



JRC TECHNICAL REPORTS

Review of the Commission Decision 2010/477/EU concerning MSFD criteria for assessing Good Environmental Status

Descriptor 7

Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems

MSFD Expert Network on MSFD Descriptor 7:

D. González, C. Coughlan, A. Stips, A. Stolk, C. González Pola, I.M. Moreno Aranda, G. Giorgi, J. Rees, L. Babbini, M. Manca Zeichen, P. Alenius, V. Cariou, V. Zervakis, W. Krzyminski.

2015

Review of the 2010/477/EU criteria for Environmental	Commission concerning assessing Status	Decision MSFD Good
---	---	--------------------------

This publication is a Technical report by the Joint Research Centre, the European Commission's in-house science service. It aims to provide evidence-based scientific support to the European policy-making process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

JRC Science Hub

<https://ec.europa.eu/jrc>

JRC97721

EUR 27544 EN

ISBN 978-92-79-53086-9 (PDF)

ISSN 1831-9424 (online)

doi:10.2788/435059 (online)

© European Union, 2015

Reproduction is authorised provided the source is acknowledged.

All images © European Union 2015

How to cite: González et al.; Review of the Commission Decision 2010/477/EU concerning MSFD criteria for assessing Good Environmental Status, Descriptor 7; EUR 27544 EN; doi:10.2788/435059

Abstract

This report represents the result of the scientific and technical review of Commission Decision 2010/477/EU in relation to Descriptor 7. The review has been carried out by the EC JRC together with experts nominated by EU Member States, and has considered contributions from the GES Working Group in accordance with the roadmap set out in the MSFD implementation strategy (agreed on at the 11th CIS MSCG meeting).

The report is one of a series of reports (review manuals) including Descriptor 1, 2, 5, 7, 8, 9, 10 that conclude phase 1 of the review process and, as agreed within the MSFD Common Implementation Strategy, are the basis for review phase 2, towards an eventual revision of the Commission Decision 2010/477/EU.

The report presents the state of the technical discussions as of 30 April 2015 (document version 7.0: ComDecRev_D7_V7), as some discussions are ongoing, it does not contain agreed conclusions on all issues.

The views expressed in the document do not necessarily represent the views of the European Commission.

Review of Commission Decision 2010/477/EU concerning MSFD criteria for assessing good environmental status

Descriptor 7

Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems

This report represents the result of the scientific and technical review of Commission Decision 2010/477/EU in relation to Descriptor 7. The review has been carried out by the EC JRC together with experts nominated by EU Member States, and has considered contributions from the GES Working Group in accordance with the roadmap set out in the MSFD implementation strategy (agreed on at the 11th CIS MSCG meeting).

The report is one of a series of reports (review manuals) including Descriptor 1, 2, 5, 7, 8, 9, 10 that conclude phase 1 of the review process and, as agreed within the MSFD Common Implementation Strategy, are the basis for review phase 2, towards an eventual revision of the Commission Decision 2010/477/EU.

The report presents the state of the technical discussions as of 30 April 2015 (document version 7.0: ComDecRev_D7_V7), as some discussions are ongoing, it does not contain agreed conclusions on all issues.

The views expressed in the document do not necessarily represent the views of the European Commission.

Foreword

The review of MSFD Descriptor 7 has been performed through a collaborative work among experts of the network for MSFD Descriptor 7, led by JRC (Adolf Stips, Daniel Gonzalez and Clare Coughlan). The current state of these discussions is being reflected in this document. Discussions have not been concluded and final recommendations are being prepared in the second review phase (Part 2 of the present draft).

MSFD Expert Network on D7: Ad Stolk, César González-Pola, Isabel M. Moreno Aranda, Giordano Giorgi, Jon Rees, Lorenza Babbini, Marta Manca Zeichen, Pekka Alenius, Valérie Cariou, Vassilis Zervakis, Włodzimierz Krzyminski.

Descriptor 7: Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.

PART I: COMPILATION OF INFORMATION	6
1. Approach	6
1.1 Introduction	6
1.2 General guiding principles for the review	6
1.3 Definition of Descriptor 7	7
1.4 Linkages with existing relevant EU legal requirements, standards and limit values ...	10
1.5 Linkages with international and RSC norms and standards	12
1.6 Definition of GES	12
1.7 The "climate sensitivity"	14
2. Analysis of the implementation process	14
2.1 Summary of the findings relating to the determination of GES and specifically the use of the Decision criteria and indicators, based on the Commission/Milieu Article 12 reports and the JRC in-depth assessment	14
3. Analysis of the current text of the Decision	17
4. Identification of issues	18
PART II: CONCLUSIONS AND RECOMMENDATIONS	21
5. GES criteria (in accordance with Art. 9.3)	21
6. GES methodological standards (in accordance with Art. 9.3)	23
7. Standardised methods for monitoring for comparability (in accordance with Art. 11.4) .	24
8. Standardised methods for assessment for comparability (in accordance with Art. 11.4 GES)	26
9. Other related products (e.g. technical guidance, reference in common understanding document)	27
9.1 Proposed way forward for identified issues	27
10. Reference Documents	28

PART I: COMPILATION OF INFORMATION

1. Approach

1.1 Introduction

The MSFD Committee discussed and concluded an approach and an outline for the process of a review and possible revision of Commission Decision 2010/477/EU on GES criteria (COM DEC) and of MSFD Annex III (see Committee/07/2013/03rev for details). Based on the template in the annex to the mandate of the MSFD Committee, a more detailed manual for the technical phase relating to the review of COM DEC has been developed to guide the parallel preparatory process and discussions per descriptor. The review manual and the potential structure were decided and agreed by the WG GES in March 2014. These are common for all descriptors to ensure coherence in the review approach.

Experts should comment on the review template following the approach outlined in the review manual and the general guiding principles laid out below. It is very important to understand that this review template is not a closed document. It has been prefilled in an attempt to highlight relevant aspects and issues that are important for the review of COM DEC. Please keep in mind that experts are free to add any relevant points, questions and information that are not yet included. Input and comments are expected from the experts for all sections, including those that have been prefilled.

Part I of the review template comprises 4 sections to be developed in accordance with the review manual:

- Approach
- Analysis of the implementation process
- Analysis of the current text of the Decision
- Identification of issues

Part II of the review template comprises 5 sections that will describe conclusions, recommendations and proposals resulting from the work developed in Part I. Experts were asked to start providing input to this part in parallel with Part I.

1.2 General guiding principles for the review

The review aims to analyse the results from the first MSFD reporting round on Articles 8, 9, and 10 with a view to update/improve and simplify the COM DEC.

Based on the Information in the Art 12 assessment reports (COM(2014)97 final; SWD(2014) 49 final) and the JRC in-depth assessments (JRC IDA D7, 2014) the review template has been prefilled by Milieu, DG ENV and JRC. This should enable the experts group to analyse current shortcomings and propose ways forward, e.g., needs for further guidance and development, but eventually also to develop proposals for amending the COM DEC based on scientific knowledge and experience in the implementation process.

The current review should lead to a new COM DEC which (is):

- Simpler
- Clearer
- Introduces minimum requirements (to be enhanced by regions and MS, if necessary)

- Self-explanatory
- Coherent with other EU legislation
- Coherent with regional assessment methods (where EU does not exist)
- Has a clear and minimum list of criteria and methodological standards and related characteristics, pressures and impacts (MSFD Annex III)
- Ensures that criteria and methodological standards adequately address coverage of the descriptors by the proposed criteria, to lead to complete assessments
- Coherent with the MSFD terminology

This review should develop a more coherent approach to the definition of GES based on agreed criteria and methodological standards that can enable assessment of the current state and hence establish whether GES has been achieved and, if not, the gap between the current state and GES.

