targets (as qualitative and quantitative elements of the determination of GES); 3. Consider relevant existing targets and underlying methodologies and discuss their suitability for use within the context of MSFD 4. Where the target or underlying methodology is felt not to be suitable for MSFD

Time	Topic
	<p>aspirations or needs (<i>i.e.</i> GES and its broader biodiversity and geographical scope), participants should discuss what alternative approach(es) could be taken.</p> <p>5. Participants should identify the target-setting approach(es) that are useful for their working group. If multiple approaches are identified as being appropriate/necessary, participants should assess the degree to which they are similar, clarify the need for several approaches and identify any problems associated with the application of these different approaches.</p> <p>6. Finally, identify conditions where other approaches (<i>e.g.</i> Setting impact or pressure targets as proxy for state) should be considered for each of your species functional groups/habitat types;</p> <p><i>During this work you are supported by a matrix that includes a list of species or habitat groups and existing European targets and the methods used to arrive at them. Rapporteurs will be instructed on how to record discussions during these sessions.</i></p>
15:15	Coffee break
15:40	Plenary to resolve uncertainties and problems
16:00	<p>Working Groups</p> <p>Finalise your work. Be ready to present your preferred approaches for each species functional group or habitat type tomorrow morning and to answer questions on your selections. Technical facilitators should be ready to present the results for your working group.</p>
18:00	Close

Day 2: Working Group Products and Next Steps

Time	Topic
8:30	Coffee break
9:00	<p>Plenary</p> <ol style="list-style-type: none"> 1. Presentations from each Working Group with questions and answers from the floor 2. Identification of issues regarding comparability of approaches between Working Groups 3. What can Working Groups do to improve the comparability where needed?
11:00	Coffee break
11:30	<p>Working groups -- Continuation of their work:</p> <ol style="list-style-type: none"> 1. Improve comparability of approaches. 2. Identify elements for advice documents 3. List further steps for your work
12:30	Lunch

13:30	<p>Closing Plenary</p> <ol style="list-style-type: none"> 1. Reporting on comparability improvements 2. Identifying potential way forward for advice documents 3. Identification of common tasks and, where possible, potential task managers and supporting groups
15:30	Closing statement
16:00	Close

Annex 3 – Summary of workshop purpose and aims

This workshop will explore the ways in which GES can be defined under the MSFD and will then begin to investigate how quantitative targets for GES (and associated pressures) could be developed for MSFD Biodiversity Descriptors (1, 4 and 6). The initial focus of the workshop will be on technical discussions around the definition of GES with subsequent discussion covering

- i) appraisal of target setting approaches that have been adopted under existing environmental Directives and Conventions (e.g. Habitats Directive, WFD, OSPAR, HELCOM); and
- ii) exploration of other national and international target-setting approaches that might be appropriate in an MSFD context.

The workshop is intended to provide a practical way forward for defining GES and setting pressure and state targets for the biodiversity descriptors. Background materials for the workshop which outline potential options for setting GES targets for biodiversity descriptors (such as use of reference conditions, targets measured against historic baselines, trends over time, etc.) will be prepared.

The workshop will begin with a series of presentations which will seek to build a common understanding of the qualitative and quantitative aspects of defining GES, and will cover lessons learnt from defining reference levels and quantitative thresholds under WFD, Habitats Directive, HELCOM and OSPAR as well as other international or national conservation mechanisms. Presentations will also be given to introduce new approaches that have not been applied so far. National views on defining GES will also be put forward and discussed. Participants will then explore and evaluate, in sub-group and plenary sessions, all operational and hypothetical options, with a view to reaching agreement (where possible) on the approaches that might be suitable for MSFD application.

Desired outcome of the workshop:

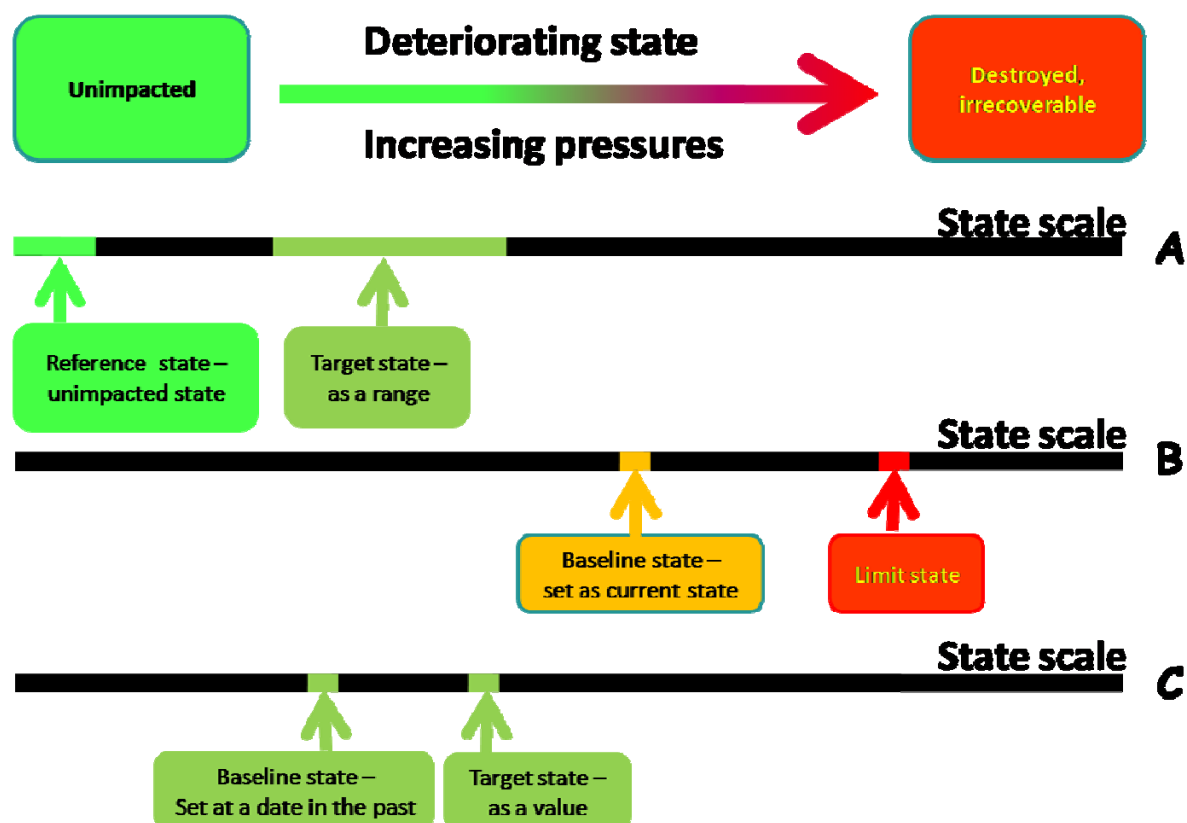
- a. Understanding of how GES for species and habitats (both qualitatively and quantitatively) might be defined and set to enable the preparation of Advice documents³.
- b. Documentation of the current status of how we are defining thresholds for the habitats and species on draft lists. This will allow us to identify:
 - i. where we need to re-evaluate the approaches for quantitative GES definition and perhaps look for harmonisation across components (e.g. between seabirds and marine mammals);
 - ii. where quantitative GES definitions are inappropriate/unrealistic and alternative approaches should be explored.
- c. It is expected that this workshop will help to clarify the likely next steps in this process, including a more detailed consideration of approaches for target setting, with a focus on setting suitable pressure targets (MSFD Art. 10)⁴.

³ The term Advice documents refers to the manuals envisaged to provide practical advice to Contracting Parties on setting GES targets for habitats and species.

⁴ In view of ongoing discussions at EU level (e.g. WG GES) on potential role of pressure targets in MSFD implementation, the workshop organising group considers further elaboration of pressure approaches a next step.

