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MARINE AND COASTAL BIODIVERSITY: REVISED VOLUNTARY GUIDELINES FOR THE CONSIDERATION OF BIODIVERSITY IN ENVIRONMENTAL IMPACT ASSESSMENTS AND STRATEGIC ENVIRONMENTAL ASSESSMENTS IN MARINE AND COASTAL AREAS

Note by the Executive Secretary

BACKGROUND

1. The Conference of the Parties, by decision IX/20, invited Parties, other Governments and relevant organizations to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction and to cooperate in further developing scientific and technical guidance for the implementation of environmental impact assessments and strategic environmental assessments for activities and processes under their jurisdiction or control which may have significant adverse impacts on marine biodiversity beyond national jurisdiction with a view to ensuring that such activities are regulated in such a way that they do not compromise ecosystem integrity (paragraph 8). For this purpose, the Conference of the Parties, taking into account the relevant provisions of the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity, decided to convene an expert workshop to discuss scientific and technical aspects relevant to environmental impact assessment in areas beyond national jurisdiction with a view to contributing to the development of such scientific and technical guidance (paragraph 10). Pursuant to this decision, the Executive Secretary convened the Expert Workshop on Scientific and Technical Aspects relevant to Environmental Impact Assessment in Marine Areas Beyond National Jurisdiction, in Manila, Philippines, from 18 to 20 November 2009.

2. Subsequently, by decision X/29, the Conference of the Parties requested the Executive Secretary to facilitate the development of voluntary guidelines for the consideration of biodiversity in environmental impact assessments (EIAs) and strategic environmental assessments (SEAs) in marine and coastal areas using the guidance in annexes II, III and IV to the above-mentioned Manila workshop report (UNEP/CBD/SBSTTA/14/INF/5), recognizing that these guidelines would be most useful for activities that are currently unregulated with no process of assessing impacts (paragraph 50).

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3. Pursuant to this request, the Executive Secretary facilitated the development of voluntary guidelines, and circulated them, together with background information, to Parties, other Governments and organizations for technical peer-review through notification 2011-212 issued on 7 November 2011. The comments[1] from the technical peer-review were reflected in the draft guidelines that were submitted to the Subsidiary Body at its sixteenth meeting for its consideration (UNEP/CBD/SBSTTA/16/7/Add.1) together with a background document (UNEP/CBD/SBSTTA/16/INF/16).

4. The Subsidiary Body, at its sixteenth meeting, considered them and prepared recommendation XVI/6. SBSTTA also requested Executive Secretary to further refine the voluntary guidelines in light of views submitted by Parties, other Governments and relevant organizations by 30 June 2012 (SBSTTA recommendation XVI/6).

5. Accordingly, the Secretariat of the Convention compiled views[2] by Parties, other Governments and relevant organization through notification 2012-069 issued on 11 May 2012, and these views were taken into account in preparing the revised guidelines, as contained in the annex to this note.

[1] Submissions were provided by Canada, India, Japan, Mexico, Netherlands, UNDOALOS, IUCN, and WWF

[2] Submissions were provided by Argentina, Australia, Brazil, European Union and its Member States, Mexico, USA, UNDOALOS, Global Biodiversity Information Facility, International Council of Environmental Law, and the Institute of Marine Engineering, Science and Technology

Annex

Part I

VOLUNTARY GUIDELINES FOR THE CONSIDERATION OF BIODIVERSITY IN ENVIRONMENTAL IMPACT ASSESSMENTS (EIAS) IN MARINE AND COASTAL AREAS

Note: The voluntary guidelines on biodiversity-inclusive environmental impact assessment were endorsed in decision VIII/28. This note provides annotations to those guidelines specific to marine and coastal biodiversity. The original guidelines are reproduced in plain text with annotations highlighted in italics, bold font.

1. The guidelines are structured in accordance with the internationally accepted sequence of procedural steps characterizing good-practice environmental impact assessment (EIA). They aim at a better integration of biodiversity-related considerations into the EIA process***. The guidelines were endorsed by decision VIII/28. These annotations provide additional considerations specifically for marine and coastal areas including marine areas beyond national jurisdiction, in line with decision X/29 (paragraph 50). These voluntary guidelines, as annotated, should be used in a manner consistent with the United Nations Convention on the Law of the Sea, in keeping with Article 22(2) of the Convention on Biological Diversity, while paying due regard to the ongoing work and future outcomes of other processes relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction undertaken under the auspices of the United Nations General Assembly.***

2. National EIA systems are regularly being evaluated and revised. These guidelines are intended to assist national authorities, regional authorities or international agencies as appropriate in better incorporating biodiversity-related considerations during such a revision, at which time a significant enhancement and improvement of the EIA system can be made. This also implies that further elaboration of practical guidelines is needed to reflect the ecological, socio-economic, cultural and institutional conditions for which the EIA system is designed.

3. The guidelines focus on how to promote and facilitate a biodiversity-inclusive EIA process in marine and coastal areas. They do not provide a technical manual on how to conduct a biodiversity-inclusive assessment study.

4. Screening and scoping are considered to be critical stages in the EIA process and consequently receive particular attention. Screening provides the trigger to start an EIA process. During scoping, relevant impacts are identified, resulting in the terms of reference for the actual impact study. The scoping stage is considered critical in the process, as it defines the issues to be studied and it provides the reference information on which a review of results from the study will be based. Scoping and review usually are linked to some form of public information, consultation or participation. During scoping, promising alternatives can be identified that may significantly reduce or entirely prevent adverse impacts on biodiversity. ***The conduct of screening and scoping for activities with the potential to affect marine biodiversity may involve considerable challenges, particularly for open-ocean waters and deep-sea habitats, and for areas beyond national jurisdiction, due to ecological, governance and practical differences and the general lack of knowledge about these areas.***

A. Stages in the process

5. Environmental impact assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. The effective participation of relevant

stakeholders, including indigenous and local communities, is a precondition for a successful EIA. Although legislation and practice vary around the world, the fundamental components of an EIA in marine and coastal areas would necessarily involve the following stages:

(a) *Screening* to determine which projects or developments require a full or partial EIA study;

(b) *Scoping* to identify which potential impacts are relevant to assess (based on legislative requirements, international conventions, expert knowledge and public involvement), to identify alternative options that avoid, mitigate or compensate adverse impacts on biodiversity (including the option of not proceeding with the activity, finding alternative designs or sites which avoid the impacts, incorporating safeguards in the design of the project, or providing compensation for adverse impacts), and finally to derive terms of reference for the EIA. ***The scoping process for activities affecting marine biodiversity in areas beyond national jurisdiction may be more challenging than for marine areas within national jurisdiction. Relevant stakeholders may encompass global and regional organizations as well as national authorities and communities. The scoping process is likely to draw on a wider pool of expertise, which includes global and regional experts as well as national experts on the potential impacts of the relevant activity. The diversity and geographic spread of both the stakeholder and expert communities could increase the time and costs associated with the scoping process;***

(c) *Assessment and evaluation of impacts and development of alternatives*, to predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives. ***For activities affecting marine and coastal biodiversity, this stage of the EIA process may often need to be undertaken with incomplete data and knowledge for assessment and evaluation. Efforts should also be made to incorporate the latest work on ecosystem services and values. Predictions of impacts may be more uncertain, and there is likely less knowledge and experience available to apply in developing alternatives. Compared to terrestrial ecosystems, there is usually a paucity of data on marine ecosystems with data coverage for coastal ecosystems usually better than for offshore marine areas. Consequently, knowledge of what ecosystem components may be at risk is poorer, and the ability to assess potential risks is weaker. In areas beyond national jurisdiction, the proponent of the activity to be assessed may be based far from the site of the proposed activity, as may also be the governmental and administrative authorities of the flag State. These issues may make the likely cost of conducting an EIA for activities affecting marine biodiversity in areas beyond national jurisdiction much higher than an EIA for a comparable activity in coastal or terrestrial areas. Likewise the necessary follow-up management, monitoring, control and surveillance recommended by an EIA may be more difficult in marine areas beyond national jurisdiction where "customs of practice" for EIA are less established, methodologies are less mature, and different assessment approaches may occur. The different history and culture of organizations with interests in the same area may have three important implications for EIA beyond areas of national jurisdiction. First, the application of a precautionary approach will be a particularly important consideration in decision-making. Secondly, there may be greater need for information gathering through scientific assessments, surveys and modelling to describe ecologically or biologically significant areas and other important features as part of the assessment process. And thirdly, there will necessarily be greater dependence on incremental and iterative "test-based" approaches to permitting activities, given the outcome of an EIA. To increase the very limited knowledge available on the impacts of a particular activity, it may need to be allowed at a small scale with stringent conditions for monitoring and surveillance, so that the permitted activity becomes the source of better information for a more complete assessment of the impacts at potentially larger scales. Where possible, information from other areas of the world where this activity has taken place would be used to ascertain likely risk and impacts before allowing a small-scale activity to occur.***

(d) *Reporting*: the environmental impact statement (EIS) or EIA report, including an environmental management plan (EMP), and a non-technical summary for the general audience. ***For EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction, the general audience may include relevant authorities of the flag State, competent international organizations with***

functional responsibility for the activities involved, and non-governmental organizations. For these EIAs, the question of who prepares and who approves the EMP may not be clearly defined and may require a consensus determination by relevant players, including the proponent of the activity, the flag States of vessels involved in the activity and international organizations with functional responsibilities related to the proposed activities.

(e) *Review of the EIS*, based on the terms of reference (scoping) and public participation. ***For EIAs related to marine biodiversity in areas beyond national jurisdiction, the question of whether a particular EIS meets acceptable standards may be an issue for joint determination by the flag States as well as international organizations with functional responsibilities related to the proposed activities. Independent scientific scrutiny of best work practices should be undertaken;***

(f) *Decision-making* on whether to approve the project or not, and under what conditions. ***For EIAs related to marine biodiversity in areas beyond national jurisdiction this decision may in the first instance reside with the flag State, but it may need to meet the criteria set by competent international organizations with functional responsibilities related to the proposed activities where such organizations exist and be subject to their review;*** and

(g) *Monitoring, compliance, enforcement and environmental auditing*. Monitor whether the impacts and proposed mitigation measures occur as defined in the EMP. Verify the compliance by the proponent with the EMP, to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion. ***For EIAs related to marine biodiversity in areas beyond national jurisdiction, the duty to monitor and ensure compliance with the EMP is likely to fall on the flag State. Relevant organizations with functional responsibilities for the activities may also play an important role. Community-based or civil-society monitoring, which plays an important role in many States for terrestrial and coastal EIAs, may be much harder to implement in marine areas beyond national jurisdiction, but particular organizations may develop models for this over time. Also, for any specified level of monitoring and enforcement, the cost to industry and to governments or agencies for their respective tasks may be higher, due to the greater distance between the project and the country's or agency's base of operations. However, effective use of remote-sensing tools and interactive communications may help to bring down the costs.***

B. Biodiversity issues at different stages of environmental impact assessment

1. Screening

6. Screening is used to determine which proposals should be subject to EIA, to exclude those unlikely to have harmful environmental impacts and to indicate the level of assessment required. Screening criteria must include measures of biodiversity, or else there is a risk that proposals with potentially significant impacts on biodiversity will be screened out. The outcome of the screening process is a *screening decision*. ***For EIAs related to marine biodiversity in areas beyond national jurisdiction, the screening decision may be made in the first instance by the flag State, and reviewed by competent international organizations with functional responsibilities related to the proposed activities where such organizations exist. Where such organizations do not exist, some organization or expert body may need to be designated.***