1.3 Definition of Descriptor 7

Hydrography is the branch of applied sciences that deals with the measurement and description of the **physical features** of oceans, seas, coastal areas, lakes and rivers, as well as with the prediction of their change over time, for the primary purpose of safety of navigation and in support of all other marine activities, including economic development, security and defence, scientific research, and environmental protection¹.

Hydrology (from the Greek word *hydrologia*, the "study of water") is the study of the movement, distribution, and quality of water throughout the Earth, including the hydrologic cycle, water resources and environmental watershed sustainability².

Hydromorphology is that new subfield of hydrology that deals with structure and evolution of Earth's water resources. It deals with the origin and dynamic morphology of water resource systems as caused by both natural and anthropogenic influences³. The MSFD and WFD do not define hydromorphology. The WFD considers hydromorphological quality elements for the classification of ecological status. The COM DEC refers to the WFD 'hydromorphological objectives', although this term is not explicitly mentioned in the WFD text.

Hydrographical conditions include the bathymetry of the seabed, sea level, temperature, salinity, currents, tides, waves and turbidity. This strict definition of hydrography would exclude chemical features like pH, alkalinity, oxygen and nutrients from consideration under D7. The definition builds mainly on cases from Water Framework Directive (WFD) and the Flood Directive. Some **hydrographical conditions** outlined under the Marine Strategy Framework Directive (MSFD) are comparable to the hydromorphological conditions referred to under the WFD (Annex II "Characterisation of surface water types" section 1.2.4 coastal waters system B).

The MSFD text does not define what 'physical features' are. Table 1 of MSFD Annex III includes an indicative list of elements (features and characteristics) with no further specification on which ones should apply for Descriptor 7. This table would also include

¹International Hydrographic Organization, www.iho.int

²<http://www.newworldencyclopedia.org/entry/Hydrology>

³<http://engineering.tufts.edu/cee/people/vogel/documents/hydromorphologyEditorial.pdf>

other features or characteristics typical of or specific to the marine region or subregion considered. The text of the COM DEC refers to the physical and chemical characteristics listed in Table I Annex III of the MSFD. In terms of comparing and clarifying the definition, some other sources might need to be consulted. Table 2 of MSFD Annex III, regarding pressures and impacts, includes interference with hydrological processes, but these processes are not defined and they only refer to changes in thermal and saline regimes.

Comments:

- *Do hydrographical conditions and physical features refer to the same term? Hydrographical conditions and physical features are considered as different terms, but there is no agreement on the definitions. Guidance is needed to set up agreed definitions.*
- *Suggestion to clarify the definition for physical features, considering also that many features are scale-dependent*
- *It is not clear if features and characteristics refer to the same term. There is no agreement on the definitions. Guidance is needed to set up agreed definitions. Pelagic features such as eddies, fronts and/or river plumes should/must be considered because of their important role on pelagic habitats.*
- *Discussion is needed on the adequacy of considering certain elements as physical features under Descriptor 7 (e.g. turbidity – linked to plankton, so not independent from Descriptor 5)*
- *Inclusion of hydrochemical conditions (like pH, alkalinity, oxygen or nutrients) would significantly change and extend the parameters and goes beyond what the Directive requires. On the other hand, many experts consider that chemical features should be considered under D7, including pH, pCO₂, alkalinity and oxygen in the monitoring programmes.*
- *Needs definition for hydrological processes and a clarification of the specific hydrological processes that should be considered under the MSDF framework (Pressures and impacts, Table 2 ANNEX III of MSFD)*
- *There's a need to define all parameters and units used, links to calibration and standards, spatio-temporal scales and permanent alteration.*

Under the WFD, water bodies may be classified as 'heavily modified water bodies' when, as result of physical alterations by human activity, their character has been substantially changed and specific requirements must be applied to achieve 'good ecological potential', i.e. waters affected by permanent changes to hydrographical conditions such as coastal defence works, land reclamation or building activities. On the other hand, the terms 'permanent changes' or 'hydrographical conditions' are not referred to in the WFD. This makes it difficult to determine the interaction between assessments under both WFD and MSFD, e.g. if only permanent hydrographical changes will be considered in MSFD. The term 'permanent' implies a situation that is not going to be reversed, but it is not defined under the MSFD, although OSPAR has proposed a temporal threshold.

Permanent hydrographical changes can occur due to changes in the thermal or salinity regimes, changes in the tidal regime, sediment and freshwater transport, current or wave action and changes in turbidity. The degree of change and the period over which such change occurs varies considerably, depending on the type of modification. Assessment of the degree of change can be related to both the water column and the sea-floor, and consequently to their biological communities. These types of change are normally triggered by infrastructure building activities, such as extensions or alterations to the coast, or the building of artificial islands and other infrastructural works in the

marine environment (such as outfalls from power stations, bridges and causeways to islands, offshore installations). This descriptor addresses all such developments (existing and new infrastructures) and both large-and small-scale structures. Cumulative impact assessment should be considered for assessing the significance of the aggregated effect of many small-scale changes. Importance is given to new planning activities that will have to fulfil Environmental Impacts Assessments (EIA).

Comments:

- *Whether or not a temporal threshold is defined for 'permanent' has consequences for a harmonized approach to assess GES for D7.*
- *Does this mean that temporary hydrographical changes would be excluded from Descriptor 7? Based on CIS Guidance Document 20, where it is confirmed that the WFD is not concerned with 'temporary' changes, expert's feedback suggests it would seem reasonable to take the same approach for the MSFD.*
- *The timescale for definition of permanent could be location specific.*
- *To assess permanent changes we need reliable reference data, this point is missing in all papers! The definition of a 30-year reference period is mandatory. A useful interval is 1981-2010, because this interval includes the regime shift to higher temperatures beginning in the 1990s. Hydrographical conditions can exhibit a strong natural variability depending on time-scale due to strong interaction with bigger scale environmental features. As an example, the North Sea interaction with the Northeast Atlantic involves existence of temperature differences in the southern North Sea related to different NOA index periods. This natural variability with a period of about 7 years masks every human impact. In other words: to assess a "permanent change", very long time series are required to provide the proof that the change is permanent and not a signal of natural variability.*
- *There is a lack of specification and coherence between the MSFD text (indicative list of characteristics, pressures and impacts in table 2, Annex III, MSFD) and the COM DEC text. Some pressures listed under physical loss could and have been applied for assessment of D7. In order to assure comparability between MSs, a harmonization/agreement of the activities/pressures under D7 should be considered/reached and a clearer link between the COM DEC and the Directive should be set for this descriptor.*

Descriptor 7 is primarily a 'pressure' descriptor that focuses on permanently altered hydrographical conditions (often at a localized scale), which predominantly arise from pressures causing structural alteration of the coast or seabed: coastal activities causing topographical changes (e.g. land claim, barrages, sea defences) and coastal and offshore infrastructures (e.g. ports, wind farms, oil rigs, pipelines, heat and brine outfalls). Hence, the pressure is the change in morphology of the seabed/coast or change in habitat (e.g. from sediment to concrete/metal) that causes hydrographical changes. These changes of the hydrographical conditions consequently will act as a pressure that is impacting the habitat or even the ecosystem. Assessment for this descriptor should take into account the cumulative 'impact' of all these 'localized activities' that act as pressures, linking them also to the associated physical loss and damage. In this sense the total pressure from D7 needs to be considered with other impacts in the assessments of each seabed and water column habitat under D1 and D6.