Appendix 1: The conceptual relationship between reference and baseline conditions, targets and limits⁵.

Environmental state can be considered as a gradation from un-impacted conditions to a destroyed or an irrecoverable state (top of figure). Assessment systems variously set reference, baseline, target or limit points (or ranges) along this gradient to assist in status assessment and for monitoring progress against time and actions. Here three different approaches are shown (A, B, C).



⁵ Diagram taken from Task Group 1 report on Biological diversity (2010). Reference: Cochrane, S.K.J., D.W. Connor, P. Nilsson, I. Mitchell, J. Reker, J. Franco, V. Valavanis, S. Moncheva, J. Ekebom, K. Nygaard, R. Serrão Santos, I. Naberhaus, T. Packeiser, W. van de Bund and A.C. Cardoso 2010. Marine Strategy Framework Directive. Guidance on the interpretation and application of Descriptor 1: Biological diversity. Report by Task Group 1 on Biological diversity for the European Commission's Joint Research Centre, Ispra, Italy.

Annex 4 – Composition of working groups

The compositions of the six working groups are presented in table 1. Each working group was supported by a technical facilitator** and a rapporteur*. For the most part, the working group composition remained constant throughout the workshop, with the exception when specific expertise was required in more than one group. Members of the organising committee moved between groups to provide additional support as required.

Table 1. Composition of Working groups

Working Group	Members
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Mammals and Reptiles	Ms Annabelle Aish** Dr Stefan Bräger Dr Saa Kabuta Ms Naomi Matthiessen Mr Hans Nieuwenhuis Dr Diana Slijkerman Mr Mark Tasker Ms Saskia Van Gaever
Seabirds	Dr Stefan Garthe Mr Peter Heslenfeld** Dr Ian Mitchell Ms Julie Percelay Dr Sharon Thompson* Mr Gerard van Vliet

Working Group	Members
Pelagic habitats	Mr. Patrick Camus Mr. Simon Claus Ms Caroline Gernez Dr Lars Hansson Dr Britta Knefelkamp Mr Lex Oosterbaan* Mr Theo Prins Dr Diana Slijkerman Ms Anne Marie Svoboda* Dr Sandra van der Graaf** Mr Marcel van den Berg
Sediment habitats	Dr Angel Bora Mr Rik Duijts Dr Robbert Jak Dr Eamonn Kelly Dr Jochen Krause** Ms Wera Leujak Dr Hans Nilsson Dr Melanie Sapp Ms Anne-Britt Storeng Mr Gert van Hoey Ms Charlotte Vinchon
Rock and biogenic reef habitats	Dr Laurent Guérin Dr Jan Haelters Dr Kerry Howell Mr Samuli Korpinen Ms Hayley Miles* Dr Ingo Narberhaus** Mr Marijn Rabaut Mr Jorge Alonso Rodriguez Dr Alexander Schröder Dr Fernando Tempera Ms Agnes Ytreberg

Annex 5 – Working group summaries

The workshop was divided into six working groups covering three species groups (seabirds, fish and cephalopods, mammals and reptiles) and three habitat groups (pelagic, sediment and rock and biogenic reefs) (c.f. Annex 4).

Each working group was asked to consider,

- a. advantages and disadvantages of current and potential approaches for setting state targets (as qualitative and quantitative elements of the determination of GES), including the setting of baselines;
- b. whether existing European/OSPAR biodiversity baseline and target setting methodologies are suitable for MSFD needs (*i.e.* in the light of the GES descriptor objectives and their broader biodiversity and geographical scope), and what alternative approaches could be taken;
- c. where multiple state target-setting approaches may be necessary (*e.g.* across species functional groups or predominant habitat types);
- d. whether other approaches (*e.g.* setting impact or pressure targets) should be considered for the biodiversity descriptors.

The results from the working groups were recorded using matrix templates in order to enable consistency in the discussion between the groups and provide an audit trail for any recommendations of the group.

The summary outputs of each of six working groups are presented as appendixes A-F to this annex, providing the main findings from each of the working groups and setting out recommendations to ICG-COBAM regarding the development of advice on the methods for setting baselines and targets for GES descriptors 1, 4 and 6. The matrix templates that were completed during the working session are embedded within each appendix.

Annex 6 presents a matrix that presents an initial overview of the results across the different working groups.

Fish and Cephalopods

Working Group interpretation of audit trail matrices

The main objective of the MSFD is to achieve or maintain good environmental status (GES) for the marine environment. The choice of method used to define a baseline state against which GES may be evaluated (e.g. the reference conditions) is wholly dependent on the data available for each fish and cephalopod ecotype. It is important to keep in mind that the reference condition does not necessarily equal the target. It was felt that, for a number of fish and cephalopods that are well sampled by scientific fisheries surveys, setting a baseline in the past is feasible and is commonly done for commercial species. For species that are not often sampled, either due to their low abundance or the unsuitability of the sampling method, a mixture of baselines set in the past, modelling of reference conditions⁶ together with expert judgment, would allow a more robust baseline to be set. An “unimpacted state” is felt both as an extremely difficult state to apprehend (as man has been fishing for centuries) and as a misleading concept (as the MSFD target is aimed at a sustainable use of the environment rather than a non-impacted state). It was recognized that 'reference condition' as defined by OSPAR GES4BIO Doc.2 is a non-impacted state. While we do not have complete data for unimpacted states in all maritime areas, some remote, deep-sea areas can be considered as relatively unimpacted and as such can provide reference conditions for similar ecotypes and their fish and cephalopod assemblages. Similarly, historical records and time series together with anecdotal information can provide useful insights into the past characteristics of a given area and their species assemblages, conditions and population parameters. Expert judgement could be used to evaluate this evidence and model near-unimpacted conditions.

A set of proposed target-setting methods were assigned (after a rapid preliminary review by the sub-group) to each of the European Commission Decision Document⁷ Criteria and Indicators which relate to the biodiversity components of the fish and cephalopod working group. These were added to the audit trail spreadsheet but are also summarised below, using the following list of methods put forward to the workshop:

1. Directional / trend based targets (rate of change);
2. Directional / trend based targets (direction of change);
3. Limits / thresholds;
4. Absolute Value (target set as baseline);
5. Absolute Value (target not set at baseline);
6. Target set as deviation from baseline.

⁶ the matrix only gave “modelling of unimpacted conditions” as an option. It was felt that modelling, of any condition, would have been more relevant as an option

⁷ COMMISSION DECISION of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters (2010/477/EU) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:232:0014:0024:EN:PDF>)

GES Descriptor: Attribute: Indicator	Proposed Target-setting method
1 Species: Distributional range (1.1.1)	1 or 2
1 Species: Distributional pattern within range (1.1.2)	1 or 2
1 Species: Area covered by the species (for sessile/benthic species) (1.1.3)	1 or 2
1 Species: Population biomass (1.2.1)	2, 3, or 5
1 Species: Population abundance (1.2.1)	2, 3, or 5
1 Species: Population demographic characteristics (1.3.1)	3 or 6
1 Species: Population demographic characteristics (e.g. body size or age class structure) (1.3.1)	3 or 6
1 Species: Population demographic characteristics (e.g. sex ratio) (1.3.1)	3 or 6
1 Species: Population demographic characteristics (e.g. fecundity rates) (1.3.1)	3 or 6
1 Species: Population demographic characteristics (e.g. survival/mortality rates) (1.3.1)	5 or 6
1 Species: Population genetic structure (1.3.2)	2?
4 Performance of key predator species using their production per unit biomass (productivity) (4.1.1)	5 or 3
4 Large fish by weight (4.2.1)	1, 2, 3 or 5
4 Abundance trends of functionally important selected groups/species (4.3.1)	1 or 2

There were some members of the group who felt that the only target-setting method that can always be applied is a directional/trend-based target on direction of change (#2 in the table above). It was felt that the choice of additional target-setting methods must be treated on a case-by-case basis depending on the available information.