7. Since legal requirements for EIA may not guarantee that biodiversity will be taken into account, consideration should be given to incorporating biodiversity criteria into existing, or the development of new, screening criteria. Important information for developing screening criteria for EIAs related to marine areas under national jurisdiction can be found in national biodiversity strategies and action plans (NBSAPs) or equivalent documents. These strategies provide detailed information on conservation priorities and on types and conservation status of ecosystems. Furthermore, they describe trends and threats at ecosystem- as well as at species level and provide an overview of planned conservation activities. ***For EIAs of activities affecting marine and coastal biodiversity the screening stage will need to make the best use of existing information and data, including through the use of models and proxies, with the relevant collection of data at the location of an activity.***

8. *Pertinent questions from a biodiversity perspective.* Taking into account the three objectives of the Convention, fundamental questions which need to be answered in an EIA study include:

(a) Would the intended activity affect the biophysical environment directly or indirectly in such a manner or cause such biological changes that it will increase risks of extinction of genotypes, varieties, populations of species, or the chance of loss of habitats or ecosystems? ***For EIAs of activities affecting marine and coastal biodiversity, including open-ocean waters and deep-sea habitats, there may be less knowledge of risk of extinction, and of factors which affect the risk of extinction. Therefore more emphasis may need to be placed on the protection of habitats of importance for threatened, endangered or declining species, and on factors that may cause changes to biological or ecological processes that may affect such species;***

(b) Would the intended activity surpass the maximum sustainable yield, the carrying capacity of a habitat/ecosystem or the maximum allowable disturbance level of a resource, population, or ecosystem, taking into account the full spectrum of values of that resource, population or ecosystem? ***For marine and coastal biodiversity in many areas, there is not enough knowledge on which to establish a baseline for any of these three criteria, and hence no ability to objectively evaluate the potential effects of an intended activity on these three criteria. It may be simpler to use the more generic criteria of "the potential to cause significant adverse impacts" and then define these elsewhere, building on the FAO International Guidelines for the Management of Deep- sea Fisheries in the High Seas;***

(c) Would the intended activity result in changes to access to and/or rights over biological resources? ***Identification of "stakeholders" may be particularly difficult in marine areas beyond national jurisdiction because there are no universal standards to support this process (Box 2 of the Draft Guidance on Biodiversity-inclusive Strategic Environmental Assessment in Marine and Coastal Areas may be of assistance). It may however be possible to identify those who have historically used the resource or the area, but this is unlikely to include the full suite of those who may have an interest in area. Considerations regarding the equity in distribution of socio-economic benefits, allocating environmental costs and identifying environmental benefits, and building consensus on the appropriate balance of those costs and benefits could be particularly challenging, both because of the difficulty in identifying stakeholders and because the "environment" of marine areas beyond national jurisdiction may be on a basin-wide or global scale, rather than a local or national scale.***

9. To facilitate the development of screening criteria, the questions above have been reformulated for the three levels of diversity (ecosystem, species, genetic diversity), reproduced in table 1 below.

Table 1. Questions pertinent to screening on biodiversity impacts

Level of diversity	Conservation of biodiversity	Sustainable use of biodiversity
Ecosystem diversity	Would the intended activity lead, either directly or indirectly, to serious damage or total loss of (an) ecosystem(s), or land-use type(s), thus leading to a loss of ecosystem services of scientific/ecological value, or of cultural value? ***In the marine context it should also be considered whether the activity would otherwise cause substantial pollution of, or significant and harmful changes to an ecologically or biologically significant marine area,***	Does the intended activity affect the sustainable human use of (an) ecosystem(s) such that the use becomes destructive or non-sustainable (i.e., the loss of ecosystem services of social and/or economic value)?
Species diversity	Would the intended activity cause a direct or indirect loss of a population of a species?	Would the intended activity affect sustainable use of a population of a species?

Level of diversity	Conservation of biodiversity	Sustainable use of biodiversity
Genetic diversity	Would the intended activity result in extinction of a population of a localized endemic species of scientific, ecological, or cultural value?	Does the intended activity cause a local loss of varieties of genes or genomes of social, scientific and economic value?

10. Types of existing screening mechanisms include:

(a) *Positive lists* identifying projects requiring EIA (inclusion lists). A disadvantage of this approach is that the significance of impacts of projects varies substantially depending on the nature of the receiving environment, which is not taken into account. ***For marine and coastal biodiversity, in particular in open-ocean waters and deep-sea habitats, less may be known about the receiving environments, their sensitivities to impacts, and how sensitivities might vary in time and space or by activity. This suggests that positive lists for screening of activities should be broad, particularly in open-ocean waters and deep-sea habitats;***

(b) Lists identifying those *geographical areas* where important biodiversity is found, and hence where projects would require EIA. The advantage of this approach is that the emphasis is on the sensitivity of the receiving environment rather than on the type of project. ***For marine and coastal biodiversity, including in open-ocean waters and deep-sea habitats, the spatial scales of the "areas where important biodiversity is found" may be large. The scientific criteria for describing "ecologically or biologically significant marine areas" (EBSAs) adopted in CBD decision IX/20, and similar criteria, such as the FAO criteria for "vulnerable marine ecosystems" (VMEs) in the 2009 International Guidelines for the Management of Deep- sea Fisheries in the High Seas, may provide useful reference frameworks in this regard. Any activity with the potential to cause substantial pollution of or significant and harmful changes should be subject to some form of initial screening and initial environmental evaluation;***

(d) *Expert judgement* (with or without a limited study, sometimes referred to as *initial environmental examination* or *preliminary environmental assessment*). Biodiversity expertise should be included in expert teams; and

(e) A *combination* of a list plus expert judgement to determine the need for an EIA. The considerations outlined in paragraph subparagraph (a) and (b) are also relevant here.

11. A *screening decision* defines the appropriate *level of assessment*. The result of a screening decision can be that:

(a) The proposed project is "fatally flawed", in that it would be inconsistent with international or national conventions, policies or laws. It is advisable not to pursue the proposed project. Should the proponent choose to accept the risks and proceed, an EIA would be required to ensure that measures are adopted to prevent significant adverse impacts. ***Proponents proceeding with projects at their own risk in marine areas beyond national jurisdiction, following a decision by States or the competent international organizations that the project should not proceed, raises a number of issues;***

(b) An EIA is required (often referred to as "category A" projects);

(c) A limited environmental study is sufficient because only limited environmental impacts are expected; the screening decision is based on a set of criteria with quantitative benchmarks or threshold values (often referred to as "category B" projects). ***For EIAs of activities affecting marine and coastal biodiversity, including in open-ocean waters and deep-sea habitats, this concept is appropriate, but data and knowledge to set criteria and quantitative benchmarks are likely to be much more incomplete in open-ocean waters and deep-sea habitats. No precedents, except in the context of fishing activities, are known to exist for how it should be done in relation to marine biodiversity in open-ocean waters and deep-sea habitats and the development of consistent approaches to setting baselines and standards in such areas will be challenging, and individual applications of whatever approaches are preferred are likely to be contested to a greater degree than in coastal waters and habitats. The precautionary***

approach will be particularly important in implementing this category of screening decisions in marine areas beyond national jurisdiction;

(d) There is still uncertainty whether an EIA is required, and an initial environmental examination has to be conducted to determine whether a project requires EIA or not; or

(e) The project does not require an EIA.

12. *Biodiversity-inclusive screening criteria* set out circumstances in which EIA is justified on the basis of biodiversity considerations. They may relate to:

(a) Categories of activities known to cause biodiversity impacts, including thresholds referring to the size of the intervention area and/or the magnitude, duration and frequency of the activity. ***The development of consistent approaches to setting thresholds in marine and coastal areas could be more challenging than in terrestrial areas, particularly in open-ocean waters and deep-sea habitats, although there are relevant experiences in some fisheries, and individual applications of whatever approaches are preferred are likely to be contested to a greater degree in areas beyond national jurisdiction than in marine areas within national jurisdiction. Application of the precautionary approach will be particularly important in establishing biodiversity-inclusive screening criteria for marine areas beyond national jurisdiction;***

(b) The magnitude of biophysical change that is caused by the activity. ***For marine and coastal biodiversity, criteria for "acceptable" magnitudes of change will normally be harder to set than for terrestrial areas. They may be particularly difficult to set in areas beyond national jurisdiction and challenged more aggressively by both proponents and opponents***; or

(c) Maps indicating areas important for biodiversity, often with their legal status. ***For most, open-ocean waters and deep-sea habitats as well as many coastal waters and habitats, maps of ecosystem features are as yet only in the early stages of development. The scientific criteria for "ecologically or biologically significant areas" (EBSAs), and similar criteria such as the FAO criteria for VMEs may provide useful reference frameworks in this regard.***

All these factors need to be considered for both the "construction" (exploration) and "operational" (exploitation) phases of projects, because the impacts could be very different for each phase.

13. A suggested approach to the development of biodiversity-inclusive screening criteria, combining the above types of criteria, includes the following steps: (i) design a biodiversity screening map indicating areas in which EIA is required; (ii) define activities for which EIA is required; (iii) define threshold values to distinguish between full, limited/undecided, or no EIA (see appendix 1 for a generic set of screening criteria). This suggested approach takes account of biodiversity values (including valued ecosystem services) and activities that might have an impact on drivers of change of biodiversity. ***For marine and coastal biodiversity, this process could be more complex than in terrestrial areas and the application of the precautionary approach will be particularly important. The extent and diversity of marine and coastal areas, including open-ocean waters and deep-sea habitats, make the notion of a single threshold for the diversity of habitats and ecosystems unlikely to be appropriate. Different thresholds would have to be considered for different deep-sea areas and ecosystem features. For marine biodiversity in areas beyond national jurisdiction, it will also be necessary to develop some prioritization of screening methodologies, to provide guidance on which ones deliver the most reliable and cost-effective results.***

14. If possible, biodiversity-inclusive screening criteria should be integrated with the development (or revision) of a national biodiversity strategy and action plan. This process can generate valuable information such as a national spatial biodiversity assessment, including conservation priorities and targets, which can guide the further development of EIA screening criteria. ***For marine and coastal areas within national jurisdiction, biodiversity-inclusive screening criteria should be integrated with the development (or revision) of a national biodiversity strategy and action plan as well as national marine policy and ecosystem-based management planning. This process can generate valuable information, such as a national spatial biodiversity assessment, including conservation priorities and targets, which***

can guide the further development of EIA screening criteria. For marine areas beyond national jurisdiction, marine regional biodiversity strategies and action plans are important and need to be developed where they do not exist. Some regional seas organizations have already developed their own biodiversity strategies. There would be a number of benefits for EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction if competent international organizations were also to develop biodiversity strategies and action plans.