Considering the intention of MFSD to prevent significant negative effects on marine ecosystems (habitats and species) the defining of GES for D7 must be intimately linked to GES in descriptors D1 and D6, and to a lesser extent to D4 and D5, where impacts

can occur from changes to the water column and seabed habitats. Changes, such as altered erosion patterns or residence time can modify local conditions in a way that negatively impact sensitive species and habitats and can therefore compromise the achievement of the biodiversity and eutrophication descriptors D1, D4, D5 and D6. Consequently the cumulative impact on the ecosystem from pressures resulting from the alteration of hydrographical conditions should ultimately be assessed in these relevant descriptors (D1, D4, D5 and D6).

Comments:

- *General comment: Proposition to consider the D7 as a “state” and “pressure” descriptor. Hydrographic conditions are an inherent part of marine ecosystems and thus contribute to describe the state. But in parallel, human activities modifying these hydrographic conditions, can lead to changes in these same hydrographic conditions (pressure) that induce impacts on marine ecosystems. Consideration of D7 as a ‘pressure’ descriptor, but also as a ‘status’ descriptor is under discussion. MSFD uses EBM that implies to consider the whole ecosystems and/or habitats including the biotope and marine life. Therefore, D7 would also be a ‘status’ descriptor.*
- *The list of possible human activities/pressures to be considered in D7 is not exhaustive. There is a need to define an indicative list, and there is a need for clarification on how to deal with additional pressures, i.e. Inland activities like river damming can also modify the sediment and freshwater transport, giving rise to changes in the hydrographical conditions in the coastline. On the other hand, although inland activities can affect the coastline, they should already be addressed by the WFD. Thus reference should be made to the role of the WFD rather than risking duplication.*
- *It is difficult to attribute ecosystem changes to a specific cause or mix of causes. Some guidance on cumulative impacts is recommended.*
- *Local changes ‘can’ but often won’t compromise the achievement of D1 or D5... The impact of such changes and any in-combination effects will be site specific. But, D7 should not be treated in isolation from other impacts.*
- *Regarding ‘negative effects’, the term ‘significant’ should be clearly defined as ‘adversely affect the marine ecosystem’ in order to prevent effects that are negative by themselves but at much smaller scales.*
- *There would also be the possibility that some changes could bring favourable effects to the ecosystem. Further, existing structures can be very important for e.g. coastal protection, nature reservation or economic reasons.*
- *Evidence of a pressure-impact relationship is needed before measures are imposed*

1.4 Linkages with existing relevant EU legal requirements, standards and limit values

The WFD is referred to in the MSFD and specifically in the Commission Decision for Descriptor 7. The WFD explicitly applies to coastal waters (< 1 nautical mile from the baseline). A significant proportion of activities that could cause permanently altered hydrographical conditions take place within coastal waters. It provides definitions for high, good and moderate ecological status for a set of hydrographical conditions (e.g. temperature, salinity, current velocity) that are to a large extent similar to the hydrographical parameters referred to in Annex III of the MSFD. To ensure coherence between WFD and MSFD, the link between GES under the MSFD and Good Ecological Status (GES) for coastal waters under the WFD should be clearly stated; including whether it is meant to be linked at assessment level and GES definition, or simply in terms of sharing information and data to be applied under independent assessment methodologies.

There are also a number of tools at EU level that support Member States with the control of activities that can result in permanent alterations of hydrographical conditions. Some of these tools are referred to explicitly in the MSFD, such as Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA) and Maritime Spatial Planning (MSP).

EIAs and SEAs are regulated, respectively, by Directive 2011/92/EU and Directive 2001/42/EC. These directives require that the impacts from the implementation of new projects or strategic plans in the environment are assessed prior to their approval or authorisation. A new EU directive on Maritime Spatial Planning (2014/89/EU) has been recently adopted with the aim of establishing a framework for maritime spatial planning to promote the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources.

The effects of hydrographical changes (such as enhanced erosion) could have a direct impact on (protected) habitats; therefore a clear linkage to the Habitats Directive 92/43/EEC exists.

Comments:

- *Associating D7 with the GECS of coastal water under WFD could be inadequate in the context of the requirement of the MSFD (need measurements along the water column and not only integrated values as in WFD).*
- *How should assessment under MSFD on hydromorphology take into account the benthic assessment done under WFD? Should other sensitive receptors be taken into account? Which ones? WFD could cover 0-1 nm as hydromorphology and leave MSFD to address issues beyond 1nm.*
- *In coastal water bodies, physical modifications caused by infrastructure building activities are already assessed under WFD Article 4(3) (existing modifications) or Article 4(7) (new modifications). Care will therefore be required to ensure that duplication of efforts is avoided between MSFD and WFD.*
- *In coastal water bodies, reference should first be made to the compliance assessment carried out for the WFD and any exemptions granted (e.g. through Article 4(7)) as a result. Care needs to be taken to ensure that the requirements of the two Directives remain compatible, (referring to scale of the effects).*
- *For heavily modified water bodies, whilst the MSFD does not have such a provision, WFD outcomes must be respected.*
- *Care is required not to undermine or contradict the provisions of the WFD in coastal water bodies e.g. Article 4(3).*
- *Cumulative impacts indeed represent a significant challenge for MSFD implementation. In coastal water bodies, the local / water body level effects of an individual modification should have been assessed for compliance with the WFD. However, it is quite possible that, for such developments, the in-combination effects may not have been adequately assessed at a scale of relevance to the MSFD, either by the WFD compliance assessment or by an EIA.*
- *Regarding EIA and SEA, the MSFD refers to the implementation of new projects or strategic plans, but what about existing activities? (e.g. cases where they were not subject to these regulations at the planning stage).*
- *MSFD needs to encompass total impacts (past) to assess contribution to status – then new plans and projects can be assessed against the GES boundary.*
- *The suggested possibility to include GES D7 in future EIA seems to go way beyond what is required under the newly-revised EIA. It is not even clear if EIA would be useful for MSFD GES assessment.*

1.5 Linkages with international and RSC norms and standards

OSPAR has produced a guidance document for the assessment of GES for Descriptor 7: "MSFD Advice document on Good environmental status - Descriptor 7: Hydrographical conditions, a living document - Version 17 January 2012" (OSPAR Advice Doc. GES D7, 2012). OSPAR advises that changes in hydrographical conditions are analysed in a broader context, where not only human-induced changes are taken into consideration but also the cumulative effects of multiple impacts. OSPAR suggests that the use of EIA and SEA processes is important to enable existing and new proposals to be considered in the light of their cumulative impacts on any particular ecosystem components. For coastal waters, OSPAR links the GES under the MSFD with the Good Ecological Status (GEcS) under the WFD. For the setting of targets, OSPAR recommends that emphasis is placed on new and large-scale developments and on the links with descriptors 1, 4 and 6 covering biodiversity, food webs and sea-floor integrity. OSPAR has also adopted guidelines on marine sediment extraction (OSPAR Agreement 03/17/1). OSPAR advises that the most appropriate scale for assessing D7 is one equivalent to EUNIS level 3. They recommend that under the condition that the effects of the permanent changes of hydrographical conditions are restricted to coastal waters; D7 does not need further work, provided these alterations are fully assessed in WFD or EIA and that cumulative effects on marine waters are included.

HELCOM, the Barcelona Convention and the Black Sea Convention have not produced any guidance documents specifically for Descriptor 7. However, both the HELCOM HOLAS 2010 and the MEDPOL Assessment 2012 refer, even if briefly, to changes in hydrographical conditions. HELCOM has adopted guidelines on marine sediment extraction (HELCOM Recommendation 19/1), and the Barcelona Convention has adopted the Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil.