Additional work group discussions

The fish species listed by the OSPAR Commission (Agreement 2008-6) and Habitats Directive (92/43/EEC) (neither contain cephalopods) are limited to 28 species and focused on rare species. This distorted the exercise, as the assessment for common species requires different methodologies from rare species. It is clear from MSFD Annex III that characteristics for fish populations need to be provided for all species rather than a selection of species. The ecotype “elasmobranchs” is in fact a sub-class containing, demersal, pelagic and deep-sea shark skates and rays. It was felt that using examples of key species at different trophic levels could be more relevant to the biodiversity descriptors 1 and 4.

Within the MSFD text the following terms are used throughout:

- a. sustainable use of the seas;
- b. sustainable use of marine goods and services;

- c. sustainable use of marine biodiversity;
- d. sustainable development.

Target-setting approaches need to reflect on the sustainable use of the environment⁸, while keeping in mind that the overarching and prime objective of the Directive is to achieve GES; however the definition of sustainability needs further clarification as it could differ from a fisheries perspective compared to a rare species biodiversity point of view (indeed, not all elements of the marine environment are or should be exploited or used).

An integrative approach: although the participants recognized the benefits of the workshop approach (separate work in sub-groups at high taxa level and broad habitat types), it was felt that a more integrative approach might be required to take into account interactions between these sub-groups and tackle e.g. Descriptor 4 on food webs.

The need for alternative or proxy indicators for pressure and/or impact:

- a. most participants agreed that state indicators were most appropriate for measuring biological diversity while moving towards defining indicators of pressure (as a proxy), requires further work, in particular research into cause-effect relationships that scientifically underpin/validate the assumptions;
- b. according to the methodology of 'Biological valuation maps'⁹, biological valuation of a spatial unit/entity (based on state descriptors and algorithms) is conducted through methods that are independent from the 'pressure' assessments/maps and the confidence assessments/maps. In a later step, these three different components can be integrated into one view. This approach offers clear benefits for management purposes.

Next steps

The next step would be to assess which existing indicators within the North-East Atlantic correspond to the criteria for each of the biodiversity descriptors in the EC Decision. Work should also start immediately on developing indicators for criteria which are not currently covered (or insufficiently so) by existing indicators. It was strongly felt that, in order to fully explore the ways in which GES can be defined under the MSFD, it is essential for OSPAR as a coordinator to extend the reviewing of baseline-setting methods and associated targets to indicators beyond those used within EU Directives or Conventions for a particular species. The projects and Council Regulation (EC) which were felt to be highly relevant to this method-setting approach include:

- a. Data Collection Framework (DCF) "Ecosystem" Indicators (<http://dcallnet.jrc.it/web/dcf/home>);
- b. Indiseas (<http://www.indiseas.org/>);
- c. Biodiversity Indicators Partnership (<http://www.twentyten.net/language/en-us/home>).

Not only do the indicators developed for the GES descriptor 3 "commercial fish" also contain data and targets which are directly relevant to the biodiversity descriptors, but some DCF indicators specifically

⁸ 'Good Environmental Status' as defined by the MSFD means "the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations".

⁹ 'Biological valuation maps'⁹ developed by Derous et al (2008) – see also proposal in GES4BIO workshop made by Dr A. Borja during his presentation

address the ecosystem approach within the Common Fisheries Policy and as such contain ecosystem components.

The matrix templates recording the discussion and audit trail for the working group are embedded here:

http://www.ospar.org/html_documents/ospar/html/AppendixA_Rapporteur_tables_final_fish.xls

Marine Mammals and Reptiles

For GES 'state' targets

Overall, the group felt that the most appropriate means of setting GES 'state' targets are:

- a. Adopting directional/trends based targets (specifying direction of change) using a 'mixture of approaches' to set a baseline (current state, past state, expert judgement, historical data¹⁰);
 - i. In practice, this means using an approach similar to that of Habitats Directive Favourable Conservation Status reporting, but:
 - 1) with assessment units based on biological populations as opposed to Member State political boundaries; and
 - 2) ensuring that, where historic data indicate population size, distribution and condition were greater in the past, GES targets should seek a clear improvement in these criteria (rather than simply maintaining them at current state);
 - ii. The limitation of being unable to specify an 'end point' state target with this approach was acknowledged by the group but any attempt to do so was considered scientifically flawed on the basis of current information;
- b. Modelling carrying capacity for common marine mammal species, based on assumptions or measurements of parameters of life history and setting a target as a deviation from this total carrying capacity to allow for "sustainability" (for example, 80%). (This method underpins the targets set for harbour porpoise bycatch by ASCOBANS and the OSPAR EcoQO, see below).

For GES 'pressure' targets

Reducing known pressures on marine mammals and reptiles was felt to be an appropriate solution where absolute state targets couldn't be specified (ideally, state and pressure targets should be used in combination where possible). For example:

- a. Using the EIA/SEA process to regulate licensed activities that may introduce (new) pressures believed to cause an impact on marine mammals and reptiles (unless mitigation measures are introduced);
- b. Setting levels of pressure in line with agreed deviations from modelled carrying capacity (e.g. the Harbour porpoise EcoQO which sets a 1.7% limit for anthropogenic removal (including bycatch) so that a target population of at least 80% of carrying capacity is maintained);
- c. Reducing pressures on marine mammals and reptiles at crucial points during their life-cycle. For example, preventing visual/noise disturbance at seal haul out/pupping areas during relevant times of the year (these areas can change on an annual basis, so are not necessarily protected through Natura 2000);

¹⁰ Note that although the group felt that there may not be enough historical information on genuinely 'unimpacted' marine mammal and reptile populations, historical information was still very useful in indicating what marine mammal populations may have looked like at various (impacted) points in the past. It was agreed that this information should inform baseline-setting, along with current and recent scientific monitoring data.

- d. Reducing or eliminating impacts on endangered/threatened species (for example the by-catch of turtles).

Other key issues discussed

The use of state 'thresholds' or 'limits':

- a. The group considered the OSPAR 'threatened and declining' status of several marine mammals and reptiles, but felt that approach used to assign species to this list was not useful for setting GES targets. This was because the approach is intended to indicate problematic population decline as opposed to guiding aspirations for future population size (that are equivalent to 'Good Environmental Status'). However, the group felt that the (historic) data OSPAR used to generate a baseline against which to assess population decline could also be used to support trends-based GES targets for these marine species;
- b. The same discussion arose in relation to the OSPAR EcoQO on seal populations, in that the EcoQO is simply a threshold (10% decline) that triggers further research, and therefore couldn't be considered a GES 'target'. It was agreed that the OSPAR seal population index would be useful in indicating areas where seal populations might not be moving towards GES. However, the group did agree that, under MSFD, Member States could commit to taking necessary measures for seals if this research indicated a need to do so.

The link with taking 'measures' to achieve GES targets:

The group felt it was possibly problematic to set targets for rare marine mammals where appropriate management measures are simply not known (because current pressures/reasons for lack of recovery are not known¹¹) – for example, in the case of some species of baleen whales.

The 'population condition' of marine mammals and reptiles as Com Decision criterion:

Towards the end of discussions, the group indicated some concern that the workshop had focused primarily on target setting for two out of the three Commission Decision D1 species criteria – *i.e.* Population size and distribution. Population condition (and underpinning indicators) perhaps hadn't received as much consideration for marine mammals and reptiles. It was felt that target setting for body size or age class structure, sex ratio, fecundity rates, survival/mortality rates of marine mammals and reptiles could be considered, where possible. Targets for these indicators could be set through methods outlined above (see section 1) or through using pressure targets (for example, for certain pollutants such as PCBs) as a proxy for species population health condition. However, it was also acknowledged that population condition (and underpinning indicators) were considered by ICES during ECOQO development, but there were considerable difficulties in monitoring them. A further difficulty was noted of setting too many targets for managers to work towards under conditions of extremely poor information.