15. *Step 1*: According to the principles of the ecosystem approach, a *biodiversity screening map* is designed, indicating important ecosystem services (replacing the concept of sensitive areas – see appendix 2 below). The map is based on the best scientific and technical information available and has to be formally peer reviewed and approved**. *In view of the large spatial scales involved for most marine areas, it is unlikely that important ecosystem services could be mapped on scales that are relevant to management of many activities, although predictive modelling, based on environmental factors that are known to regulate species distributions may be used for key species. Moreover the degree of degradation of open-ocean waters and deep-sea habitats is generally not as severe as for many coastal areas, so the need to focus on protecting limited remaining areas where ecosystem services are provided is not an appropriate starting point. With present knowledge of marine and coastal biodiversity, an approach based on ecologically or biologically significant areas (EBSAs) is considered likely to be sufficient to allow progress on conservation and sustainable use of biodiversity, including in marine areas beyond national jurisdiction, particularly for small scale ecosystems that may be discontinuous such as cold seeps and hydrothermal vents. In the longer term, enhanced management and conservation efforts at a broader scale, covering a wide depth range may be required for fauna that occur broadly in a regional but narrow depth band.***

16. Suggested categories of geographically defined areas related to important ecosystem services are:

(a) Areas with *important regulating services in terms of maintaining biodiversity*:

Protected areas: depending on the legal provisions in a particular national jurisdiction, these may be defined as areas in which no human intervention is allowed, or as areas where impact assessment at an appropriate level of detail is always required;

Areas containing *threatened ecosystems outside of formally protected areas*, where certain classes of activities (see step 2) would always require an impact assessment at an appropriate level of detail; ***In the marine context, "threatened ecosystems" would be understood as referring to "vulnerable marine ecosystems" or areas that meet the criteria of " vulnerability, fragility, sensitivity or slow recovery"***;

Areas identified as being important for the *maintenance of key ecological or evolutionary processes*, where certain classes of activities (see step 2) would always require an impact assessment at an appropriate level of detail;

Areas known to be *habitat for threatened species*, which would always require an impact assessment at an appropriate level of detail;

(b) Areas with *important regulating services for maintaining natural processes with regard to water, or air*, where impact assessment at an appropriate level of detail is always required. ***Refer to Appendix 2 for examples;***

(c) Areas with *important provisioning services*, where impact assessment at an appropriate level of detail is always required. ***Examples can be waters traditionally occupied or used by indigenous and local communities or breeding, nursery, feeding, spawning grounds or migratory routes of various fishery and cetacean resources;***

(d) Areas with *important cultural services*, where impact assessment at an appropriate level of detail is always required. ***Examples can be scenic seascapes, heritage sites and sacred sites;***

(e) Areas with *other relevant ecosystem services* (such as areas with valued landscape quality); the need for impact assessment and/or the level of assessment is to be determined (depending on

the screening system in place). "***Landscape quality" should read "seascape quality" in the marine context. Other ecosystem services could include high value for scientific research purpose;***

(f) All other areas: no impact assessment required from a biodiversity perspective (an EIA may still be required for other reasons).

In view of the ecological, governance and practical differences relevant to marine areas beyond national jurisdiction, these detailed categories of defined geographic areas cannot be applied in the same way. As noted above, an approach based on ecologically or biologically significant marine areas (EBSAs) is considered likely to be a practical short-term option for defining such geographic areas. Given the current limited knowledge of marine and coastal biodiversity, and in particular of open-ocean waters and deep-sea habitats, no categorical geographically-based exclusions from EIAs are appropriate.

17. *Step 2:* Define activities for which impact assessment may be required from a biodiversity perspective. The activities are characterized by the following direct drivers of change:

(a) Change of land-use or land cover, and underground extraction: above a defined area affected, EIA always required, regardless of the location of the activity - define thresholds for level of assessment in terms of surface (or underground) area affected; ***In the marine context "land-use or land cover, and underground extraction" and "surface (or underground) area" refer to the uses of the seabed;***

(b) Change in the use of marine and/or coastal ecosystems, and extraction of seabed resources: above a defined area affected, EIA always required, regardless of the location of the activity - define thresholds for level of assessment in terms of surface (or underground) area affected. ***For EIAs of activities affecting marine and coastal biodiversity, including biodiversity in areas beyond national jurisdiction, this definition of activities is completely appropriate, but data and knowledge to identify direct drivers of change are likely to be much more incomplete for open-ocean waters and deep-sea habitats. The development of consistent approaches to defining such activities in marine and coastal areas could be more challenging, and individual applications of whatever approaches are preferred are likely to be contested to a greater degree in areas marine beyond national jurisdiction than in marine areas within national jurisdiction. Use of the precautionary approach may be particularly relevant in defining such activities in marine areas beyond national jurisdiction;***

(c) Fragmentation, usually related to linear infrastructure. Above a defined length, EIA always required, regardless of the location of the activity – define thresholds for level of assessment in terms of the length of the proposed infrastructural works. ***This guideline may only rarely be relevant to marine biodiversity in open ocean and deep-sea habitats, where the scale of habitats is generally large, especially when transport mechanisms in the three-dimensional water column are considered, and where the scales of direct impacts of most activities are generally local;***

(d) Emissions, effluents or other chemical, thermal, radiation or noise emissions — relate level of assessment to the ecosystem services map**.** ***There are problems where activities at one depth affect other depths not within the immediate impact zone (e.g., downslope turbidity currents initiated by bottom trawling but which extend into much deeper depths and may be more severe than where the initial impact took place;***

(e) Introduction or removal of species, changes to ecosystem composition, ecosystem structure, or key ecosystem processes responsible for the maintenance of ecosystems and ecosystem services (see appendix 2 below for an indicative listing) — relate level of assessment to ecosystem services map.

18. It should be noted that these criteria only relate to biodiversity and serve as an add-on in situations where biodiversity has not been fully covered by the existing screening criteria.

19. *Determining norms or threshold values for screening* is partly a technical and partly a political process, whose outcome may vary between countries and ecosystems. ***For EIAs related to marine biodiversity in areas beyond national jurisdiction, determining norms and threshold values for***

screening is likely to be an issue for joint consideration by competent international organizations with functional responsibilities related to the proposed activities.

The technical process should at least provide a description of:

(a) *Categories of activities* that create direct drivers of change (extraction, harvest or removal of species, change in seabed-use or cover, fragmentation and isolation, external inputs such as emissions, effluents, or other chemical, radiation, thermal or noise emissions, introduction of invasive alien species or genetically modified organisms, or change in ecosystem composition, structure or key processes), taking into account characteristics such as: type or nature of activity, magnitude, extent/location, timing, duration, reversibility/irreversibility, uniqueness, likelihood, and significance; possibility of interaction with other activities or impacts. ***For marine and coastal areas, the scientific criteria for identifying "ecologically or biologically significant areas" (EBSAs), and similar criteria such as the FAO criteria for "vulnerable marine ecosystems"(VMEs) may provide useful reference frameworks;***

(b) *Where and when*: the area of influence of these direct drivers of change can be modelled or predicted; the timing and duration of influence can be similarly defined. ***For marine and coastal biodiversity, the area, timing and duration of influence must be determined with the limited knowledge and data available for assessment and evaluation. In open-ocean waters and deep-sea habitats predictions could be particularly uncertain, and there is less knowledge and experience to apply in making these determinations. Hence, there may have to be a greater reliance on borrowing and adapting experience elsewhere, which will also result in greater uncertainty;***

(c) A *map of valued ecosystem services* (including maintenance of biodiversity itself) on the basis of which decision makers can define levels of protection or conservation measures for each defined area. This map is the experts' input into the definition of categories on the biodiversity screening map referred to above under step 1. ***For marine and coastal areas, the scientific criteria for identifying "ecologically or biologically significant areas" (EBSAs), and similar criteria such as the FAO criteria for "vulnerable marine ecosystems"(VMEs) may be relevant.***

2. Scoping

20. Scoping is used to define the focus of the EIA study and to identify key issues which should be studied in more detail. It is used to derive terms of reference (sometimes referred to as guidelines) for the EIA study and to set out the proposed approach and methodology. Scoping also enables the competent authority, national, regional or global, the latter two in the case of EIAs of activities affecting marine areas beyond national jurisdiction) (or EIA professionals in countries where scoping is voluntary) to:

(a) Guide study teams on significant issues and alternatives to be assessed, clarify how they should be examined (methods of prediction and analysis, depth of analysis), and according to which guidelines and criteria. ***In the case of marine biodiversity in areas beyond national jurisdiction, the composition of study teams may be determined by competent international organizations with functional responsibilities for the relevant activities;***

(b) Provide an opportunity for stakeholders to have their interests taken into account in the EIA. ***Relevant stakeholders for marine biodiversity in beyond areas of national jurisdiction will encompass competent international organizations and flag States, as well as the traditional stakeholders (see Box II on Stakeholders). It should be noted that identifying stakeholders in these areas may be particularly difficult;***

(c) Ensure that the resulting EIS is useful to the decision-maker and is understandable to the public. ***In the case of EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction the decision-maker may be a flag state or a competent international organization.***

21. During the scoping phase, promising alternatives can be identified for in-depth consideration during the EIA study.

22. *Consideration of mitigation and/or enhancement measures*: The purpose of mitigation in EIA is to look for ways to achieve the project objectives while avoiding negative impacts or reducing them to

acceptable levels. The purpose of enhancement is to look for ways of optimizing environmental benefits. The chosen methods for mitigation of impacts and enhancement of benefits should ensure that the public or individuals do not bear costs which are greater than the benefits that accrue to them. ***For EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction, the public is the global community. Considerations of equity in distribution of socio-economic benefits and in allocating environmental costs, and building a consensus on the appropriate balance of those costs and benefits in EIAs are challenging for marine and coastal areas, and in particular in marine areas beyond national jurisdiction, both because of the difficulty in identifying relevant stakeholders and because the "environment" of marine areas beyond national jurisdiction may be on a basin-wide or global scale rather than local or national. However, the knowledge that can be gained from an industry operating in an area of limited knowledge can be a benefit that needs to be taken into account, particularly when the scale of the commercial activity can be kept small enough initially that the risk of significant adverse impacts is low to the extent that such information is made freely available, and is unbiased and independently verifiable. Significant knowledge can also be gained through the assessment process itself.***

23. Remedial action can take several forms, i.e., *avoidance* (or prevention), *mitigation* (by considering changes to the scale, design, location, siting, process, sequencing, phasing, management and/or monitoring of the proposed activity, as well as restoration or rehabilitation of sites), and *compensation* (often associated with residual impacts after prevention and mitigation). A 'positive planning approach' should be used, where avoidance has priority and compensation is used as a last-resort measure. It is acknowledged that compensation will not always be possible: there are cases where it is appropriate to reject a development proposal on grounds of irreversible damage to, or irreplaceable loss of, biodiversity. ***For EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction, the threshold values for rejection of a development proposal may need to be stated differently to ensure alignment with the provisions under the United Nations Convention on the Law of the Sea.***

24. Practical evidence with respect to mitigation suggests that:

(a) Timely and ample attention to mitigation and compensation, as well as the interaction with society, will largely reduce the risk of negative publicity, public opposition and delays, including associated costs. Specialist input on biodiversity can take place prior to initiating the legally required EIA process, as a component of the project proposal. This approach improves and streamlines the formal EIA process by identifying and avoiding, preventing or mitigating biodiversity impacts at the earliest possible stage of planning. ***For marine biodiversity in areas beyond national jurisdiction, public awareness of and engagement in dialogue on conservation and sustainable use may be lower than for a comparable activity in terrestrial and coastal areas, although public awareness of ocean biodiversity and conservation is growing;***

(b) Mitigation requires a joint effort by the proponent, planners, engineers, ecologists and other specialists, to arrive at the best practicable environmental option;

(c) Potential mitigation or compensation measures must be included in an impact study in order to assess their feasibility; consequently they are best identified during the scoping stage;

(d) In project planning, it must be kept in mind that it may take time for effects to become apparent. ***For marine and coastal biodiversity, this will be true for both the effects of projects and the effects of mitigation measures. The very long time frames for recovery from many types of perturbations (decades to millennia) will be a significant consideration in mitigation planning for these areas. In addition, in areas beyond national jurisdiction the duty of monitoring and ensuring compliance with the EMP would fall on the flag States. This may entail greater costs and logistical challenges associated with the remote location of the relevant activities.***

25. The following sequence of questions provides an example of the kind of information that should be requested in the terms of reference for an EIA if the project screening suggests that the proposed activity is likely to have adverse impacts on biodiversity. This list of steps represents an iterative process.