1.6 Definition of GES

Considering the relative novelty of this descriptor, along with the substantial lack of data and knowledge, so far quantitative boundaries for GES have not been established.

With regard to the indicators provided in the COM DEC for Descriptor 7, European or international conventions are mostly without methodological standards, and these need developing. According to OSPAR, the definition of MSFD GES for coastal waters in relation to D7 should, in the first place, be associated with the definition of Good Ecological Status of coastal waters under the WFD (OSPAR Advice Doc. GES D7, 2012). The physical characteristics to be addressed under these criteria should take into account Annex III of the MSFD.

At present there is no broadly agreed definition of "**permanent**". OSPAR recommends that alterations lasting for more than ten years should be considered permanent. Following this approach, human activities whose effect in terms of hydrographical alteration is reversible and lasting less than 10 years, should not be considered for GES of D7. In addition to timescale, potential for recovery from impacts should also be factored in.

OSPAR recommends that emphasis is placed on new and large-scale developments, but existing activities/infrastructure may also have produced, and continue to produce, significant impacts and should be considered. "Large-scale" is not defined, but could be at a scale that considers effects at the ecosystem level, or just simply effects over a large spatial area. Many human activities occur on smaller scales, but even these activities can produce effect at larger scale, particularly in the case of aggregated impacts. Although there may not be many examples of installations that would be

removed in the future, it is not the scale of the installations that is important but rather the scale of the effects. Where appropriate, these changes are considered under the WFD and other Directives (Birds Directive, Habitats Directive, EIA, and SEA). There appears to be a gap in guidance for dealing with situations that may occur where the WFD does not apply (e.g. outside of coastal waters) or where EIA is not sufficient, i.e. in identifying cumulative effects. OSPAR recognised the effects of aggregated "small-scale" impacts as important and at the spatial scale of the MSFD and recommends that any cumulative effects of the impact should be part of the GES definition of the Descriptor. However, no guidance on assessing cumulative impacts exists and the development of methodological standards is needed.

A pure quantitative definition of GES in D7 (as for example <1% of permanently altered area) without considering the impact on the related ecosystem and habitat does not seem to be the intention of MSFD. Instead the extent of damage from relevant activities to a habitat (or ecosystem) could be quantified and the resultant loss or damage to the habitat could then be assessed under D1 and D6. This would relate GES for D7 to the maximum allowable loss and damage to habitat as set under D1 and D6. Definition of GES for D7 should include what is impacted state from hydrographical changes (e.g. altered sediment type leading to changed benthic communities) and to give a spatial extent of this impact as input to a seabed habitat assessment under D1/D6.

Comments:

- *For harmonization a precise definition of permanent is required.*
- *A 'permanent' alteration could be related to its potential triggering of natural positive feedback processes, or at least when there is no natural negative feedback process to return to the previous conditions. There are difficulties related to this approach, and simply determining an absolute time scale of change as permanent would be actually realizable. However, maybe such processes should be identified, quantified and mentioned in the framework of MSFD within future EIAs.*
- *Definition of 'permanent' could also be related to the biological cycles, processes. For instance, excavation for submersed tunnel could be considered as temporal allowing for further habitats restoration after construction work, while periodic dredging of navigational channel would be a permanent activity etc.*
- *Can quantitative boundaries be defined for GES? Effects could be quantified from EIA studies and modelling? Issues of definitions of scale should be sort out in relation to specified habitats types in D1 and D6.*
- *'Area' is indeed an appropriate parameter and necessary for a first approach in the definition of quantitative boundaries. It is necessary first to define the scale of the effect, e.g. by modelling, and then decide what has to be monitored. But other parameters, like 'volume', can be added.*
- *'Area' of changes in e.g. currents are, in themselves, less useful metrics. A change doesn't necessarily affect the ecosystem. It is more important to look at the overall % of a vulnerable receptor that is impacted by the pressure – link to Criterion 7.2.*
- *Guidance on cumulative impacts is needed. Modelling is a tool that can be used to investigate the accumulation of small-scale impacts. Regional Environmental Assessment type modelling can indicate envelopes of changes on MSFD scale – significance of these depends on distribution and sensitivity of receptors.*
- *Care is needed on use of 'cumulative'. It is often used to consider multiple pressures/impacts on the same spot (which is highly complex and we need first the basic single pressure/impact assessments to be operational), whilst what is needed here is simply to add up all the small-scale impacts from D7 (and impacts from other pressures)*

- in relation to each seabed type to define the proportion of the habitat which is impacted (against a defined GES value).*
- *Should D7 be interested only in large-scale impacts and not localised ones? Then, how would it be its relationship with cumulative small-scale impacts?*
 - *Habitats vs. Ecosystem - OSPAR recommends that the most appropriate scale for assessing this Descriptor is one equivalent to EUNIS level 3. It should be possible to assess effects on each habitat type, but this could be complicated for ecosystems comprising multiple habitats. On the other hand, assessing at the habitat level could imply smaller scales. Moreover, assessing on the scale of the habitat level is only meaningful if it is necessary for a judgment on ecosystem level, since the descriptor is about ecosystem level for assessment of D7. On the other hand, the monitoring should be done at EIA/operational stages once the operation is licensed.*
 - *There must be a judgment on the impact on the ecosystem first, e.g. by modelling, to avoid unnecessary and costly monitoring on habitat level.*
 - *If a "permanent alteration of hydrographical conditions", caused by changes in the morphology is considered as irreversible (because of safety or economic reasons) then the baseline for the hydrographical conditions should be the current situation. However this would mean that the baseline for D1, D3, D4 and D6 should incorporate the effect of the change in these hydrographical conditions. (cross-cutting issue)*

1.7 The "climate sensitivity"

The issues covered under Descriptor 7 are likely to be exacerbated by climate change, namely due to increased sea temperatures and rising sea levels that are the consequences of global warming. Defining of GES for this descriptor takes place within the context of global hydrographical changes, such as increased temperatures and wave action. Therefore adequate monitoring of these large-scale changes is an implicit requirement for this descriptor. Also, there is a need for periodic review of the GES definition if, for example, climate change has led to altered extents of coastal habitat (due to sea level rise).

2. Analysis of the implementation process

2.1 Summary of the findings relating to the determination of GES and specifically the use of the Decision criteria and indicators, based on the Commission/Milieu Article 12 reports and the JRC in-depth assessment

Descriptor 7

Five Member States have not defined GES for Descriptor 7 while for the rest there was large variability in the definitions. Most of the definitions were made at a general level and only few countries provided further specification beyond the definition in Annex I of the MSFD by providing lists of features or pressures addressed by GES. Very few countries defined baselines, referring to the present situation as regards to the Initial Assessment 2012. Additionally, OSPAR Quality Status Report 2010 and Report WISE WFD I cycle 2010 were each referred to on only one single occasion. References to thresholds were almost non-existent. Some MSs managed to provide an assessment or judgement on their GES for D7, but these assessments were mostly qualitative, subject to a lack of appropriate data sets and knowledge rather than based on cogent Initial Assessment results. According to the MSFD article 12 report, only one Member State

reported a GES definition that was considered adequate; the remaining GES definitions were almost equally divided between partially adequate and inadequate.

Few Member States mentioned links to the WFD normative definitions of ecological status classifications for coastal water. Although most of the pressures covered by Descriptor 7 occur in coastal zones, the development and integration of such WFD's hydromorphological conditions in the Initial Assessment reports was surprisingly very low. On the other hand, some Member States referred to other existing EU regulatory regimes that should be complied with (e.g. EIA, SEA, Habitats Directive and Birds Directive). However, the process on how to integrate information from other EU legislation into the assessment is missing. Further, the use of biological assessment elements implies a link with the biological descriptors, e.g. descriptors 1, 4 and 6. Moreover, descriptors 3 (fisheries), 5 (eutrophication) and 11 (underwater noise) were mentioned occasionally as having links with hydrographical conditions.