The matrix templates recording the discussion and audit trail for the working group are embedded here:

http://www.ospar.org/html_documents/ospar/html/AppendixB_Rapporteur_tables_Final_Mammals.xls

¹¹ This is exacerbated by limited monitoring data for some marine mammals and reptiles.

Seabirds

Baseline-setting Methodologies

For seabirds, the preferred base-line setting approach was method B. (Baseline set as a past state) with additional use of expert judgement.

The use of reference levels were rejected because:

- a. seabirds are predominantly mobile (though there are aggregations at sea during certain times of the year in some species, and several species occur mostly in shallow and/or coastal regions where they usually aggregate) and there are no populations that could be considered to be not currently impacted in some way by man;
- b. within the historical record, there has been no point in time when humans were not having a significant impact on seabirds e.g. through hunting.

The use of baselines set as a past state is practical because time-series data on seabirds exists throughout Europe. Given the existence of these data, it makes little sense to arbitrarily set baselines at the current state or to derive them purely from expert judgement. The main problem with setting baselines as past states is that the method is constrained by length of the time series (30-40 years in most countries) and will be dependent on the knowledge of previous and current impacts.

For this reason, expert judgment is needed to identify the most appropriate point in the time-series to derive the baseline from. The OSPAR EcoQO on seabird population trends¹², consisting of an aggregation of individual bird population trends, uses a baseline that is set at a past population size that is considered desirable for each individual species within each geographical area. Expert judgement is used to identify the point in time when population levels were considered to be least impacted by human activities.

The EcoQO is applicable for all functional groups except for Coastal Top Predators, because these species rely on terrestrial environments.

Target-setting methodologies

For each criterion in the Commission Decision (2010/477/EU), the group considered the relevance of the criterion and its indicators for seabirds and target setting approaches were considered for each of the GES Criteria potentially applicable to seabirds.

Species distribution (1.1):

Species distribution was generally considered not to be useful criterion for determining GES. This is because seabirds are highly mobile and have large ranges that are mostly constrained by climatic, geographic and physiographic factors, rather than by human pressures except at a very local level.

Population size (1.2), Abundance/distribution of key Trophic groups/species (4.3)

These criteria are relevant for the definition of GES for seabirds:

- a. The OSPAR EcoQO on seabird population trends as an index of seabird community health was considered to be an appropriate approach for setting targets for the population size of seabirds and the abundance of a key trophic group. The EcoQO on seabird population

¹² <http://www.ices.dk/reports/LRC/2008/WKSEQUIN/WKSEQUIN2008.pdf>

trends sets targets on two levels: firstly targets are set separately for the annual breeding abundance of individual species, as positive and negative deviations from each species-specific baseline (see above). Secondly, the EcoQO sets a limit on the proportion of species for which breeding abundance was within target levels; the EcoQO is achieved if this proportion exceeds the limit;

- b. The EcoQO on seabird population trends has not yet been adopted by OSPAR but is 'under development' as data is collated from countries within the Greater North Sea. The EcoQO was developed for breeding populations of seabirds in functional groups: offshore and inshore surface- and pelagic-feeders; but only partially reflects the state of non-breeding populations. Insufficient data exist to enable trends in offshore non-breeding abundance to be estimated. There may be scope to apply the EcoQO to limited data on inshore non-breeding aggregations of pelagic feeders. The EcoQO should be adapted to provide a target for GES for inshore and inter-tidal benthic feeders, for which extensive time-series data on non-breeding abundance exists. Most species in these groups breed widely dispersed in the Arctic and over-winter in Europe, therefore non-breeding abundance is a more appropriate indicator than breeding population size. The group considered that the level of functional groups was the most appropriate level for applying this EcoQO, because the impacts and appropriate measures that are employed to minimise them, are likely to be different for each functional group;
- c. The development of targets based solely on the status of species listed by OSPAR as 'threatened or declining' was considered ineffective for determining GES in seabird populations because these species are either rare and therefore difficult to monitor, or are not representative of the seabird community as a whole.

Population condition (1.3), productivity of key species or trophic groups (4.1)

- a. These criteria were considered relevant to the definition of GES for seabirds. Indeed, abundance represents only one aspect of the state of seabird populations and communities. Seabirds tend to be generally long-lived and slow to reproduce. Changes in their breeding numbers are a poorer indicator of short-term environmental change or acute impacts from pressures (e.g. to food supply) than are other breeding parameters (e.g. breeding success).
- b. The EcoQO on Local sandeel availability to black-legged kittiwakes (under development) presents an example of how targets could be set for demographic characteristics (c.f. indicator 1.3.1). The EcoQO assumes that if black-legged kittiwakes are unable to breed successfully for several years in succession, then it is likely that sandeel abundance (or that of other small shoaling fish) is low, representing a serious risk of adverse effects on many animal species. The target is set at a limit of mean annual breeding success over a specified period – if the mean breeding success falls below the limit, the viability of the population is considered to be under threat.
- c. Kittiwakes are a good indicator species as their survival and breeding success are closely linked to food supply and the factors (such as climate) that affect it. Further work is needed to determine:
 - i) the most appropriate period over which to assess breeding success (i.e. the 3 years recommended by the EcoQO may be too short to indicate a threat of serious or irreversible harm to kittiwake populations);
 - ii) most appropriate limit; and

- iii) to include other species that are representative of other functional groups. The determination of GES using these criteria may be limited to those areas where sufficient monitoring of breeding success of kittiwakes and other applicable species is undertaken. Incidentally, other demographic characteristics that might be good indicators of population condition are monitored at only a few sites and in a few species.
- d. The other EcoQOs considered by this group are pressure indicators: on Plastic particles in stomachs of seabirds and Proportion of oiled common guillemots (*Uria aalge*) among those found dead or dying on beaches (both have been adopted by OSPAR), Mercury concentrations in seabird eggs and organohalogen concentrations in seabird eggs (both underdevelopment). These EcoQOs all provide appropriate targets and indicators for descriptors D8 on contaminants and D10 on litter, but not for D1, D4 and D6 because the pressures they indicate are not significant single drivers of GES in seabird populations at the regional or sub-regional sea level.

Recommendations to ICG-COBAM

Next steps

The Seabird group consisted of a mixture of experts, managers and policy makers. It is recommended to use this structure to further define targets.

The Seabird group had not the time to review all functional bird groups whether these would be applicable for the GES indicators, especially for GES 4 “Food webs”. If needed, this has to be elaborated further.

A list of indicator species needs to be selected for each of the functional groups. The current list is composed of species covered by other International Environmental Agreements that tend to report on threatened and/or declining species that are not necessarily good indicators of GES of the wider seabird community.

The target-setting approach for GES criterion: population size that is recommended above may lead to spurious conclusions that GES had either been or not been met. The EcoQO on seabird population trends that this target-setting approach is based on was designed to provide triggers for appropriate action. Appropriate action in the EcoQO context would include both research and/or management, depending on how well the causes of change are understood at the time. Further guidance is required on whether research is an appropriate ‘Measure’ under MSFD?

Gaps

Any targets that are set for seabirds following the methods outlined above will not be precise. Reference levels and baselines are subjective or at best approximations of unimpacted states. There needs to be recognition of this, of how targets relate to measures and how targets can be reviewed and updated.

Given that there are limitations to target-setting against baselines set in the past (as recommended above for population size), state targets may not necessarily be the most appropriate for measuring GES in seabirds. An alternative approach would be to set targets on those pressures that have a known significant impact on seabirds. Fishing is thought to have significant impacts on seabirds by depleting seabird prey species; increasing seabird mortality through by-catch; and by artificially elevating population size through food provision by discards. But evidence on fishing impacts is probably too limited to be able to set targets on fishing activity that would ensure GES in seabird populations and that would be defensible under the spirit of MSFD. There is need to know more about major impacts with the aim of setting workable targets to help achieve GES.