Scoping and impact study are two formal rounds of iteration; during the study further iterative rounds may be needed, for example when alternatives to the proposed project design have to be defined and assessed:

(a) Describe the type of project, and define each project activity in terms of its nature, magnitude, location, timing, duration and frequency;

(b) Define possible alternatives, including "no net biodiversity loss" or "biodiversity restoration" alternatives (such alternatives may not be readily identifiable at the outset of an EIA, and one would need to go through the EIA to determine such alternatives). Alternatives include location alternatives, scale alternatives, siting or layout alternatives, and/or technology alternatives. ***Where response times of some ecosystem components to restoration are slower, restoration may be viewed as a less attractive option., In addition, the less complete knowledge on both ecosystem dynamics and often shorter history of and more limited experience with many types of commercial or large-scale research activities in marine areas, in particular in open-ocean waters and deep-sea habitats, mean that there often are fewer technology alternatives that have been developed already (a negative consideration) but the potential to develop new alternatives may be large (a positive consideration); On the other hand, the large spatial scale of many marine ecosystems makes relocation of some types of activities more feasible because there is a wider range of areas from which to choose;***

(c) Describe expected biophysical changes (in water, air, flora, fauna) resulting from proposed activities or induced by any socio-economic changes caused by the activity. ***For EIAs of activities affecting marine and coastal biodiversity, in particular in open-ocean waters and deep-sea habitats, there could be less knowledge of biophysical changes, including the risk of extinction or even of factors which affect risk of extinction and in which ways they affect the risk of extinction than for terrestrial ecosystems. In addition, recovery times from perturbations in those areas are usually at best incompletely known;***

(d) Determine the spatial and temporal scale of influence of each biophysical change, identifying effects on connectivity between ecosystems, and potential cumulative effects. ***These determinations could be more difficult for marine and coastal biodiversity in many areas, particularly in open-ocean waters and deep-sea habitats, than for terrestrial biodiversity because of the size and variability of the temporal and spatial scales involved, the variety and patchiness of the habitats and communities, in the water column, on the seabed and below the seabed, the importance of connectivity between marine ecosystems, and the incomplete and sometimes absence of data on all of these elements;***

(e) Describe ecosystems and water column and seabed-use types lying within the range of influence of biophysical changes. ***For marine biodiversity, knowledge of ecological relationships is more limited than for terrestrial biodiversity. However, there is potential for substantial progress in improving our bio-geographic classifications and mapping of patterns of historical human activities in marine and coastal areas through the EIA process;***

(f) Determine, for each of these ecosystems or water column and seabed-use types, if biophysical changes are likely to have adverse impacts on biodiversity in terms of composition, structure (spatial and temporal), and key processes. Give indication of the level of certainty of predictions, and take into account mitigation measures. Highlight any irreversible impacts and any irreplaceable loss. ***For marine and coastal biodiversity, knowledge of all these factors is likely to be more limited than for terrestrial biodiversity. In open-ocean waters and deep-sea habitats, there is a particular concern about the limited ability to predict indirect adverse impacts;***

(g) For the affected areas, collect available information on baseline conditions and any anticipated trends in biodiversity in the absence of the proposal. ***For most marine areas, particularly open-ocean waters and deep-sea habitats, there is little capability to do this at present. Very few of these areas have been affected so far and few data exist on conditions prevailing prior to human activities that may have already caused undocumented changes. The large spatial scale of many***

species' distributions and their migratory and dispersal patterns are useful factors, however, because information may be extrapolated and integrated over large scales for some ecosystem components;

(h) Identify, in consultation with stakeholders, the current and potential ecosystem services provided by the affected ecosystems or water column and seabed-use types and determine the values these functions represent for society (see box 1). Give an indication of the main beneficiaries and those adversely affected from an ecosystem services perspective, focusing on vulnerable stakeholders. ***This guideline may be challenging to implement for marine biodiversity in areas beyond national jurisdiction because of the difficulties involved in identifying the relevant stakeholders and stakeholder as discussed in guideline 5 (b) above;***

(i) Determine which of these services will be significantly affected by the proposed project, giving confidence levels in predictions, and taking into account mitigation measures. Highlight any irreversible impacts and any irreplaceable losses. ***For marine and coastal biodiversity, and in particular for biodiversity in open-ocean waters and deep-sea habitats, knowledge limitations in relation to ecological systems will make this guideline difficult to implement;***

(j) Define possible measures to avoid, minimize or compensate for significant damage to, or loss of, biodiversity and/or ecosystem services; define possibilities to enhance biodiversity. Make reference to any legal requirements. ***This guideline may also be challenging to implement for marine biodiversity, particularly in areas beyond national jurisdiction, because of the difficulties involved in identifying appropriate compensation for breach of the duty to prevent significant adverse impacts; UNCLOS sets out rules on responsibilities and liability in relation to various activities in the marine environment;***

(k) Evaluate the significance of residual impacts, i.e., in consultation with stakeholders define the importance of expected impacts for the alternatives considered. Relate the importance of expected impacts to a reference situation, which may be the existing situation, a historical situation, a probable future situation (e.g., the 'without project' or 'autonomous development' situation), or an external reference situation. When determining importance (weight), consider geographic importance of each residual impact (e.g., impact of local/regional/national/continental/global importance) and indicate its temporal dimension. ***This guideline may be challenging to implement for marine areas beyond national jurisdiction because of the difficulties involved in identifying the relevant stakeholders and stakeholder fora discussed in guideline 5 (b) above;***

(l) Identify necessary surveys to gather information required to support decision-making. Identify important gaps in knowledge. ***The feasibility of filling gaps quickly to improve the basis for decision-making is often lower in marine and coastal areas compared to terrestrial areas, and particularly so in open-ocean waters and deep-sea habitats for logistical reasons, including the high cost of gathering such information in remote locations and the more restricted availability of national, regional or global resources to perform such tasks. However, it may be possible to make better use of existing information to create models and develop proxies, as well as to commission site-specific studies to ground-truth models, in a timely and cost effective way;***

(m) Provide details on required methodology and time scales.

26. One should bear in mind that not implementing a project may in some cases also have adverse effects on biodiversity. ***In rare cases the adverse effects may be more significant than the impacts of a proposed activity (e.g., projects counteracting degradation processes).***

27. An analysis of current impact assessment practice in terrestrial and coastal areas has provided a number of practical recommendations when addressing biodiversity-related issues. ***To date, only a small proportion of this practice, except for some fishing impact assessments, has related to impacts of human activities in marine areas, but there is an expectation that guidance on EIAs in these areas will evolve as experience is gained;***

(a) Beyond the focus on protected species and protected areas, further attention must be given to (i) sustainable use of ecosystem services; (ii) ecosystem-level diversity; (iii) non-protected biodiversity; and (iv) ecological processes and their spatial scale. ***For marine and coastal areas, the scientific criteria for identifying "ecologically or biologically significant areas" (EBSAs), and similar criteria such as the FAO criteria for "vulnerable marine ecosystems" (VMEs) may be relevant;***

(b) The terms of reference should be unambiguous, specific and compatible with the ecosystem approach; too often, the terms of reference are too general and impractical. ***This could be challenging for EIAs of activities affecting marine biodiversity that involve large spatial and temporal scales. In such cases, it is unlikely that important ecosystem services could be mapped on scales that are relevant to such a precise application of the ecosystem approach. The ecosystem approach is better applied in a more generic way in these areas. The scientific criteria for identifying "ecologically or biologically significant areas" (EBSAs), and similar criteria such as the FAO criteria for "vulnerable marine ecosystems" (VMEs) may be relevant;***

(c) In order to provide a sound basis for assessing the significance of impacts, baseline conditions must be defined and understood and quantified where possible. Baseline conditions are dynamic, implying that present and expected future developments if the proposed project is not implemented (autonomous development) need to be included. ***This may be particularly difficult to apply to EIAs of activities affecting marine biodiversity in open-ocean waters and deep-sea habitats because of the relatively limited knowledge of ecosystems and their relationships, and hence the need to develop a sound basis for assessing what constitutes significant and harmful changes to the marine environment;***

(d) Field surveys, quantitative data, meaningful analyses, and a broad, long-term perspective enabling cause-effect chains to be tracked in time and space are important elements when assessing biodiversity impacts. ***For EIAs of activities affecting marine biodiversity, in particular in open-ocean waters and deep-sea habitats, the knowledge limitations already discussed with regard to ecosystems and their relationships become even more important when there is a requirement to track cause-effect chains in space and time. This may not be possible for some time to come for most ecosystems in these areas. Potential indirect and cumulative impacts need to be better assessed and understood;***

(e) Alternatives and/or mitigation measures must be identified and described in detail, including an analysis of their likely success and realistic potential to offset adverse project impacts. ***For EIAs of activities affecting marine and coastal biodiversity, particularly in open-ocean waters and deep-sea habitats, the implementation of this guideline could be hampered by the knowledge limitations on ecosystems and their relationships;***

(f) Guidance for scoping on biodiversity issues in EIA must be developed at national level, but should, where appropriate, also consider regional aspects, to reduce and preferably prevent transboundary impacts. ***For EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction, scoping of issues at a regional, rather than a national, scale may be the usual starting point. Global guidance will also be relevant to the regional scale of scoping;***

(g) Guidance for determining levels of acceptable change to biodiversity must be developed at national level to facilitate decision-making. ***For EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction, guidance for determining levels for acceptable change could be more difficult to establish. These need to be developed at the global and where applicable at the regional scale. Given the many knowledge limitations with regard to ecosystems and their relationships in marine and coastal areas, making case-by-case evaluations may be challenging;***

(h) Guidance on assessing and evaluating impacts on ecosystem processes, rather than on composition or structure, must be developed at national level. The conservation of ecosystem processes which support composition and structure requires consideration of a substantially larger proportion of the landscape than is required to represent biodiversity composition and structure. ***"Landscape" here would refer to "coastal and marine ecosystems". For marine biodiversity in areas beyond national jurisdiction, the comments in sub-paragraph 27(g) on global, and where applicable regional, rather***

than national levels for guidance may also apply here. Knowledge limitations regarding ecosystem processes and services in marine and coastal areas also apply, so in practice evaluation of impacts will usually be of composition and structure, with any evaluation of impacts on processes only inferred indirectly;

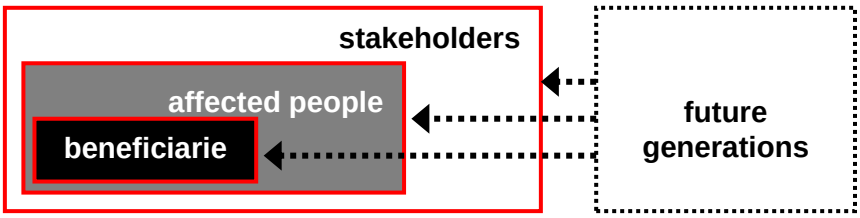
(i) Capacity development is needed to effectively represent biodiversity issues in the scoping stage; this will result in better guidelines for the EIA study. ***Capacity-building needs for EIAs relating to activities in open-ocean waters and deep-sea habitats are likely to be larger than capacity-building needs for coastal waters and habitats. In marine areas beyond national jurisdiction, "customs of practice" for EIA are less well established, methodologies are less mature and multiple assessment cultures may converge in the same area. Nonetheless experience with EIAs is growing with respect to bottom fishing, waste dumping and deep-sea mineral exploration and the effects of fishing on seabirds and other marine animals that may become helpful for future capacity development.***

Box 1: Stakeholders and participation

Impact assessment is concerned with (i) information, (ii) participation, and (iii) transparency of decision-making. Public involvement consequently is a prerequisite for effective EIA and can take place at different levels: informing (one-way flow of information), consulting (two-way flow of information), or "real" participation (shared analysis and assessment). Public participation is relevant in all stages of EIA. The legal requirements for and the level of participation differ among countries and regions, but it is generally accepted that public consultation at the scoping and review stage is essential; participation during the assessment study is generally acknowledged to enhance the quality of the process.