A few North-East Atlantic Member States mentioned the OSPAR Advice Doc. GES D7 (2012). This document considers terms that should be included in the definition of GES (e.g. large-scale human activities that take place against a background of broader scale hydrographical changes, or the inclusion of cumulative effects of impacts). Further, advice is given on parameters, monitoring and targets, considering the implementation of indicators by modelling the changes in hydrographical conditions like currents, waves, bottom shear stress and salinity to assess the extent of the possible affected area and the intensity of the changes to determine the effect on habitats.

Criterion 7.1 Spatial characterisation of permanent alterations

Information on relevant pressures to be considered as causing permanent alterations was limited or non-existent in many cases. When available, lists of relevant pressures showed variability among countries. In general, quantitative data was limited regarding both pressures on the water column and on the seabed. Additionally, some countries included acidification as an issue to be considered in Descriptor 7, although its role in the assessment of GES is not well defined and its links to D7 need further consideration. One possible option would be the use of climate change data aimed to identify shifts in existing baselines, allowing appropriate assessment of human activities causing impacts on hydrographical conditions in order to differentiate it from global changes.

As the effects on the ecosystem from a change in hydrographical conditions can be caused by change in chemical conditions that are caused by a change in physical conditions, hydro-chemical variables cannot be excluded a priori. But in order to avoid extra complications in assessing GES for D7 changes in hydro-chemical conditions should be only considered, when caused by permanent alterations of the hydrographical conditions.

The OSPAR Advice Doc. GES D7 (2012) suggests using as a parameter the area (e.g. km²) where significant, regional scale changes in currents, waves, salinity and temperature occur or are expected (modelling or semi-quantitative estimation).

However the impact on the ecosystem under D7 explicitly considers the full water column (in contrast to D6 and to WFD). Hydrographical changes are not restricted to the sea floor, therefore the volume where significant changes do occur, could be a more adequate parameter/indicator than area.

Comments:

- *Criteria 7.1 and Indicator 7.1.1 refer to the extent of the physical area or volume where there is evidence of permanent alterations in the hydrographical conditions: area for*

- benthic systems and volume for pelagic systems. But it has to be done carefully, because the pelagic habitats must not be only characterized by their volume.*
- *It might be worth noting that the volume of change of hydrographic conditions could be different from the volume of the impact caused by that change (for example, a change in the surface mixed-layer temperature could affect stratification, thus changing the conditions over the whole water column).*
 - *Considering the spatial characterization of the alterations: River damming may be related to small alterations related to each river dam, however a significant shift of the freshwater budget of the whole of the Mediterranean when considering the cumulative impact of all rivers dammed. Furthermore, the impact might be spatiotemporal and not just spatial.*

Criterion 7.2 Impact of permanent hydrographical changes

Few member States included references to the impacts on habitats of permanent hydrographical changes. The understanding of impacts caused by the pressures considered under Descriptor 7 is rather restricted, with limited available data and knowledge. Some Member States included lists of potentially impacted environment components (such as specific seabed habitats, oxygen levels or current velocity), linking this descriptor to the biodiversity descriptors (descriptors 1, 4 and 6).

For indicator 7.2.1, the OSPAR Advice Doc. GES D7 (2012) suggests to use as a parameter the area of habitats and the proportion of the total habitat if that type is significantly affected by the permanent change, for example, in bottom shear stress, waves, temperature or salinity (modelling or semi-quantitative estimation). The suggestion for indicator 7.2.2 is to use as parameter, where not already covered by Natura 2000 in coastal waters, key species and habitat types (including benthic communities – listed by ICG COBAM) significantly affected by the changes in hydrographical conditions, which would need to be determined on a case-by-case basis. Links with other descriptors would also need to be determined on a case-by-case basis; for example, the definition of functional habitats within the biodiversity and food web descriptors could help to define these key species and habitat types.

Regional coherence descriptor 7

Member States in the North East Atlantic region have not fully followed OSPAR Advice Doc. GES D7 (2012) and usually only in its restrictive considerations, focusing only on new activities. Notwithstanding, the regional coherence in this region is considered high. In the Mediterranean the coherence is moderate and in the Baltic it is low. In the Black Sea region, only Bulgaria has defined GES for Descriptor 7 and therefore it was not possible to assess regional coherence. It should be noted that no references are made by MS to existing work carried out under UNEP/MAP (Barcelona Convention) in the Mediterranean Region, or under HELCOM in the Baltic Region, possibly due to the timing of that work in relation to the submission of the initial evaluations.

MS good practices

Some countries have specified the environmental components to be taken into account and have given a list of relevant parameters or activities. Some Member States have referred to existing regulatory regimes (other than the WFD) that are to be complied with (e.g. EIA, SEA, Habitats Directive and Birds Directive). Some Member States have included lists of potentially impacted environment components such as specific seabed habitats, oxygen levels or current velocities, linking this descriptor to the biodiversity descriptors (descriptors 1, 4 and 6).

3. Analysis of the current text of the Decision

This section contains the original COM DEC text. Experts are asked to analyse the whole text and identify those parts to be kept in, to be placed in a guidance document and any improvements or modifications that could be made. Suggested changes are made in red. Suggested deletions are struck through.

➤ Original text in COM DEC

Good Environmental Status for Descriptor 7: Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems. (Annex I of MFSD)

Permanent alterations of the hydrographical conditions by human activities may consist for instance of changes in the tidal regime, sediment and freshwater transport, current or wave action, leading to modifications of the physical and chemical characteristics set out in Table 1 of Annex III to Directive 2008/56/EC. Such changes may be particularly relevant whenever they have the potential to affect marine ecosystems at a broader scale and their assessment may provide an early warning of possible impacts on the ecosystem. For coastal waters, Directive 2000/60/EC sets hydromorphological objectives that need to be addressed through measures in the context of river basin management plans. A case by case approach is necessary to assess the impact of activities. Tools such as environmental impact assessment, strategic environmental assessment and maritime spatial planning may contribute to evaluate and assess the extent and the cumulative aspects of impacts from such activities. It is however important to ensure that any such tools provide for adequate elements to assess potential impacts on the marine environment, including transboundary considerations.

7.1. Spatial characterisation of permanent alterations

- Extent of area affected by permanent alterations (7.1.1)

7.2. Impact of permanent hydrographical changes

- Spatial extent of habitats affected by the permanent alteration (7.2.1)
- Changes in habitats, in particular the functions provided (e.g. spawning, breeding and feeding areas and migration routes of fish, birds and mammals), due to altered hydrographical conditions (7.2.2).

➤ Suggested modifications to the Original text in COM DEC

- Extent of area/**volume** affected by permanent alterations (7.1.1)
- Indicator 7.2.2. Changes in habitats **that affect the ecosystem**, in particular the functions provided (e.g. spawning, breeding and feeding areas and migration routes of fish, birds and mammals), due to altered hydrographical conditions (7.2.2).