The Seabird group, nor other groups, have taken into account Seabird habitats. It might be useful to consider the inclusion of seabird habitats in the target-setting approach.

The added value of the EcoQO on Seabird population trends in relation to the EC Birds Directive is that the EcoQO covers birds of the whole sea. In some Contracting Parties/Member States, the Birds Directive is interpreted in such a way as to be restricted to covering mainly the Special Protected Areas rather than also including 'other measures'.

The EcoQO on seabird population trends has so far been developed using data on the number of birds breeding at colonies in the NE Atlantic. The region also hosts important at-sea aggregations of seabird and waterbird species that breed elsewhere. In the future, it might be also be possible to apply the EcoQO to trends in these non-breeding aggregations. This will only be realistic in the next reporting period for MSFD (starting from 2018), since monitoring programmes for aggregations of seabird and waterbirds at sea in many parts of Europe are still under development.

The focus of the group was on Descriptor 1, thus more work needs to be done to use seabirds as indicators of food web changes (Descriptor 4), for example by dietary sampling of seabirds that would also indicate conditions of lower food web levels (e.g. prey condition).

The matrix templates recording the discussion and audit trail for the working group are embedded here:

http://www.ospar.org/html_documents/ospar/html/AppendixC_20101202_Rapporteur_tables_Final_Birds.xls

Pelagic habitats

Working Group interpretation of audit trail matrices

Session 1 – task 2

The Pelagic Habitat Group has added two rows at the top of the first worksheet ('Examples' and 'Usefulness method') in which we have respectively named examples and judged the usefulness of this method. If the method was not considered useful, the other cells in the column were left empty. Also, another column was added with a variation to method C (current state, Cii): to add a prediction of the modelled effects of measures implemented under current policies to the current status, and set this as a baseline.

Audit Trail Tasks 3-6 Habitats

In the second worksheet we did not consider the separate habitats as we felt the existing indicators belonged to all habitats. Hence, we only considered the two existing approaches that were listed.

The OSPAR approach is valid for all habitats, the WFD approach only for estuarine and coastal habitats. However, one should note that estuaries are not considered under the MSFD.

Group discussions

Baseline setting methodologies

The Pelagic Habitat group strongly felt that a baseline cannot be defined using unimpacted conditions, because:

- a. there are no existing unimpacted conditions
 - (i) there is no comparable, unimpacted, reference system that can be used for open sea areas (as compared with the WFD where an unimpacted comparable system was, at times, available);
 - (ii) pressures are everywhere;
 - (iii) one cannot identify unimpacted reference sites within an impacted sea region, as hydrodynamic transport, migration of organisms, etc. result in transboundary effects, even in the case of local pressures;
- b. There are no data from before impacts started;
- c. Even for modelling you need data.

Baseline development is relevant. There is some knowledge on baselines for phytoplankton (e.g. chlorophyll) but general baselines need to be developed for all pelagic organism groups based on available or new data and expert opinion. Preferred method to set a baseline would be using a past state, for which data are available, or the present state, when no data from the past are available. To set a baseline you always need:

- a. Data: the more data the more robust and transparent your baseline is;
- b. Expert judgement.

Existing indicators and targets

The group considered the two existing approaches that were listed in the second worksheet that both pertain to phytoplankton.

Both approaches used expert judgement (in OSPAR combined with modelling) to determine a baseline. The OSPAR target for example chlorophyll-a is a deviation from a natural background level: "Maximum and mean phytoplankton chlorophyll-a concentrations during the growing season should remain below a justified area-specific % deviation from background not exceeding 50%". This is a target that was set by policy makers and there is no scientific basis to define the boundary between good/not good. The WFD target is an absolute value other than the baseline.

Furthermore the group considered the indicators from the Commission Decision document. Indicators 1.4.1, 1.4.2, 1.5.1 and 1.5.2, that are related to habitat distribution and extent, were considered as irrelevant for pelagic habitats since these are fixed features of the predominant pelagic habitat types listed in the workshop worksheet, and therefore they can't be used as quality indicators.

A lot of the other indicators are undefined for this habitat, for example because we do not know what the characteristic species of this habitat are or are strongly related to other groups and descriptors (fish, mammal and bird group, descriptors 5,7,8).

Preferred methodology for setting targets

Also in order to set targets a combined approach is needed using expert judgement and data.

The type of target that is needed (direction, limit, value) depends on the indicator. Since there are few existing indicators for the pelagic habitat it is difficult to specify preferred methods. However, below are some thoughts from the group.

It was noted that targets, for example, for the abundance of a certain species, as a quality indicator, would best be defined as a range, around a desirable state or around the current state. However, in the case of pelagic habitats this range has to be dynamic, taking into account seasonal fluctuations as well as other fluctuations, such as long-term inter-annual fluctuations due to the North Atlantic Oscillation (NAO), regime shifts, etc.

If setting targets for the number of species as an indicator for the food web (D4), the target could be set as a minimal threshold.

While there is knowledge on the effects of pressures on the abiotic characteristics of pelagic habitats, little knowledge is available on the effects of pressures on the quantity and quality of pelagic habitats and the consequences for typical organisms in those habitats (perhaps only plankton in relation to nutrients). Targets for indicators more directly related to a pressure, such as the amount of non-indigenous species, should be set as a no increase target.

Ideas for pressure indicators:

- a. plankton abundance as a pressure indicator for nutrients;
- b. presence of non-indigenous species;
- c. amount of jellyfish: when they are present they take over the role of small pelagic fish in the pelagic habitat (i.e. eat zooplankton) and an increase in jellyfish is therefore an indication of changes in the food web.

For all these pressure-related indicators there is no direct link to a single pressure. When something changes one therefore has to start research to find out the underlying causes.

Gaps

Who is looking at the total picture? : Food web is about relations between groups, productivity, etc. – we miss that in this approach.

Other gaps:

- a. Zooplankton;

- b. Food web in general;
- c. Ecosystem structure;
- d. Measure of Productivity;
- e. Effect of fisheries on balance of ecosystem -> plankton;
- f. Introduction of ctenophores

Recommendations to ICG-COBAM

We make three recommendations to ICG-COBAM, all related to gaps in the current work.

Define pelagic habitats

It is relatively new to consider the pelagial to include separate habitats. The Pelagic Habitats have, for this workshop, been split up into: estuarine, coastal, shelf and oceanic. The group feels that this can probably be further split up, taking into account such as mixed waters, stratification, frontal systems, *i.e.* features that are ecologically relevant, that can be assumed to effect the biodiversity. It should be noted that boundaries between pelagic habitats may be dynamic, for example depending on season, riverine outflow *etc.*

Another useful option from point of biodiversity is to define functional habitat types, for example spawning areas (as also indicated in the commission Decision (2010/477/EU)).

Advice document: Definition of pelagic habitats.

Food web

Food webs and ecosystem functions have not been considered sufficiently in this workshop. They are about the interactions between species at different levels in the food web and about overall processes. Little is known about the quantitative link between pressures and state, there are no existing indicators, and hence, there is insufficient information to determine even a methodology to set targets.

Advice document: An advice to member states on how to deal with food webs under the MSFD.

Consider the connectivity of all the targets that are set

At some point targets will be set for all the different groups and descriptors, for example eutrophication, mammals, seabirds, *etc.* However, these targets are connected and may counteract each other.

For example setting a target such as “no eutrophication”, may eventually lead to a lower food availability for seabirds and marine mammals and may result in not reaching the target that was set for seabirds and mammals. Where possible, the natural condition will set the baseline. However, in many cases it will not be possible to determine what the natural condition is. In that case choices will have to be made.