With respect to biodiversity, relevant stakeholders in the process are:

- Beneficiaries of the project - target groups making use of, or putting a value to, known ecosystem services which are purposefully enhanced by the project;
- Affected people – i.e., those people that experience, as a result of the project, intended or unintended changes in ecosystem services that they value;
- General stakeholders – i.e., formal or informal institutions and groups representing either affected people or biodiversity itself.
- Future generations – "absent stakeholders", i.e., those stakeholders from future generations, who may rely on the biodiversity about which decisions are currently taken.



There are a number of potential constraints on effective public participation. These include:

- **Deficient identification** of relevant stakeholders, which may make public involvement ineffective;
- **Poverty**: involvement requires time spent away from income-producing tasks;
- **Illiteracy**: or lack of written command of non-local languages, can inhibit representative involvement if print media are used;
- **Local values/culture**: behavioural norms or cultural practices can inhibit involvement by some groups, who may not feel free to disagree publicly with dominant groups;
- **Languages**: in some areas a number of different languages or dialects may be spoken, making communication difficult;
- **Legal systems**: may be in conflict with traditional systems, and cause confusion about rights to

and responsibilities for resources;

- **Interest groups**: may have conflicting or divergent views, and vested interests;
- **Confidentiality**: can be important for the proponent, who may be against early involvement and consideration of alternatives.

Also refer to decision VII/16 F containing the Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessment regarding Developments Proposed to Take Place on, or which are Likely to Have an Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities.

All these complexities are even more challenging in marine areas beyond national jurisdiction than those within national jurisdiction, due to the different governance structures and the difficulties involved in identifying relevant stakeholders and stakeholder fora. The goals of public participation are just as valid, but achieving them may be more complex.

3. Assessment and evaluation of impacts, and development of alternatives

28. EIA should be an iterative process of assessing impacts, re-designing alternatives and comparison. The main tasks of impact analysis and assessment are:

(a) Refinement of the understanding of the nature of the potential impacts identified during screening and scoping and described in the terms of reference. This includes the identification of indirect and cumulative impacts, and of the likely cause–effect chains;

(b) Identification and description of relevant criteria for decision-making can be an essential element of this stage;

(c) Review and redesign of alternatives; consideration of mitigation and enhancement measures, as well as compensation of residual impacts; planning of impact management; evaluation of impacts; and comparison of the alternatives; and

(d) Reporting of study results in an EIS or EIA report.

29. Assessing impacts usually involves a detailed analysis of their nature, magnitude, extent and duration, and a judgement of their significance, i.e., whether the impacts are acceptable to stakeholders and society as a whole, require mitigation and/or compensation, or are unacceptable.

30. Available biodiversity information is usually limited and descriptive, and cannot be used as a basis for numerical predictions. There is a need to develop biodiversity criteria for impact evaluation and measurable standards or objectives against which the significance of individual impacts can be evaluated. The priorities and targets set in the National Biodiversity Strategy and Action Plan process or a comparable regional process in regional sea organizations or regional fisheries management organizations for marine areas beyond national jurisdiction can provide guidance for developing these criteria. Tools will need to be developed to deal with uncertainty, including criteria on using risk assessment techniques, precautionary approach and adaptive management.

31. A number of practical lessons with respect to the study process have emerged, including that the assessment should:

(a) Allow for enough survey time to take seasonal features into account, where confidence levels in predicting the significance of impacts are low without such surveys. ***For EIAs of activities affecting marine and coastal, in particular in open-ocean waters and deep-sea habitats, multiple surveys may not be feasible logistically or financially, so strategies to make the best use of existing information, to build models and develop proxies, together with a survey, may need to suffice. Incremental and carefully controlled and monitored industry activities may be an alternative in some cases;***

(b) Focus on processes and services, which are critical to human well-being and the integrity of ecosystems. Explain the main risks and opportunities for biodiversity. ***For EIAs of activities affecting***

marine and coastal biodiversity, practical options could focus on EBSA-like properties rather than processes and services;

(c) Apply the ecosystem approach and actively seek information from relevant stakeholders and indigenous and local communities. ***For EIAs of activities affecting marine and coastal biodiversity, in particular in open-ocean waters and deep-sea habitats, often an industry operating in these areas such as fisheries, shipping or deep seabed mining will be more likely to be a source of information than local communities. In addition the ecosystem approach is better applied in a more generic way.*** Address any request from stakeholders for further information and/or investigation adequately. This does not necessarily imply that all requests must be honoured; however, clear reasons should be provided where requests are not honoured;

(d) Consider the full range of factors affecting biodiversity. These include direct drivers of change associated with a proposal (e.g., disturbance, introduction of invasive alien species or genetically modified organisms, etc.) and, to the extent possible, indirect drivers of change, including demographic, economic, socio-political, cultural and technological processes or interventions;

(e) Evaluate impacts of alternatives with reference to the baseline situation. Compare against legal standards, thresholds, targets and/or objectives for biodiversity. Use national biodiversity strategies and action plans and other relevant documents for information and objectives. The vision, objectives and targets for the conservation and sustainable use of biodiversity contained in local plans, policies and strategies, as well as levels of public concern about, dependence on, or interest in, biodiversity provide useful indicators of acceptable change. ***This guideline will be challenging to apply for EIAs of activities affecting marine and coastal biodiversity, particularly in areas beyond national jurisdiction, due to all the previously discussed issues with setting baselines and reference levels for the high seas and seabed area, the lack of biodiversity strategies and action plans for such areas, the differences in the implementation of flag States' obligations, and the array of competent international organizations;***

(f) Take account of cumulative threats and impacts resulting either from repeated impacts of projects of the same or different nature over space and time, and/or from proposed plans, programmes or policies; ***In marine and coastal areas, including in open-ocean waters and deep-sea habitats, it may also be necessary to consider the cumulative effect of environmental changes such as climate change and ocean acidification that may shift the location or timing of key ecological processes and features, as well as impose increased stresses on organisms;***

(g) Recognize that biodiversity is influenced by cultural, social, economic and biophysical factors. Cooperation between different specialists in the team is thus essential, as is the integration of findings which have a bearing on biodiversity. ***This guideline may be challenging to apply in EIAs of activities affecting marine and coastal biodiversity because of limited knowledge of the cultural, economic, and social factors that influence biodiversity in these areas, and the high likelihood that different cultural, social and economic values may have to be reconciled in these EIAs. Better collaboration among competent international organizations would improve implementation of this guideline;***

(h) Provide insight into cause – effect chains. Also explain why certain chains do not need to be studied. ***For EIAs of activities affecting marine and coastal biodiversity, in particular biodiversity of open-ocean waters and deep-sea habitats, the knowledge limitations already discussed with regard to ecosystems and their relationships become even more important when there is a requirement to track cause-effect chains in space and time. This will not be possible for some time to come for most marine ecosystems. Potential indirect and cumulative impacts need to be better assessed and understood;***

(i) If possible, quantify the changes in biodiversity composition, structure and key processes, as well as ecosystem services. Explain the expected consequences of the loss of biodiversity associated with the proposal, including the costs of replacing ecosystem services if they will be adversely affected by a proposal;

(j) Indicate the legal provisions that guide decision-making. List all types of potential impacts identified during screening and scoping and described in the terms of reference and identify

applicable legal provisions. Ensure that potential impacts to which no legal provision applies are taken into account during decision-making.

4. Reporting: the environmental impact statement (EIS)

32. The environmental impacts statement (EIS) consists of: (i) a technical report with annexes, (ii) an environmental management plan, providing detailed information on how measures to avoid, mitigate or compensate expected impacts are to be implemented, managed and monitored, and (iii) a non-technical summary.

33. The EIS is designed to assist:

(a) The proponent to plan, design and implement the proposal in a way that eliminates or minimizes the negative effect on the biophysical and socio-economic environments and maximizes the benefits to all parties in the most cost-effective manner;

(b) The Government or responsible authority to decide whether a proposal should be approved and the terms and conditions that should be applied; and

(c) The public to understand the proposal and its impacts on the community and environment, and provide an opportunity for comments on the proposed action for consideration by decision-makers. Some adverse impacts may be wide-ranging and have effects beyond the limits of particular habitats/ecosystems or across national boundaries. Therefore, environmental management plans and strategies contained in the EIS should consider regional and transboundary impacts, taking into account the ecosystem approach. The inclusion of a non-technical summary of the EIA, understandable to the interested general audience, is strongly recommended.

In an EIS for activities that affect marine and coastal biodiversity, in particular in open-ocean waters and deep-sea habitats, it should be expected that the answers are likely to be less complete and have greater uncertainty, justifying a need for greater caution in decision-making. Given the complexity of governance and decision-making in marine areas beyond national jurisdiction, there could be special challenges in getting all the information to all the stakeholders, getting their comments to the decision-makers, and finding decisions which are credible and acceptable.

5. Review of the environmental impact statement

34. The purpose of the review of the EIS is to ensure that the information for decision-makers is sufficient, focused on the key issues, and is scientifically and technically accurate. In addition, the review should evaluate whether:

(a) The likely impacts would be acceptable from an environmental viewpoint;

(b) The design complies with relevant official standards and policies, or with standards of good practice where official standards do not exist;

Such standards usually do not exist for marine areas beyond national jurisdiction globally, and relevant regional organizations are in very different stages in their development. This will make achieving this desirable standard difficult for some time to come.

(c) All of the relevant impacts, including indirect and cumulative impacts, of a proposed activity have been identified and adequately addressed in the EIA. To this end, biodiversity specialists should be called upon for the review and information on official standards and/or standards for good practice to be compiled and disseminated.

35. Public involvement, including the full and effective participation of indigenous and local communities, is important in various stages of the process and particularly at this stage. The concerns and comments of all stakeholders are adequately considered and included in the final report presented to decision makers. The process promotes a better understanding of relevant issues and concerns. ***For EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction, identification of the "stakeholders" and appropriate stakeholder fora is particularly difficult, because there are no universal standards to support this process. There is also a lack of consensus regarding whether there***

are "indigenous and local communities" using marine areas beyond national jurisdiction. Box 2 in the draft guidance on biodiversity-inclusive Strategic Environmental Assessment in marine and coastal areas may provide some assistance.