➤ **To be taken out of the Decision and included in guidance**

Comments

- *Regarding Indicator 7.2.2, UK expert suggests to change COM DEC text to a more simple sentence like: "...impacts of key dominant habitats and those identified as having local conservation sensitivity..."*
- *The pelagic habitats must not be only characterized by their volume.*

4. Identification of issues

1) Scope and guidance for D7 is lacking

- a) Due to the lack of common understanding on the scope of this descriptor there are not harmonized approaches. A 'best practice' document based on the previous assessment could facilitate convergence of approaches;
- b) Descriptor 7 lacks specific guidance document at EU level. In particular guidance is needed to determine scales and processes;
- c) There is a need to provide clear guidance in the Decision on how to integrate the existing minimum requirements under existing EU legislation (e.g. WFD, EIA, SEA) in the GES definition, in particular on where other legislation is invoked to identify and mitigate any impacts to avoid double accounting for these types of activities. Some member states focused entirely outside of the WFD domain, but this could be too restrictive in terms of consideration of the whole water column (hydrographic conditions under WFD relate only to the quality of surface waters). Guidance on where the gaps in other legislation should be covered by MSFD is needed;
- d) It has been suggested that GES for D7 could be included in future EIAs so that the required EIA assessment studies should determine whether MSFD applies. In this case all EIAs in the marine environment would be required to assess the effects regarding GES for D7;
- e) Guidance on monitoring requirements for D7 is lacking. This document should allow MSs to adapt their monitoring plans depending on the existing pressures and states.

2) The pressure impact relation is unclear

- a) Clarification of the pressure impact chain: the original pressures are the human constructions/developments that can cause changes to the hydrographical conditions. Significant changes act then as a pressure on the ecosystem and could impact on that ecosystem (negatively or positively).
- b) Regarding the MSs reports for Articles 8, 9 and 10, differentiation between 'pressures' and 'impacts' needs to be improved to avoid confusion. A clearer link between the Directive and the Decision is needed;
- c) Clarify the concept that D7 is effectively a pressure descriptor whose impacts need to be considered as part of the assessments of GES (habitat types, eutrophication) under D1, D4, D5 and D6 (would make it impossible to define only GES within D7); it would be primarily a pressure descriptor, however not necessarily effectively or adversely influencing other components of marine ecosystems;

- d) There is a need to clarify which activities/pressures should be included in the context of D7 with a focus on activities resulting in localized impacts (pressures causing impacts at local scale, e.g. piers, harbours). The characterization of localized activities would allow assessment of cumulative impacts. Note that it is not the scales of the activities that is important – it is the scale of the effects;
- e) A large number of Member States focus only on the impacts of new activities, however existing installations or activities can have resulted in or also result in further alteration or degradation of the current environmental status;

3) Time and space scales for assessment are not defined

- a) There is a need to clarify the concept of ‘permanent alteration’ (potentially by defining a simple time scale as “permanent”);
- b) The link between functional groups and hydrographical conditions is still in the research phase and therefore a challenging aspect of D7. This could be referred back to D1/D6 to create a joint framework to assess functional impacts on benthic and pelagic habitats;
- c) Scales need to be defined: local/intermediate vs. large scales and should be linked to scales used for D1/D6 habitat assessments; D7 is referring to GES at the ecosystem level, but the pressure is typically coming from small scale constructions, so there is a large gap in the scales from pressure to impact;
- d) It is suggested to align with WFD and use the 1 nm limit to differentiate coastal waters from off-shore waters. On the other hand, this limit is not related with any environmental reasoning or background. A different option would be to consider bathymetry to define the extension of coastal waters. In any case, it is important to keep in mind that environmental processes, pressures and impacts are variable and independent from these zoning approaches. Further, definition of coastal waters extension could be dependant to the process considered: in terms of surface waves, it would be half the wavelength of the longest waves; in terms of currents the Rossby radius; in terms of the coastal ecosystem, probably the isobaths of the maximum depth of the euphotic zone. However, this has nothing to do with the WFD.
- e) Clarify if the impacts of localized activities should be assessed under consideration of a changing environment (climate change - several MS have done this). It should be addressed in that context, especially as in many cases it would be required to differentiate between global scale anthropogenic effects and interregional-scale anthropogenic effects (i.e. river damming in the BS catchment area affecting the freshwater budget and thermohaline functioning of the Med).
- f) Should impacts be assessed on habitats or on ecosystems? Presumably the first assessment can be only done at the habitat level, and afterwards a cumulative IA would be needed to arrive at the ecosystem level? It will depend on the capabilities to identify and monitor such impacts. One suggestion is to stick to habitat level.

4) Baseline, parameters and GES are not well defined

- a) Is it a quantitative or qualitative descriptor? How could it be made quantitative? Modelling could be used to help quantify the effects; however there are still regional scale changes in ecosystem processes that cannot be predicted using ecosystem models at present (e.g., regime changes). EIA procedures should have standard modelling approaches to quantify the effects;
- b) Thresholds for GES/non GES are almost non-existent. The strong natural variability masks anthropogenic impact, and thus it is very difficult to set thresholds. It should be possible to define 'impact' (i.e. when a habitat has been altered by changes in hydrology);

- c) In the case where the current situation already compromises the achievement of GES for other descriptors, in particular D1 and D6, additional measures affecting existing activities/ installations might be necessary;
- d) Only few countries defined explicit baselines. Most of them used the current situation (Initial Assessment 2012) as their baseline and considered D7 at GES at the baseline; however, this ignores the extent of past hydrographical changes on particular habitat types (which can be significant in some coastal areas). Deciding how far back to set the baseline is a complicating factor and combining this with the cost of removing old constructions explain why most member states considered the IA 2012 as their baseline and only considered new developments; this however is not in accordance with the intention of MFSD to achieve GES. If permanent changes occur within 1nm they could be assessed under WFD hydromorphology and potentially as 'heavily modified water bodies';
- e) There is the need to clarify if descriptor D7 "permanent alteration of hydrographical conditions" should be extended (or not) to include also hydrochemical conditions (like pH, alkalinity, oxygen, nutrients) as already done by some MS; possibly to the extent that the hydrochemical conditions reflect a change in the hydrographic conditions and possibly a shift in the functioning of the ecosystem.
- f) Chemical processes are not within the present definition of hydrographical processes; however several member states included acidification. If not modified by infrastructural works, it does not seem appropriate to include parameters such as acidification in the assessment of D7;
- g) Features, pressures and physico-chemical parameters are not well defined nor harmonized for comparability;

PART II: CONCLUSIONS AND RECOMMENDATIONS

5. GES criteria (in accordance with Art. 9.3)

The existing Criteria are appropriate for assessment of D7 and serve as a starting point for implementation of the descriptor. The feasibility of the assessment will depend on data availability. Data are needed on human activities (location and intensity of exploitation) for assessment of Criterion 7.1. Habitat classification has to be improved for assessment of Criterion 7.2 (e.g. pelagic habitats not well defined in comparison with EUNIS3 benthic habitats). Assessment should focus on the geographical extent of alterations in hydrographical conditions and their implications at habitat level effects, before being able to assess at ecosystems level. Further, determination of 'prevailing conditions' would be more of a complex issue.

In general, the existing Indicators are appropriate for assessment of D7, but obviously, feasibility will depend on data availability. The difficulties are implicit in the definition of limits between 'altered/not altered' areas or habitats.

Criteria 7.1 and Indicator 7.1.1 refer to the extent of the physical area or volume where there is evidence of permanent alterations in the hydrographical conditions: area for benthic systems and volume for pelagic systems.

Regarding Criteria 7.2, there is a lack of knowledge on how to develop the assessment of impacts; the major concern would be on how to aggregate assessment results from habitat to ecosystems levels. In any case, most comments indicate that assessments should be done at both habitats and ecosystem levels under D7, by using a stepwise approach. However, in the current situation, it is more important to focus on habitat level effects.

The assessment of impacts is a cross-cutting issue for D1, D6 and D7. It is suggested to keep Indicator 7.2.2 under D7. One option would be to develop a joint assessment of impacts in relation to biological elements for D1, D6 and D7, considering their common assessment elements.