Our advice is to let a group of experts look at this connectivity and set out clear scenarios and choices.

In the plenary it was discussed that it would finally be up to policy makers to decide what target has priority (for example, rather more seabirds than no eutrophication), based on the advice from experts. This process would probably need to take place at a later stage when the targets for individual groups are already known.

Carrying capacity is one of the things that needs to be taken into account in this study.

Advice document: An advice to Member States on the connectivity between targets and a guideline for making (policy) choices for targets.

The matrix templates recording the discussion and audit trail for the working group are embedded here:

http://www.ospar.org/html_documents/ospar/html/AppendixD_Rapporteur_tables_Final_Pelagic2.xls

Sediment habitats

Baseline

In most European marine regions 'sediment habitats' are the predominate habitat of the seafloor. Since the beginning of the 20th century these have been regularly analysed by benthic research and/or monitoring programmes. Some 'sediment habitats' are addressed by the European Water Framework Directive, *i.e.* when lying within 1 nm from the coastal baseline of the Member States, or the Habitats Directive, for example when they are sandbanks and large shallow bays. In particular, offshore and deep-water sediment seafloors have not been included in these Directives and, even in research programmes, these habitats are only scarcely sampled. Thus, identification, delineation and ecological descriptions, as well as large-scale mapping programmes for the full range of 'sediment habitats', are often missing for most Member States.

'Sediment habitats' often cover larger areas than 'rocky habitats'. However, despite this principle difference the identification of baselines and the setting of targets for these habitat types should in general be very similar.

The group agreed that before determining a baseline for the ecological state of sediment habitats a typology is necessary. This habitat typology can be built upon common habitat systematics like the EUNIS classification system and the Water Framework Directive typology. It should also include vulnerable and functionally important habitats, *e.g.* those already identified by OSPAR and under the Habitats Directive. The basic typology should be pragmatic, especially when concerning the assessment scale required by the Marine Strategy Framework Directive (MSFD) and adaptable to the characteristic features of the marine seafloor of the Member States.

For the resulting sediment habitat types neither actual nor historical complete datasets exist. Information on range, species composition and ecological function is missing in particular for offshore areas and for deep seafloors.

Identification of a state baseline based on analysing currently existing unimpacted areas is in principle more scientifically robust and transparent than using high quality data of historical unimpacted conditions or to model unimpacted conditions. Usually a pragmatic combination of all of the methods will be most successful. It should be kept in mind that in Europe seas fully unimpacted parts of the seafloor are actually very rare and even in history bottom trawling started before benthic sampling. However, areas with a sufficient documentation of the actual or historical absence of the most impacting human activities, including fisheries and eutrophication, could be used as 'unimpacted' reference sites. Such sites are probably more abundant in the open seas (at least for the pressure eutrophication) but are also less well researched.

Identification and analysis of baseline situations of the large-scale sediment habitats will take significantly more time than is available for the first report on Good Environmental Status under the MSFD in July 2012. Therefore, for the first approach expert judgment is very helpful, necessary and applicable. The group has a tendency to advocate for a panel of experts, rather than the involvement of a single expert in the decision process.

Existing targets

Clarifications

Ostrea edulis beds should be targeted as rocky sediment as they are considered as reefs under the Habitats Directives (code 1170).

The Habitats Directive set a limit for no further degradation from the year of policy inception, which is 1992. This is true for two cases. Firstly, plans or projects which have an actual valid license given before 1992 are allowed to continue their activities and secondly, for the reporting categories 'range' and 'area' the extent of the habitats in 1992 is a minimum limit, when sufficient for a favourable conservation status. Therefore habitats lost before 1992, e.g. oyster reefs in some areas of the North Sea, need not to be restored. The group agreed, as did the 'rocky' habitat group, that this target setting method of using a minimum limit is not suitable for the aspirations of the MSFD. However, even under the Habitats Directive's reintroduction programmes for habitats or species extinct or extirpated before 1992 can be carried out successfully, e.g. the reintroduction of the sturgeon in France, Germany and Poland. The '1992'-limitation of the Habitats Directive does not apply to the third reporting category named 'structure and function' which includes among others the characteristic species composition of the habitat. For this category the overall favourable conservation status has to be reached disregarding the status in 1992.

Targets

For the given list of habitats targets under the MSFD should be defined as a deviation in relation to reference conditions which would allow for recovery and restoration of impacted or destroyed features. The specific targets which are set should account for the natural variability of the habitat type and its potential for recovery. As for 'recovery' various definitions exist, it is important to use a definition that takes the precautionary principle for physical and biological recovery fully into account.

Targets developed under the Water Framework Directive, the Habitats Directive or under OSPAR are considered in general as suitable for the descriptors D1 (biodiversity) and D6 (integrity of the seafloor) in annex I of the MSFD. Applied in the context of the MSFD they might need adaptations. This is also the case for those habitats which, depending on the basic typology, are selected for the MSFD process and which so far are not considered by WFD, Habitats Directive or OSPAR as they are in offshore areas or represent predominant habitat types. In some cases these targets are also suitable for descriptor D4 (food web), in particular when existing monitoring programmes include benthic communities and ground fishes (in the Commission Decision referred to as: "groups/species that are tightly linked to specific groups/species at another trophic level").

Targets setting processes should also take into account fisheries monitoring systems, e.g. *Nephrops* monitoring and *Nephrops* landings, since these provide valuable information of the biotic composition of soft sediment habitats.

First ideas for a roadmap to determine thresholds for sediment habitats

STEP 1: Pragmatic definition of habitat typology as baseline for habitat distribution (including range and pattern) and habitat extent (including area) (criteria 1.4 and 1.5 of Commission Decision) of the sediment habitats:

- a. mapping criteria based on physical parameters which determine biological communities, e.g. depth, sediment classes, organic content, exposure, salinity;
- b. habitat mapping programmes are ideally a combination of hydro-acoustic methods covering large areas in combination with ground truthing through classical point samplings by grabs or dredges using underwater-video, underwater-imaging or SCUBA diving;
- c. habitat delineation based on existing data and knowledge as well as additional actual mapping results; typology should be at a pragmatic level for the differentiation of the habitats.

STEP 2: Analysing diversity of habitat types, their ecological structure and functions in order to set target values for habitat condition (criterion 1.6 in Commission Decision). Such a process can lead to

biological valuation maps of the habitats. However, such procedures can be very complicated and methodology has to be developed guided by practical issues, respectively.

STEP 3: Compilation of activity/ pressure/impact maps:

- a. to date, the main pressures on sediment habitats are;
 - 1) fisheries, e.g. through bottom trawling, dredging;
 - 2) eutrophication, e.g. through lack of oxygen;
 - 3) sediment extraction and
 - 4) installations and construction works, e.g. through smothering and sealing.

For some of these impacts the area affected is known or can be derived from existing information (e.g. vessel monitoring systems);
- b. currently, for most impacts, pressure targets according to their undisturbed extent are missing. However, they exist for habitats under the Habitats Directive in MPAs and overall monitoring;
- c. for the assessment of eutrophication (including oxygen deficiency) on sediment habitat existing eutrophication assessment frameworks of HEAT (HELCOM) and COMP (OSPAR) should be used as a starting point and could be adapted to the requirements of the MSFD (e.g. incorporation of organic matter) and can be used to identify targets in the MSFD framework, as well;
- d. benthic indices (e.g. M-AMBI) for coastal and transitional waters as used in the Water Framework Directive could be adapted to be applied for offshore areas.

The above drafted outline for a sediment habitat assessment under the MSFD will take most Member States many years before all information has been collected. Therefore, the group suggested using as a first attempt for the first report in July 2012 the procedure detailed below while further developing the above drafted procedures until 2018 and beyond.