36. Review should also guarantee that the information provided in the EIS is sufficient for a decision-maker to determine whether the project complies with or contradicts the objectives of the Convention on Biological Diversity. ***For marine and coastal areas, including areas beyond national jurisdiction, the provisions of the United Nations Convention on the Law of the Sea (UNCLOS) and other relevant instruments also apply. This is a desirable goal for EIAs of activities affecting marine biodiversity, including biodiversity in open-ocean waters and deep-sea habitats, but it could be implemented with greater uncertainty due to the knowledge limitations with regard to ecosystems in these areas.***

37. The effectiveness of the review process depends on the quality of the terms of reference defining the issues to be included in the study. Scoping and review are therefore complementary stages.

38. Reviewers should as far as possible be independent and different from the persons/organizations who prepare the EIS. ***The international context of EIAs of activities affecting marine biodiversity in areas beyond national jurisdiction means that more thought should be given to what "independent" means for this purpose; reviewers could be drawn from a range of competent international organizations and scientific institutions.***

6. Decision-making

39. Decision-making takes place throughout the process of EIA in an incremental way, from the screening and scoping stages to decisions during data-collecting and analysis, to impact prediction, to making choices between alternatives and mitigation measures, and finally the decision to either refuse or authorize the project.

40. Biodiversity issues should play a part in decision-making throughout. The final decision is essentially a political choice about whether or not the proposal is to proceed, and under what conditions. If rejected, the project can be redesigned and resubmitted. It is desirable that the proponent and the decision-making body are two different and independent entities.

41. It is important that there are clear criteria for taking biodiversity into account in decision-making, and to guide trade-offs between social, economic and environmental issues, including biodiversity. These criteria draw on principles, objectives, targets and standards for biodiversity and ecosystem services contained in international and national, regional and local laws, policies, plans and strategies. ***For marine and coastal areas, the scientific criteria for identifying "ecologically or biologically significant areas" (EBSAs), and similar criteria such as the FAO criteria for "vulnerable marine ecosystems" (VMEs) may be a useful reference. Significant additional efforts may be required to develop a framework for a more complete consideration of ecosystem services.***

42. The precautionary approach should be applied in decision-making in cases of scientific uncertainty when there is a risk of significant harm to biodiversity. Higher risks and/or greater potential harm to biodiversity require greater reliability and certainty of information. The reverse implies that the precautionary approach should not be pursued to the extreme; in the case of minimal risk, a greater level of uncertainty can be accepted. Guidelines for applying the precautionary principle to biodiversity conservation and natural resource management have been developed under the Precautionary Principle Project, a joint initiative of Fauna & Flora International, IUCN, Resource Africa and TRAFFIC, and are available in English, French and Spanish at: http://www.pprinciple.net/. ***The need for precaution will be even more important in decisions on activities affecting marine biodiversity in areas beyond national jurisdiction. Some organizations, the work of which is relevant to marine biodiversity in areas beyond national jurisdiction, also have guidelines for application of precaution (e.g., the FAO Technical Guidelines for Responsible Fisheries – Precautionary Approach to Capture Fisheries and Species Introduction), and these are relevant in the application of this guideline.***

43. Instead of weighing conservation goals against development goals, the decision should seek to strike a balance between conservation and sustainable use for economically viable, and socially and ecologically sustainable solutions.

7. Monitoring, compliance, enforcement and environmental auditing

44. EIA does not stop with the production of a report and a decision on the proposed project. Activities that must make sure the recommendations from EIS or EMP are implemented are commonly grouped under the heading of "EIA follow-up". They may include activities related to monitoring, compliance, enforcement and environmental auditing. Roles and responsibilities with respect to these vary and depend on regulatory frameworks in place.

45. Monitoring and auditing are used to compare the actual outcomes after project implementation has started with those anticipated before implementation. They also serve to verify that the proponent is compliant with the environmental management plan (EMP). The EMP can be a separate document, but is considered part of the EIS. An EMP usually is required to obtain a permission to implement the project. In some countries an EMP is not a legal requirement.

46. Management plans, programmes and systems, including clear management targets, responsibilities and appropriate monitoring, should be established to ensure that mitigation is effectively implemented, unforeseen negative effects or trends are detected and addressed, and expected benefits (or positive developments) are achieved as the project proceeds. Sound baseline information and/or pre-implementation monitoring are essential to provide a reliable benchmark against which changes caused by the project can be measured. Provision should be made for emergency response measures and/or contingency plans where unforeseen events or accidents could threaten biodiversity. The EMP should define responsibilities, budgets and any necessary training for monitoring and impact management, and describe how results will be reported and to whom. ***For some marine and coastal areas, pre-implementation monitoring may not be feasible or cost-effective for many activities. Again, models, proxies and remote sensing may help to lower costs. This makes effects-monitoring, contingency planning, and regular evaluation of monitoring results of even greater importance in open-ocean waters and deep-sea habitats, both in the water column and on the seabed, particularly if linked to a very gradual up-scaling of the activity being assessed.***

47. Monitoring focuses on those components of biodiversity most likely to change as a result of the project. The use of indicator organisms or ecosystems that are most sensitive to the predicted impacts is thus appropriate, to provide the earliest possible indication of undesirable change. Since monitoring often has to consider natural fluxes as well as anthropogenic effects, complementary indicators may be appropriate in monitoring. Indicators should be specific, measurable, achievable, relevant and timely. Where possible, the choice of indicators should be aligned with existing indicator processes. ***Monitoring in itself is likely to be technically difficult and costly on the large scales of ecosystems in many marine areas, particularly in open-ocean waters and deep-sea habitats. However, the incremental development of activities by industries may offer opportunities for cost-effective monitoring and may stimulate the use of new technologies.***

48. The results of monitoring provide information for periodic review and alteration of EMPs, and for optimizing environmental protection through good, adaptive management at all stages of the project. Biodiversity data generated by EIA should be made accessible and useable by others and should be linked to biodiversity assessment processes being designed and carried out at the national and global levels49.

Provision is made for regular auditing in order to verify the proponent's compliance with the EMP, and to assess the need for adaptation of the EMP (usually including the proponent's license). An environmental audit is an independent examination and assessment of a project's (past) performance. It is part of the evaluation of the EMP and contributes to the enforcement of EIA approval decisions.

50. Implementation of activities described in the EMP and formally regulated in the proponent's environmental license depends in practice on the enforcement of formal procedures. It is commonly found that a lack of enforcement leads to reduced compliance and inadequate implementation of EMPs.

Competent authorities are responsible for enforcing pertinent impact assessment regulations when formal regulations are in place.

Appendix 1

INDICATIVE SET OF SCREENING CRITERIA TO BE FURTHER ELABORATED AT NATIONAL LEVEL [3]

Category A: Environmental impact assessment mandatory for:

- Activities in protected areas (define type and level of protection); ***This should include sectoral conservation areas (e.g. fisheries closed areas, particularly sensitive sea areas (PSSAs), areas of particular environmental interest (APEI), etc.)***
- Activities in threatened ecosystems outside protected areas; ***This should include ecologically or biologically significant marine areas (EBSAs) and vulnerable marine ecosystems (VMEs)***
- Activities in ecological corridors identified as being important for ecological or evolutionary processes;
- Activities in areas known to provide important ecosystem services;
- Activities in areas known to be habitat for threatened species; ***In the marine context there should be reference to communities characteristic of vulnerable marine ecosystems***
- Extractive activities or activities leading to a change of land-use occupying or directly influencing an area of at minimum a certain threshold size (land or water, above or underground - threshold to be defined); ***In the marine context there should be reference to change of water column or seabed-characteristics***
- Creation of linear infrastructure that leads to fragmentation of habitats over a minimum length (threshold to be defined);
- Activities resulting in emissions, effluents, and/or other means of chemical, radiation, thermal or noise emissions in areas providing key ecosystem services (areas to be defined);[4] ***In the marine context these should include ecologically or biologically significant marine areas (EBSAs).***
- Activities leading to changes in ecosystem composition, ecosystem structure or key processes [5] responsible for the maintenance of ecosystems and ecosystem services in areas providing key ecosystem services (areas to be defined).

Category B: The need for, or the level of environmental impact assessment is to be determined for:

- Activities resulting in emissions, effluents and/or other chemical, thermal, radiation or noise emissions in areas providing other relevant ecosystem services (areas to be defined);
- Activities leading to changes in ecosystem composition, ecosystem structure, or ecosystem functions responsible for the maintenance of ecosystems and ecosystem services in areas providing other relevant ecosystem services (areas to be defined);
- Extractive activities, activities leading to a change of land-use or a change of use of inland water ecosystems or a change of use of marine and coastal ecosystems, and creation of linear infrastructure below the Category A threshold, in areas providing key and other relevant ecosystem services (areas to be defined). ***In the marine context there should be reference to change of water column or seabed-characteristics***

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[3] *Note*: These criteria only pertain to biodiversity and should therefore be applied as an add-on to existing screening criteria.

[4] For a non-exhaustive list of ecosystem services, see appendix 2 below.

[5] For examples of these aspects of biodiversity, see appendix 2 below.

Appendix 2

INDICATIVE LIST OF ECOSYSTEM SERVICE

Regulating services responsible for maintaining natural processes and dynamics

Biodiversity-related regulating services

- maintenance of genetic, species and ecosystem composition
- maintenance of ecosystem structure
- maintenance of key ecosystem processes for creating or maintaining biodiversity

Land-based regulating services

- decomposition of organic material
- natural desalinization of soils
- development / prevention of acid sulphate soils
- biological control mechanisms
- pollination of crops
- seasonal cleansing of soils
- soil water storage capacity
- coastal protection against floods
- coastal stabilization (against accretion / erosion)
- soil protection
- suitability for human settlement
- suitability for leisure and tourism activities
- suitability for nature conservation
- suitability for infrastructure

In the marine context reference should be made to seabed-based regulating services

- ***concentration of organic material***
- ***maintenance of (natural) pH levels and geochemical gradients in sediments and the water column***
- ***carbon sequestration***
- ***storage of pollutants***
- ***production and maintenance of soft substrata and its grain size (sediments, includes mud, oozes) and maintenance of hard substrata for settlement, growth, reproduction and dispersal of organisms***
- ***maintenance of structural complexity***
- ***cleansing of sediments and hard substrata***
- ***sediment mixing and oxygenation (bioturbation)***
- ***substrate protection and stabilization***
- ***formation of non-fuel mineral resources (e.g., ferro-manganese crusts and nodules, polymetallic sulphides)***
- ***regulating methane and carbon dioxide formation and release***

Water related regulating services

- water filtering
- dilution of pollutants
- discharge of pollutants
- flushing / cleansing
- bio-chemical/physical purification of water
- storage of pollutants
- flow regulation for flood control
- river base flow regulation
- water storage capacity
- ground water recharge capacity

- regulation of water balance
- sedimentation / retention capacity
- protection against water erosion
- protection against wave action
- prevention of saline groundwater intrusion
- prevention of saline surface-water intrusion
- transmission of diseases
- suitability for navigation
- suitability for leisure and tourism activities
- suitability for nature conservation

Additional regulating services in the marine context include:
- ***oxygen production***
- ***climate regulation***
- ***uptake of carbon dioxide***
- ***regulation of seawater chemical balance (salinity, pH, oxygen concentration, nutrients)***
- ***transfer of organic and inorganic carbon, nutrients and pollutants, both down the water column (biological pump) and up (mixing, upwelling, daily vertical movement of organisms in deep scattering layer)***
- ***filtering***
- ***concentration of pollutants***
- ***carbon sequestration***

Air-related regulating services

- filtering of air
- carry off by air to other areas
- photo-chemical air processing (smog)
- wind breaks
- transmission of diseases
- carbon sequestration

Provisioning services: harvestable goods
Natural production:
- timber
- firewood
- grasses (construction and artisanal use)
- fodder & manure
- harvestable peat
- secondary (minor) products
- harvestable bush meat
- fish and shellfish
- drinking water supply
- supply of water for irrigation and industry
- water supply for hydroelectricity
- supply of surface water for other landscapes
- supply of groundwater for other landscapes
- genetic material

Additional provisioning services in the marine context include:
- ***marine living resources***
- ***marine non-living resources***
- ***genetic and biochemical material***

Nature-based human production

- crop productivity
- tree plantations productivity
- managed forest productivity
- rangeland/livestock productivity
- aquaculture productivity (freshwater)
- mariculture productivity (brackish/saltwater)

Additional nature-based human production in the marine context includes:
- ***drinking water supply***
- ***bio-energy production from algae***

Cultural services providing a source of artistic, aesthetic, spiritual, religious, recreational or scientific enrichment, or nonmaterial benefits.