The suggested modifications in the original text in COM DEC are mostly accepted by experts, although the inclusion of 'that affects the ecosystems' under Indicator 7.2.2 might seem redundant, since changes in habitats will always affect ecosystems to some extent. On the other hand, this modification could make it less operational. Other considerations would be as follows:

- Developments and impacts within WFD have no implications (other than potentially cumulative) with D7
- The boundary to consider is from WFD waters to MSFD waters – is there a significant "impact flux" across the boundary on an individual or cumulative scale?

- Even within MSFD waters, scale issues are massively important – is there an impact on regional scales? A relatively small incursion into MSFD waters will not cause the whole assessment area to fail D7.

HARMONIZATION

Due to the lack of common understanding on the scope of this descriptor there are **not harmonized approaches**.

There is a need for common and agreed methodology for monitoring and assessment.

GUIDANCE DOCUMENT

A guidance document at EU level is needed. Some subjects to be considered are: 'best practices' from previous assessments, determination of scales and processes to be considered, clarify scope of D7, integration of existing minimum requirements under existing EU legislation (e.g. WFD, EIA, SEA) in the GES definition, monitoring requirements, assessment of cumulative impacts,...

DUPLICATION OF EFFORTS

Coordination between WFD and MSFD has to be defined to avoid duplication efforts. Guidance document needed.

GLOSSARY TERMS

Key terms have to be defined and agreed: hydrographical conditions vs. physical features, features vs. characteristics, hydrological processes, permanent alterations, coastal vs. off-shore, and others.

PRESSURES/IMPACT relationship

Clarification of the pressure impact chain: the original pressures are the human constructions/developments that can cause changes to the hydrographical conditions. Significant changes act then as a pressure on the ecosystem and could impact on that ecosystem (negatively or positively).

ACTIVITIES

In order to limit and guide the scope of D7, inventories or lists of human activities that could lead to 'permanent alterations of the hydrographical conditions' should be defined and provided.

The COM DEC text should not include a closed list of human activities, but just an indicative list, in order to be able to adapt to new or unforeseen relevant activities (for flexibility and future proofing). The COM DEC text should include as **minimum requirements** the following: MSs have to provide lists with clear inventories of human activities, location, intensities, maps, etc. for the assessment of D7. It would be necessary to revise the timescale of providing such list, since the determination of all human activities potentially affecting the coastal and marine zone further away from 1 mile from the coast can be quite demanding on resources and time for MSs.

EXISTING/NEW ACTIVITIES

Although WFD outcomes must be respected (e.g. designation of heavily modified and artificial water bodies), both existing and new activities must be considered for assessment of cumulative impacts under D7 within whole marine areas. At the same time, both positive and negative impacts should be taken into account.

CROSS-CUTTING ISSUES: D7 VS OTHER DESCRIPTORS

Need to clarify the concept that D7 is effectively a pressure descriptor, a state descriptor, or both.

The French experts encourage strongly considering the D7 as a state and pressure descriptor.

Need to clarify if D7 impacts need to be considered as part of the assessments of GES under D1, D4, D5 or D6.

D7 impacts are part of the assessment of other descriptors. D7 impacts must be considered under D7, in collaboration with other descriptors.

The preparation of a guidance document can provide input to clarify on these issues.

6. GES methodological standards (in accordance with Art. 9.3)

No methodological standards have been defined for assessment of GES

The determination of GES for D7 should not depend on the definition of an explicit baseline. Due to the nature of this descriptor, the difficulty to provide a quantitative assessment (assessments based mostly on experts judgment) and the lack of common methodology, it is difficult to define clear baselines (neither thresholds nor trends). Further, the Initial Assessment 2012 report shouldn't be used as baselines because of the lack of common methodological approaches.

Due to the nature of this descriptor and its current state of development, it is not possible to make D7 a quantitative descriptor at the moment; or to define an objective threshold between GES and non-GES at the moment.

Modelling will be a key tool to be used to quantify effects from permanent alterations. Research efforts should be dedicated to develop modelling, applying a common methodology, and in order to reduce uncertainties in the assessment of impacts.

In order to improve understanding the effect of D7 related impacts on other descriptors (D1/D6), some additional research efforts would be necessary on habitat modelling, pressure mapping and cumulative impacts, along with monitoring of potentially affected areas and possibly other specific parameters (e.g. impacts on rates of energy and carbon flows due to changes on hydrographical conditions).

The features and characteristics considered for assessment under D7 can be key elements for the assessment of descriptors such as D1 and D6. Therefore, additional measures might be needed if current situation (baseline) could compromise the achievement of GES for other descriptors.

7. Standardised methods for monitoring for comparability (in accordance with Art. 11.4)

No standardised methods have been defined for monitoring

CUMULATIVE IMPACTS

Guidance is needed for the assessment of cumulative impacts and to ensure coordination across descriptors. The characterization of localized activities would allow assessment of cumulative impacts. Note that it is not the scale of the activities that is important – it is the scale of the effects.

TIME AND SPACE SCALES

A guidance document at EU level is needed to determine scales and processes.

Local scales shouldn't be excluded for the assessment of D7.

'PERMANENT ALTERATION'

No definition has been proposed for 'permanent' alteration. Setting an arbitrary temporal threshold could be a solution (e.g. OSPAR advice document on D7), but there is no agreement on this issue so far; further discussion and reasoning is needed.

According to experts' feedback, the concept of 'permanent alteration' should not be associated to a simple time scale (e.g. a certain number of years). 'Permanent' could be considered simply when an activity or construction is not expected to be discontinued or removed; or related to biological cycles, processes.

Our concern is that, if no temporal threshold is defined for 'permanent alteration' or any other appropriate definition based on a different approach, many activities or infrastructures could be legally out of the assessment of D7 while causing impacts in the marine environment. As an example, if 'permanent' would be considered as not expected to be discontinued or removed, infrastructures could be legally declared as temporal (e.g., an activity with an exploitation time of 14 years), although existing and causing impacts for a long period.

LIST OF CHARACTERISTICS, PRESSURES AND IMPACTS

In order to limit and clarify scope, indicative lists of characteristics, pressures and impacts to be considered for assessment under D7 have to be defined. The link between MSFD text and COM DEC text has to be clarified.

Hydrological processes

Table 2 of MSFD Annex III (pressures and impacts) includes interference with the following hydrological processes: Significant changes in thermal regime and saline regime; which are considered to be appropriate for assessment of D7. Further, a list with additional potential hydrological processes to be considered should be established in order to keep flexibility and future proofing. Some additional processes would be: sea currents, waves, wave exposure, sediment transport, erosion, accumulation and turbidity regimes.

Chemical parameters

Permanent alterations caused by humans can lead to chemical modifications at both local scale and bigger scale. Examples: anti-biofouling chemicals (local scale), iron enrichment IRONEX experiment (local to medium scale), warmer waters have lower oxygen saturation levels (any scale)

Chemical features should be considered under D7, including pH, pCO₂, alkalinity and oxygen in the monitoring programmes.

Acidification

Marine acidification is not included specifically under D7 and would go beyond the scope of this descriptor. Coastal and offshore permanent alterations caused by humans are not expected to influence the global climate conditions related to marine acidification.

There is no clear feedback from experts on the inclusion of acidification in the assessment of D7 or any other appropriate MSFD descriptor. At the same time, it is clear

that the possible consequences of marine acidification are an important issue for marine ecosystems and therefore a prerequisite for MSFD. In fact, this is a cross-cutting issue, since marine acidification is mentioned in the MSFD (Annex II, table 1, Characteristics), but it is not considered explicitly in any single indicator out of the 11 MSFD descriptors.