- a. use targets of the Habitats Directive for certain existing sediment habitats where applicable. This includes extent and characteristic species;
- b. use targets of the Water Framework Directive for the coastal sediments where operational;
- c. use existing data on habitat type distribution and extent and try to fill gaps with models;
- d. set, based on existing ecological knowledge, targets for the extent and intensity of pressures (or activities) and their impacts;
- e. Suggest target levels for specific pressures for all habitat types by determining a specific percentage of seafloor that should be undisturbed (unimpacted) for each habitat type. This could be done e.g. in MPAs in accordance with the Habitats Directive. In addition, for the remaining percentage of the respective habitat type that is disturbed (impacted) (in order to accommodate human uses) other targets should be set that limit the disturbance to a sustainable level.

The matrix templates recording the discussion and audit trail for the working group are embedded here:

http://www.ospar.org/html_documents/ospar/html/AppendixE_Rapporteur_tables_Final_Sediment.xls

Rock and Biogenic Reef Habitats

Summary of table 1 on evaluating baseline setting methods

The group agreed that the most suitable approach to setting baselines for the state of rock and biogenic reef habitats would usually be a combination of methods, focusing on where data is most available for each case. It was felt that ideally, reference conditions should be identified (using a combination of the three methods) and targets should be set in relation to these reference conditions. Deeper habitats would usually be experiencing fewer pressures and therefore method A(i) may ideally be best applied in deeper waters compared to coastal areas. However, less data exists on deeper habitats and therefore the use of modelling in combination with expert judgement may also be necessary. As Marine Protected Areas (MPAs) begin to recover to a less impacted state (if adequately managed), the utility of method A(i) should increase.

The group agreed that the use of the term 'unimpacted' in the context of setting reference conditions for rock and biogenic reef habitats should mean the condition of the habitat when pressures directly affecting habitat state are removed/negligible and also when pressures indirectly affecting habitat state (e.g. removal of fish species) are removed/negligible. This will result in a very restricted set of habitats which can be considered as truly unimpacted.

Setting baselines at a state in the past or at the current state is not as scientifically robust as using reference conditions but is a more pragmatic approach under tight timescales. The issue of shifting baselines is important to consider with methods B and C and the fact that biogenic reef habitats, in particular, experience high natural variability, means that long time series data of high quality is vital if baselines set using these methods are to be accurate. It was agreed that in most cases the current state of rock and biogenic reef habitats should be used only as a limit and not as a target under MSFD, and as such, could act as a baseline against which to set trend based targets.

The group agreed that expert judgement can be a very practical and applicable method for setting baselines for rock and biogenic reef habitat state but can be un-transparent and less robust than other methods. Panels of multiple objective experts can be a good way of identifying baselines for habitat condition, extent and range but ideally should be used in combination with real data or modelling obtained from the other methods.

Summary of audit trail table reviewing existing targets and further recommendations / gaps

The existing European indicators and targets for rock and biogenic reef habitats mainly relate to requirements for reporting under the Habitats Directive and habitats on the OSPAR threatened and declining list. These two existing obligations were therefore focused on by the group.

The 'limits' set under the Habitats Directive (year of policy inception - 1992) are often interpreted as no further degradation from the current baselines, although, the method for setting baselines differ between Member States. The group agreed that choosing current baselines as limits is not suitable for the aspirations of the MSFD. For example, European oyster beds which disappeared in the North Sea before 1992 would not be assessed as unfavourable under the Habitats Directive as the baseline limit was set in 1992 when this habitat was already lost. For the MSFD, targets should rather be defined as a deviation in relation to reference conditions which would allow for the restoration of destroyed and impacted features.

The 'limit' for loss of habitat extent under the OSPAR criteria for threatened and declining habitats may also not be suitable for direct application under the MSFD. Setting a limit for habitat loss (past which

there would be unacceptable levels of degradation) does not seem to align with the aspirations of achieving a 'good' status; rather, it aims only to avoid degradation. Although this limit is currently set in relation to historical reference conditions, the group agreed that more robust modelling and mapping of reference conditions for habitat extent would be required as data on the historical extent and condition of rocky and biogenic reef habitat types is often not available. The deviation from reference conditions, which is recommended to be set as the target, would need to take account of natural variability and also the different recovery potential of different habitats.

For those deep sea rock and biogenic reef habitats which experience few pressures (e.g. certain coral reefs and deep sea sponge aggregations), the group recommends that the current condition and extent is used as a baseline (determined through modelling and mapping techniques) and that a limit is set at this current condition and extent. This is to prevent further degradation of these important and slow recovering habitat types.

The existing indicators and targets considered by the group focus on structural aspects of the habitats such as distribution and extent and do not currently adequately address habitat functioning. In the context of the MSFD, this means that there are gaps in terms of Descriptor 1 on biodiversity for criteria 1.6 on Habitat Condition. Criteria under Descriptor 4 on Food webs and Descriptor 6 on seafloor integrity were not considered in detail by the group. This would be a next step in the continuation of the work and could take the form of a gap analysis across all the relevant criteria of the Commission Decision.

The group noted that the habitat types and associated targets currently considered under OSPAR and Habitats Directive may not be the most appropriate to represent the predominant rock and biogenic reef habitats under the MSFD. Next steps for the work should include a consideration of the typology of the habitat types and the different ecosystem functions which they perform. The EUNIS habitat classification system could provide a basis for analysing the coverage of predominant, functionally important and listed habitat types and how these may fit within the MSFD. Baselines and targets for range, extent and condition of these habitats could then be developed accordingly using the preferred methodologies.

The matrix templates recording the discussion and audit trail for the working group are embedded here:

http://www.ospar.org/html_documents/ospar/html/AppendixF_Rapporteur_tables_Final_Rock_Reef.xls

Annex 6 – Overview of approaches to setting baselines across the six working groups

		Baseline setting methodologies						Additional comments
		A (i) Existing/Current unimpacted condition	A (ii) Historical unimpacted condition	A (iii) Modelling of unimpacted condition	B. Baseline set as past state	C. Baseline set as current state	D. Expert judgement	
Sub-groups	Mammals and reptiles				x	x	x	<ul style="list-style-type: none"> Mainly cetaceans considered; Trends-based targets against current baseline for population size and range criteria (similar to FCS). Use historical data on more unimpacted condition to inform the setting of trend target; Modelling of carrying capacity and then % deviation from that carrying capacity; Focus on setting targets for those common species where data is good and an assessment can be made; Scale issues are important as mammals are wide ranging requiring a regional approach; Pressures targets should focus on preventing new pressures from occurring.
	Fish and cephalopods				x		x	<ul style="list-style-type: none"> Modelling can be applicable to other approaches too, not just identifying unimpacted conditions; Mix of approaches plus expert judgement should be used; EcoQOs on large fish could be useful; Possibly use a functional habitats-based approach for fish and cephalopods.
	Birds				x		x	<ul style="list-style-type: none"> EcoQO on seabird population trends could be suitable for GES - target is deviation from baseline; Using a baseline set as a date in the past is constrained by the length of time series data; It is difficult to identify what is 'good' state.

	Rock	x - best method if data available	x	x			x	<ul style="list-style-type: none"> • Mixture of methods to identify unimpacted conditions should be used; • Deeper habitats have less data available therefore require more modelling & expert judgement ; • Setting state limits (e.g. in Habitats Directive) is not suitable for MSFD aspirations; • Functional targets and targets for D4&6 are not covered adequately.
	Sediment	x - best method if data available	x	x			x	<ul style="list-style-type: none"> • Mixture of methods needed; • Targets for WFD & Habitats Directive (deviation from a baseline) are generally suitable for D1&6 and also for other non-listed habitats; • Use of a current baseline (as under Habitats Directive) is generally suitable for MSFD for range and area criteria (as these are typically not altered for most marine habitats) but not for condition.
	Pelagic				x	x	x	<ul style="list-style-type: none"> • Possible to add prediction of the effects of current policies to your current status to form a baseline against which to set targets; • Data availability and quality is important; • Targets exist under OSPAR and WFD using deviation from baseline and absolute value method; • Mixture of methods is preferred to set baselines and the target set depends on the indicator being considered.