Additional cultural services in the marine context include:
- ***marine scientific research***
- ***ocean monitoring infrastructures***

Supporting services necessary for the production of all other ecosystem services
- soil formation,
- nutrients cycling
- primary production.
- evolutionary processes

Additional supporting services in the marine context include:
- ***sediment formation***
- ***chemosynthetic primary production***
- ***photosynthetic primary production***
- ***oxygen production***

Appendix 3

ASPECTS OF BIODIVERSITY: COMPOSITION, STRUCTURE AND KEY PROCESSES

Composition	**Influenced by:**
Minimal viable population of: (a) legally protected varieties/cultivars/breeds of cultivated plants and/or domesticated animals and their relatives, genes or genomes of social, scientific and economic importance; (b) legally protected species; (c) migratory birds, migratory fish, species protected by CITES; (d) non-legally protected, but threatened species (cf. IUCN Red List of Threatened Species); species which are important in local livelihoods and cultures.	- selective removal of one or a few species by fisheries, forestry, hunting, collecting of plants (including living botanical and zoological resources); - fragmentation of their habitats leading to reproductive isolation; - introducing living modified organisms that may transfer transgenes to varieties / cultivars / breeds of cultivated plants and/or domesticated animals and their relatives; - disturbance or pollution; - habitat alteration or reduction; - introduction of (non-endemic) predators, competitors or parasites of protected species.
Structure	**Influenced by:**
Changes in spatial or temporal structure, at the scale of relevant areas, such as: (a) legally protected areas; (b) areas providing important ecosystem services, such as (i) maintaining high diversity (hot spots), large numbers of endemic or threatened species, required by migratory species; (ii) services of social, economic, cultural or scientific importance; (iii) or supporting services associated with key evolutionary or other biological processes.	Effects of human activities that work on a similar (or larger) scale as the area under consideration. For example, by emissions into the area, diversion of surface water that flows through the area, extraction of groundwater in a shared aquifer, disturbance by noise or lights, pollution through air, etc. ***Examples include bottom trawling, seabed mining and geoengineering on the scale of the relevant area***.
Food web structure and interactions: Species or groups of species perform certain roles in the food web (functional groups); changes in species composition may not necessarily lead to changes in the food web as long as roles are taken over by other species.	All influences mentioned with *composition* may lead to changes in the food web, but only when an entire role (or functional group) is affected. Specialized ecological knowledge is required.
Presence of keystone species: Keystone species often singularly represent a given functional type (or role) in the food web.	All influences mentioned with composition that work directly on keystone species. This is a relatively new, but rapidly developing field of ecological knowledge. Examples are: - sea otters and kelp forest - elephants and African savannah - starfish in intertidal zones - salmon in temperate rainforest - tiger shark in some marine ecosystems - beaver in some freshwater habitats - black-tailed prairie dogs and prairie ***In the marine context the effect on the status of keystone species needs to be considered over the scale of the area of concern. Specialized ecological knowledge is required.***

Key processes (selected examples only)	**Influenced by:**
Sedimentation patterns (sediment transport, sedimentation, and accretion) in intertidal systems (mangroves, mudflats, seagrass beds) ***Also: continental slopes and submarine canyons***	Reduced sediment supply by damming of rivers; interruption of littoral drift by seaward structures
Plant-animal dependency for pollination, seed dispersal, nutrient cycling in tropical rainforests	Selective removal of species by logging, collecting or hunting
Soil surface stability and soil processes in montane forests	Imprudent logging leads to increased erosion and loss of top soil
Nutrient cycling by invertebrates and fungi in deciduous forests	Soil and groundwater acidity by use of agrochemicals.
Plant available moisture in non-forested, steeply sloping mountains	Overgrazing and soil compaction lead to reduced available soil moisture
Grazing by herbivorous mammals in savannahs	Cattle ranching practises
Succession after fire, and dependence on fire for completion of life-cycles in savannahs	Exclusion of fire leads to loss of species diversity
Available nutrients and sunlight penetration in freshwater lakes	In-flow of fertilizers and activities leading to increased turbidity of water (dredging, emissions)
Hydrological regime in floodplains, flooded forests and tidal wetlands	Changes in river hydrology or tidal rhythm by hydraulic infrastructure or water diversions
Permanently waterlogged conditions in peat swamps and acid-sulphate soils	Drainage leads to destruction of vegetation (and peat formation process), oxidization of peat layers and subsequent soil subsidence; acid sulphate soils rapidly degrade when oxidized
Evaporation surplus in saline / alkaline lakes	Outfall of drainage water into these lakes changes the water balance
Tidal prism and salt/freshwater balance in estuaries	Infrastructure creating blockages to tidal influence; changes in river hydrology change the salt balance in estuaries.
Hydrological processes like vertical convection, currents and drifts, and the transverse circulation in coastal seas	Coastal infrastructure, dredging.
Population dynamics	Reduction in habitat leads to dramatic drop in population size, leading to extinction

Part II

DRAFT GUIDANCE ON BIODIVERSITY-INCLUSIVE STRATEGIC ENVIRONMENTAL ASSESSMENT IN MARINE AND COASTAL AREAS

Note: Guidance on biodiversity-inclusive strategic environmental assessment was endorsed in decision VIII/28. This note provides annotations to that guidance, specific to marine and coastal biodiversity. The original guidance is reproduced in plain text with annotations highlighted in italics, bold font.

1. Strategic environmental assessment (SEA) is now widely applied, and an increasing number of countries have integrated, or are in the process of integrating, SEA into their national procedures for environmental assessment. This guidance is intended to assist in better incorporating biodiversity during this process. The target audience of this document consequently are those involved in the process of establishing SEA systems. These typically are national authorities, but can also include regional authorities or international agencies. ***The guidance was endorsed by decision VIII/28. These annotations provide additional considerations specifically for marine and coastal areas including marine areas beyond national jurisdiction, in line with decision X/29 (paragraph 50). This guidance, as annotated, should be used in a manner consistent with the United Nations Convention on the Law of the Sea, in keeping with article 22(2) of the Convention on Biological Diversity, while paying due regard to the ongoing work and future outcomes of other processes relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction undertaken under the auspices of the United Nations General Assembly. The target audience for transboundary SEAs and SEAs related to marine and coastal areas, including marine areas beyond national jurisdiction, includes competent international organizations with functional responsibility for the policy, plan or programme involved.***

2. The generic nature of this guidance requires further elaboration of its practical application to reflect the ecological, social-economic, cultural and institutional conditions for which the SEA system is designed. The focus of the guidance is on how to guarantee a biodiversity-inclusive SEA process. The guidance does not intend to provide a technical manual for practitioners on how to carry out a biodiversity-inclusive assessment study.

3. This guidance is not structured according to a given procedure, because good practice SEA should be fully integrated into a planning (or policy development) process. Since planning processes differ widely, there is no typical sequence of procedural steps in SEA. Moreover, there is no general agreement on what a typical SEA procedure might be. It is intended to provide guidance on how to integrate biodiversity issues into the SEA, which in turn should be integrated into a planning process. To assist the overall ideal of SEA integration and given the variation in planning processes between countries, the SEA is not described as a separate process, but as an integral component of the applicable planning process.

4. Situations in which SEA is applied and the scope of the assessments, all vary as well. The SEA process therefore must be structured to reflect the specific situation. SEA is not a mere expansion of an EIA and it does not usually follow the same stages as an EIA. A conceptual approach and language are therefore used.

5. The guidance is fully consistent with the Ecosystem Approach (decision V/6 and VII/11). It focuses on people-nature interactions and the role of stakeholders in identifying and valuing potential impacts on biodiversity. To identify stakeholders and value biodiversity; the concept of ecosystem services as elaborated by the Millennium Ecosystem Assessment (MA) provides a useful tool. It translates biodiversity into (present and future) values for society. It provides a mechanism to 'translate' the language of biodiversity specialists into language commonly understood by decision-makers. The guidance is consistent with the MA's conceptual framework and terminology.

6. The guidance intends to facilitate the ability to contribute to Goal 7 of the Millennium Development Goals, i.e., to '*ensure environmental sustainability*', and its target 9 to '*integrate the*

principles of sustainable development into country policies and programs and reverse the loss of environmental resources'.

A. Strategic environmental assessment applies a multitude of tools

7. Strategic environmental assessment has been defined as 'the formalized, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision-making on a par with economic and social considerations'. Since this original definition was established, the field of SEA has rapidly developed and expanded, and the number of definitions of SEA has multiplied accordingly. SEA, by its nature, covers a wider range of activities or a wider area and often over a longer time span than the EIA of projects. SEA might be applied to an entire sector (such as a national policy on energy, for example) or to a geographical area (for example, in the context of a regional development scheme). SEA does not replace or reduce the need for project-level EIA (although in some cases it can), but it can help to streamline and focus the incorporation of environmental concerns (including biodiversity) into the decision-making process, often making project-level EIA a more effective process. SEA is nowadays commonly understood as being proactive and sustainability-driven, whilst EIA is often described as being largely reactive.

1. Strategic environmental assessment vs. integrated assessment

8. SEA is a rapidly evolving field with numerous definitions and interpretation in theory, in regulations, and in practice. SEA is required by legislation in many countries and carried out informally in others. Certain approaches use some or all of the principles of SEA without using the term SEA to describe them. However, practices in SEA and related approaches show an emerging continuous spectrum of interpretation and application. At one end of the continuum, the focus is mainly on the biophysical environment. It is characterized by the goal of mainstreaming and up-streaming environmental considerations into strategic decision-making at the earliest stages of planning processes to ensure they are fully included and appropriately addressed. The 2001 SEA Directive of the European Union and SEA Protocol to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991) are examples of this approach. At the other end of the spectrum is an approach which addresses the three pillars of sustainability and aims to assess environmental, social and economic concerns in an integrated manner. Depending on the needs of SEA users and the different legal requirements, SEA can be applied in different ways along this spectrum using a variety of methodologies.