Physical loss/Physical Damage

Table 2 of MSFD Annex III, regarding pressures and impacts, includes Physical loss and Physical Damage, which have been mostly associated to D1 and D6 regarding habitat assessment elements. On the other hand, they have been mentioned occasionally under D7 Member States Initial Assessments.

There is no clear feedback on the adequacy of considering Physical loss and Physical Damage as pressures/impacts for assessment of D7, or to keep them only under D6. In any case coordination is needed on this cross-cutting issue to avoid duplication of indicators between descriptors.

MONITORING

No monitoring strategies have been defined or agreed at regional or European scales.

A potential list of characteristics/features for D7 should be developed/provided to facilitate and harmonise selection of monitoring parameters. Examples:

- Temperature, salinity, current, waves, turbidity, bottom friction, etc.
- Static Bathymetric Features (continental shelf breaks, seamounts, submarine canyons, areas of high slope, channels, etc.)
- Persistent Hydrographic and Ephemeral Features (coastal upwelling, fronts and frontal systems, eddies, currents...)

Results from WFD and EIA should be used to assess D7 under MSFD.

8. Standardised methods for assessment for comparability (in accordance with Art. 11.4 GES)

No standardised methods have been defined for assessment.

RELATIONSHIP BETWEEN MSFD D7 and WFD

Both directives need to remain compatible.

We should aim for compatibility of approaches between WFD and MSFD such that the latter covers issues beyond 1nm (the WFD limit for coastal waters). Hydromorphology assessments under WFD could do the same job as D7 beyond 1nm and be fully complementary, avoiding overlaps. However, there might be certain issues that have not been considered under WFD so far, whether their scale affects both coastal and offshore areas (if 1 nm limit is considered) or just simply gaps (e.g. missing parameters).

The actual coverage of MSFD, which is mostly based on WFD, should be enough at present to define GES. MSFD should provide an integrated view of hydrographical conditions, including not only coastal but also large-scale monitoring, since WFD does not consider ocean dynamics. Some gaps to be covered by MSFD (in relation to WFD) could be: coupling between coastal dynamics and offshore dynamics; impact of waves in the systems; and transport of suspended matter.

In order to cover possible gaps resulting from WFD - and assuming local activities affecting coastal waters are individually assessed under other regulations (WFD, EIA) - the scope of D7 would have to consider: individual offshore activities; and cumulative impacts originating from both coastal and offshore activities. The assessment of cumulative impacts could also provide an integrated assessment of trends in the local impacts.

AGGREGATION

No aggregation rules have been defined.

In relation to comparability of assessments at different spatial scales (ecosystem scale, subregional scale regional scale or inter-regional scale), a common basic methodology is necessary first. It is also necessary to define the scales. Further, although an integrated view would be necessary, the characteristics (biological, physic-chemical and hydrodynamics) and the presence of different problems at different scale and in the different assessment areas would hinder comparability.

9. Other related products (e.g. technical guidance, reference in common understanding document)

9.1 Proposed way forward for identified issues

Issue	Way forward	Timeline
No standards for GES assessment existing	Agree and define methodological standards for the assessment of GES under D7 (minimum requirements including list of relevant human activities)	<u>2015/2016</u>
Space and time scales are not well defined	Define and agree (based on the GES definition) on space and time scales (including the meaning of "permanent") of relevant processes for monitoring and assessment of GES	<u>2016</u>
Cumulative impact and aggregation rules are not defined	Agree and define aggregation rules and methodological standards for cumulative impact assessment of GES	<u>2017</u>
No common monitoring strategies are existing	Agree and define a common monitoring strategy at regional and European scales for D7 (minimum list of variables to be monitored)	<u>2018</u>

10. Reference Documents

- Review of the GES Decision 2010/477/EU and MSFD Annex III Approach and outline for the process, (EC- Committee/07/2013/03rev, 2013);
- First steps in the implementation of the Marine Strategy Framework Directive - Assessment in accordance with Article 12 of Directive 2008/56/EC, (CSWD, 2014);
- COM(2014)97 final. REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT The first phase of implementation of the Marine Strategy Framework Directive (2008/56/EC) The European Commission's assessment and guidance (EC, 2014);
- SWD(2014) 49 final. COMMISSION STAFF WORKING DOCUMENT Annex Accompanying the document Commission Report to the Council and the European Parliament. The first phase of implementation of the Marine Strategy Framework Directive. The European Commission's assessment and guidance (EC, 2014);
- Common Understanding of (Initial) Assessment, Determination of Good Environmental Status (GES) & Establishment of Environmental Targets (Articles 8, 9 & 10 MSFD), (DG GES, 2014);
- Coherent geographic scales and aggregation rules in assessment and monitoring of Good Environmental Status – analysis and conceptual phase, (Deltares, 2014);
- Review of Methodological Standards Related to the Marine Strategy Framework Directive Criteria on Good Environmental Status (JRC, 2011);
- Guidance / Terms of Reference for the task groups 'criteria and methodological standards for the Good Ecological Status (GES) descriptors' (JRC, 2010);
- CSWP (2011) on the Relationship between the initial assessment of marine waters and the criteria for good environmental status;
- OSPAR Advice Doc. GES D7. MSFD Advice document on Good environmental status - D7: Hydrographical conditions, a living document - Version 17 January 2012. OSPAR Commission. ISBN 978-1-909159-16-7;
- Technical guidance on monitoring for the Marine Strategy Framework Directive. JRC Scientific and Technical Reports. Publications Office of the European Union. JRC88073;
- JRC IDA (2014). In-Depth Assessment of the EU Member States' Submissions for the Marine Strategy Framework Directive under articles 8, 9 and 10. EUR – Scientific and Technical Research series. Luxembourg: Publications Office of the European Union. EUR 26473 EN, 149 pp. doi: 10.2788/64014;
- JRC IDA D7 (2014). In-Depth Assessment of the EU Member States' Submissions for the Marine Strategy Framework Directive under articles 8, 9 and 10 on Hydrographical Conditions Descriptor 7. Luxembourg: Publications Office of the European Union. EUR 26800 EN, 15 pp. doi: 10.2788/1124;
- Guidance Document No 3. Analysis of Pressures and Impacts. CIS Guidance Documents. Luxembourg: Office for Official Publications of the European Communities, 2003;
- Guidance Document No 4. Identification and Designation of Heavily Modified and Artificial Water Bodies. CIS Guidance Documents. Luxembourg: Office for Official Publications of the European Communities, 2003;
- Guidance Document No 5. Transitional and Coastal Water - Typology, Reference Conditions and Classification Systems. CIS Guidance Documents. Luxembourg: Office for Official Publications of the European Communities, 2003;
- Guidance Document No 7. Monitoring under the Water Framework Directive. CIS Guidance Documents. Luxembourg: Office for Official Publications of the European Communities, 2003;

- Guidance Document No 20. Exemptions to the environmental objectives. CIS Guidance Documents. Luxembourg: Office for Official Publications of the European Communities, 2003.

Europe Direct is a service to help you find answers to your questions about the European Union
Free phone number (*): 00 800 6 7 8 9 10 11
(*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server <http://europa.eu>

How to obtain EU publications

Our publications are available from EU Bookshop (<http://bookshop.europa.eu>),
where you can place an order with the sales agent of your choice.

The Publications Office has a worldwide network of sales agents.
You can obtain their contact details by sending a fax to (352) 29 29-42758.

JRC Mission

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

*Serving society
Stimulating innovation
Supporting legislation*