Annex 7 – Comments and outstanding discussion points raised following the workshop

(Source ICG-COBAM(1) 11/6/1-E; GES4BIO Workshop Report Addendum 1)

During the written procedure for the workshop report, participants identified a number of questions that arose from the report and the workshop, which would require further consultation. It was agreed that these comments would be noted and maintained to ensure transparency and as part of a record of this workshop in order that they can be noted by users of this publication. The comments have been retained in their original form and the paragraph numbers refer to the workshop report manuscript.

PARAGRAPH NUMBER	PROPOSED AMENDMENT
12	Comment: There is a variety of different approaches, and underlying conceptual arguments, outlined here! We need to ensure that there is a consistency in the way indicators are selected, and targets chosen, across the various descriptors and components so that we have targets that are mutually consistent. I fear that there is a risk that achieving targets for fish, for example, may mean that targets for seals and seabirds may be unachievable and vice versa.
17 (a)	Comment: This is an important point. To me indicators where beneficial or detrimental trends can be identified, but no specific target can be defined, are not state indicators. These are surveillance indicators. GES target indicators should be fully fledged state indicators with appropriate targets, but there will be circumstances where this cannot be done. In which case a number of independent surveillance metrics can be used instead and we have a target for these (e.g. 80% of the surveillance metrics must show either no trend or a beneficial trend). Failure to achieve this triggers a response – either direct management or research to elevate one or more of the indicators showing detrimental trends up to full blown state indicators status, so that firm quantitative targets can then be established and the appropriate management to achieve these implemented.
17 g	Comment: Comparable results mean comparable/compatible monitoring methods, but not necessarily exactly the same methods.
23	Comment on 'a few nested scales': i.e. UK CP2 regions. This highlights the need to define indicators and assess variation in them at scales smaller than the EC sub-regional scale (i.e. Greater North Sea), even if performance towards a sub-regional target then has to be assessed. Our analyses for CP2 and OSPAR QSR2010 raised real problems in this respect.
28	Comment: But this is a good point. In a paper currently going through the review process we show that as the Large Fish Indicator recovers towards its target of 0.3, overall biomass of the demersal fish community declines. Populations of small fish species in particular decline, which are of course the prey of the rising number of large fish predators. Recovery will frequently require populations of species that have increased as a consequence of perturbation to their more natural levels.
28	Proposed amendment: delete this paragraph. Comment: Increase or decrease in population sizes doesn't mean better or worst ecological status. This idea is a result of a "conservation" approach. For MSFD, an

		ecosystem approach (linked components) is clearly recommended (also in GES4BIO, <i>cf.</i> paragraph 36 and 37). So, at this stage, and without consensus among all participants, I suggest we don't recommend anything about signification of population sizes.
39		Comment: But there are real problems with some of these , for example the kittiwake chick productivity metric, which now will be mainly curtailed to 0.6 per pair because of climate change. Any further warming and this target will inevitably fail.
Appendix A, §8		I have reservations about this approach. The logic is circular. What evidence do we have that reducing a pressure has any effect? We need appropriate indicators to provide the evidence that a management measure is having the desired effect in respect of GES.
Appendix B, §1b		Where has this come from? What evidence is there that carrying capacity, or some relatively small deviation from this, is where we want to be? In many instances it is almost impossible to demonstrate competition in the marine environment (but there are a few special cases – Isle of May kittiwakes for <i>e.g.</i>). If resources are not limiting, then populations are nowhere near their carrying capacity. Management measures will affect carrying capacities by altering relative population sizes of competing species. If marine mammals compete with large fish for a common prey, then as fish populations increase, as a consequence of more effective management, marine mammal carrying capacities will decline. Are the models sufficiently good to deal with this sort of complexity? We tried this for fish – the multi-species VPA assessment models, where we have lots of data to support the models -but we have effectively abandoned these models as a basis for informing management. I would want to know a lot more about the models before following this approach too much further.
Appendix B, §2b		See previous comment. The point here surely is not that these species should be near carrying capacity, but that anthropogenically caused mortality is not driving the population down. This is a situation analogous to the current fisheries management approach – <i>i.e.</i> fishing mortality should not exceed F_{pa} so that stocks are not likely to be reduced towards B_{pa} . Perhaps the problem here is in the definition of “carrying capacity” – what is meant by this term?
Appendix B, §3a		If this value (15%) refers to the Texel-Faial criteria, it relates to decline in extent of habitat; there are no specific values for species. Needs clarification/correction with the sub-group - No response received in finalisation
Appendix C, §7a		There may be some circumstances where distribution has changed due to pressures (<i>e.g.</i> loss of breeding sites due to coastal developments) and, anyway, the criterion cannot be 'dismissed' (but may require limited attention in assessments for the reasons stated here).
Appendix C, §8a		Comment: Does the EcoQO assess whether the breeding success is simply over a certain level or whether it is within certain boundaries? If the former, it may be that a species is at an unnaturally high level.
Appendix C,		Comment: There is an issue with this EcoQO in that there is now evidence to show

§9b, c	that it is very difficult to achieve the desired breeding success of 0.6 chicks/pair given any further increase in temperature. Fredricksen et al. (2004) have shown that kittiwake breeding success is not only related to the sand eel fishery but it is also negatively related to sea surface temperature. For the current SST (winter mean of ~5.8°C) a breeding success of 0.6 is only achievable given no fishing whatsoever, except in years of natural variability. If there is any further warming then the target of 0.6 is not predicted to be achievable. It has also been shown that if the target were set to less than 0.6 kittiwake populations would go into decline. Therefore given the current trends in winter SSTs we do not recommend the use of this indicator.
Appendix C, §9b	This indicator was suggested when sand eel fishing was the major problem faced by breeding kittiwake. This has been resolved through closing the fishery. More recently kittiwakes are still struggling to meet this breeding success target, primarily because of climate change effects on the marine environment. Is this therefore still a useful indicator and target? If climate change is the major issue now for kittiwakes, what measure can we implement to achieve the target? Finally kittiwake breeding success is only an indicator for kittiwakes – it does not reflect the general situation for other seabirds in the region.
Appendix D, §15a	Why would you want to do this? Measure and manage nutrient input directly – much easier!
Appendix D, §15c	But this is a change of state – fish to jellyfish. It is not a pressure indicator! What pressure does it reflect? What measure should be implemented?
Appendix D, §18a	What about the Calanus story?
Append.D, §20	How does this relate to the regional and sub-regional scales stipulated in the MSFD?
Appendix D, §26	A useful point, which again underlines the need to ensure that our targets are mutually compatible.
Appendix E, §3	Phraseology implies that MSFD develops something different to EUNIS. We must develop/improve EUNIS to ensure it is fully operational for MSFD purposes, but NOT invent an alternative typology
Append. E §3	Comment: For MSFD, functional habitats have to be considered. EUNIS do not actually register many of these functional habitats. But, EUNIS should be developed/improved to reflect these needs. At least, at highest levels (biodiversity components), a common approach should soon be defined.
Append. E §7	Should <i>Ostrea edulis</i> beds be targeted as rocky sediment as they are considered as reefs?
Append. E §7	Comment: Some individuals in sediment or rocky habitats belong to a biocenose. But biogenic structure resulting of one species high abundance (also called engineer species sensus J.A. Crooks, 2002. Oikos 97 (pp.153-166)) define a particular habitat, which is not anymore a sediment or rocky habitat, but an “engineer species habitat” with his particular associated biocenose. Ex.: Oyster beds, slipper limpets banks, zostera beds, etc.



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