9. Accordingly, SEA is referred to as "a family of tools that identifies and addresses the environmental consequences and stakeholder concerns in the development of policies, plans, programmes and other high level initiatives". In more specific terms, the Netherlands Commission for Environmental Impact Assessment describes SEA as a tool to:

(a) Structure the public and government debate in the preparation of policies, plans and programmes;

(b) Feed this debate through a robust assessment of the environmental consequences and their interrelationships with social and economic aspects;

(c) Ensure that the results of assessment and debate are taken into account during decision-making and implementation.

10. This means that *stakeholder involvement, transparency* and *good quality information* are key principles. SEA is thus more than the preparation of a report; it is a tool to enhance good governance. SEA can be a formal procedure laid down by law (e.g., the SEA Directive of the European Union) or used flexibly/opportunistically.

2. Parallel to or integrated within a planning process?

11. SEA is designed in accordance with the national, regional or global context and the characteristics of the planning processes in which SEA is applied. Traditionally, SEA is often applied as a stand-alone process parallel to planning, intended to support the decision-making at the end of the

planning process. More recently, SEA has been further developed into its most effective form: integrated into the planning process, bringing stakeholders together during key stages of the planning process and feeding their debate with reliable environmental information. In some cases, where planning procedures are weak or absent; SEA may structure or effectively represent the planning process.

12. Ideally, SEA starts as early as possible in and is integrated throughout the development process of a specific legislation, policy, plan or programme. However, even when decisions have already been taken, SEA can play a meaningful role in monitoring implementation - for example, to decide on necessary mitigating actions or to feed into future reviews of decisions. SEA may even take on the form of a sectoral assessment used to set the agenda for future policies and plans.

13. There is no typical sequence of procedural steps to define an SEA process. By definition, SEA is situation-specific.

3. Steps in the SEA process

14. SEA aims at better strategies, ranging from legislation and country-wide development policies to sectoral and spatial plans. In spite of the wide variation in application and definitions, all good practice SEAs comply with a number of performance criteria and with common procedural principles. When a decision on the need for an SEA has been taken, "good practice SEA" can be characterized by the following phases:

(a) *Phase 1*: Create transparency:

(i) Announce the start of the SEA and ensure that relevant stakeholders are aware that the process is starting;

(ii) Bring stakeholders together and facilitate development of a shared vision on (environmental) problems, objectives, and alternative actions to achieve these;

(iii) Examine, in cooperation with all relevant agencies, whether the objectives of the new policy or plan are in line with those in existing policies, including environmental objectives (consistency analysis).

(b) *Phase 2*: Technical assessment:

(i) Elaborate terms of reference for the technical assessment, based on the results of stakeholder consultation and consistency analysis;

(ii) Carry out the actual assessment, document its results and make these accessible;

(iii) Organize an effective quality assurance system of both SEA information and process.

(c) *Phase 3*: Use information in decision-making:

(i) Bring stakeholders together to discuss results and make recommendations to decision-makers.

(ii) Make sure any final decision is motivated in writing in light of the assessment results.

(d) *Phase 4*: Post-decision monitoring and evaluation:

(i) Monitor the implementation of the adopted policy or plan, and discuss the need for follow-up action. ***OSPAR Quality Status reports which are prepared every ten years are an example of this.***

15. SEA is flexible, i.e., the scope and level of detail of the above steps can differ depending on time and resources available: from rapid (2-3 months) to comprehensive (1-2 years). The extent of documentation is also highly variable – in some SEAs, particularly where decision-makers are involved throughout, the process is of paramount importance, whilst in others reporting assumes greater importance.

B. Why give special attention to biodiversity in SEA and decision-making?

16. Important reasons to pay attention to the effective incorporation of biodiversity in environmental assessment are summarized below:

(a) *Legal obligations.* A reason to pay particular attention to biodiversity in SEA is the existence of a legal national, regional or international obligation to do so. A number of legal obligations can be distinguished:

(i) *Protected areas and protected species*: ecosystems, habitats and species can have a form of legal protection, ranging from strictly protected to restrictions on certain activities.

(ii) *Valued ecosystem services* can be subject to some form of legal regulation triggering the need for environment assessment. ***Examples are fisheries activities and coastal protection (by dunes or forested wetlands). Additional examples of valued ecosystem services are listed in Appendix 2 of the EIA Guidelines and include maintenance of ecosystem structure, processes and composition, carbon sequestration, substrate stabilization, oxygen production, fisheries and other living marine resource provisioning, genetic and biochemical material;***

(iii) Lands and waters traditionally occupied or used by indigenous and local communities represent a special case of ecosystem services;

(iv) International treaties, conventions and agreements such as the World Heritage Convention, Ramsar Convention, the UNESCO Man and Biosphere Programme or Regional Seas agreements. By becoming a Party to these agreements, countries agree to certain obligations to manage these areas according to internationally agreed principles. ***Additional treaties relevant to the marine context include the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the 1995 UN Fish Stocks Agreement, the 1996 London Protocol and regional conventions.***

(b) *Facilitation of stakeholder identification*. The concept of biodiversity-derived ecosystem services provides a useful tool to identify potentially affected groups of people. Ecosystems are multi-functional and provide multiple services. By applying the ecosystem approach and focusing on ecosystem services in describing biodiversity, directly and indirectly affected stakeholders can be identified and, as appropriate, invited to participate in the SEA process;

(c) *Safeguarding livelihoods*. The identification of stakeholders through recognition of ecosystem services can lead to a better understanding of how the livelihoods of people who depend on biodiversity will be affected. In many countries, especially in developing countries, a large proportion of rural society is directly dependent on biodiversity. As these groups may also belong to the poorer and less educated strata of society, they may go unnoticed if efforts are not made to enable them to participate meaningfully in an SEA process;

(d) *Sound economic decision-making*. Ecosystem services, such as fisheries and genetic resource potential, can be valued in monetary terms, thus providing a figure on potential economic benefits and/or losses caused by the implementation of planned activities;

(e) *Cumulative effects on biodiversity* are best anticipated at a strategic level. By applying the principles of the ecosystem approach the cumulative effects of activities on those ecosystem services which support human well-being can be addressed. At the same time, it is appropriate to define levels of acceptable change or desired levels of environmental quality at the strategic (ecosystem or catchment) level;

(f) *Maintaining ecologically or biologically significant areas as defined by the CBD scientific criteria in annex I to decision IX/20.* The conservation of biological diversity and ecosystem function is critically dependant on the maintenance of ecologically or biologically significant areas. Thus

it is important to include potential impacts on areas already identified by States and competent intergovernmental organizations as ecologically or biologically significant, or areas that are likely to sustain ecologically or biologically important processes;

(g) *Maintaining the genetic base of evolution for future opportunities*. The conservation of biodiversity for future generations is one important aspect of sustainability. It seeks to maintain options for the wealth of as yet unknown potential uses of biodiversity. Moreover, maintaining the capacity of biodiversity to adapt to changing environments (e.g., climate change) and to continue providing viable living space for people is critical to human survival. Any long-term sustainability assessment has to make provisions for safeguarding that capacity. In the ocean, new efforts are underway to value ecosystem services such as carbon storage, heat storage, nutrient recycling, and future values as reservoirs of genetic resources amongst other ecosystem services. These should be incorporated even if a monetary value cannot as yet be provided. Appendix 2 of the draft voluntary guidelines for considering biodiversity in EIA in marine and coastal areas provides further details;

(h) *Benefiting society*. By promoting/facilitating sustainable solutions to development needs, SEA is benefiting society as a whole.

Box1. Ecosystem services in their regulatory context

SEA provides information on policies, plans and programmes for decision-makers, including their consistency with the regulatory context. It is important to realize that ecosystem services often have formal recognition by some form of legal protection. Legislation often has a geographical basis (e.g., protected areas) but this is not necessarily always the case (e.g., species protection is not always limited to demarcated areas). The legal context in any country, region, or area beyond national jurisdiction is different and is treated as such.

Some examples of ecosystem services linked to formal regulations:

Ecosystem service: *preservation* of biodiversity:

- Nationally protected areas/habitats, protected species;
- International status: Ramsar Convention, UNESCO Man and Biosphere, World Heritage Sites
- Subject to national policies such as the U.K. Biodiversity Action Plans (BAP), or regional regulations such as the European Natura 2000 Network.
- Marine Environmental High Risk Areas (sensitive areas prone to oil pollution from shipping)·
- Sites identified and designated under international agreements, e.g., OSPAR Marine Protected Areas
- Sites hosting species listed under the Convention on the Conservation of Migratory Species of Wild Animals or the Convention on International Trade in Endangered Species of Wild Flora and Fauna
- Sites hosting species listed under the Bern Convention (Annex 1 and 2 of the Convention on the Conservation of European Wildlife and Natural Habitats, 1979)
- Sites containing "vulnerable marine ecosystems" identified by States, RFMOs and FAO in the context of deep sea bottom fishing on the high seas pursuant to UNGA resolutions

Ecosystem service: provision of livelihood to people:

- Extractive reserves (marine, aquaculture)
- Areas of indigenous interest
- Tourist-oriented (underwater) parks (service: maintaining biodiversity to enhance tourism)

Ecosystem service: preservation of human cultural history / religious sites:

- Sacred waters
- Underwater archaeological sites

Other ecosystem services, *formally* recognized in some countries:

- Coastal defences (dunes, mangroves) (service: protecting coastal hinterlands).

Box 2. Stakeholders and participation

Impact assessment is concerned with: (i) information, (ii) participation and (iii) transparency in decision-making. Public involvement consequently is a prerequisite for effective impact assessment and can take place at different levels: informing (one-way flow of information), consulting (two-way flow of information), or "real" participation (shared analysis and assessment). In all stages of the process public participation is relevant. The legal requirements for and the level of participation differ among countries and regions, but it is generally accepted that at a minimum public consultation at the scoping and review stage is required; participation during the assessment study is generally acknowledged to enhance the quality of the process. With respect to biodiversity, three groupings of stakeholders can be distinguished. (N.B: note that the categories represent three levels, each higher level encompassing the earlier category):

- **Beneficiaries** of the policy, plan or programme - target groups such as particular industries making use of or putting a value to known ecosystem services which are purposefully enhanced by the policy, plan or programme;
- **Affected (groups of) people** – i.e., those people that experience, as a result of the policy, plan or programme, intended or unintended changes in ecosystem services that they value;
- **General stakeholders:**
  - National or local government institutions having a *formal government responsibility* with respect to the management of defined areas or the management of ecosystem services (fisheries, coastal defence, etc.);
  - Formal and informal institutions *representing affected people* (trade unions, consumer organizations, civil rights movements, *ad hoc* citizens' committees, etc.);
  - Indigenous and local communities representing traditional user groups most clearly associated with artisanal or small-scale use of marine resources
  - Formal and informal institutions *representing (the intrinsic value of) biodiversity* itself (nongovernmental nature conservation organizations, scientific panels etc.).
  - Scientists and scientific institutions representing the interests of the scientific community that may be affected (negatively or positively) (e.g. impacts on research on a particular topic or area, impact on regions yet unstudied or on long term study or monitoring sites)
  - The *general audience* that wants to be informed on new developments in their direct or indirect environment (linked to transparency of democratic processes).
  - Stakeholders from *future generations*, who may rely on the biodiversity about which decisions are currently taken. Formal and informal organizations are increasingly aware of their responsibility to consider the interests of these '*absent stakeholders'*.

In general, it can be observed that the role of institutionalized stakeholders becomes more important at higher strategic levels of assessment; at lower level the actual beneficiaries and affected people will become more important.

There are a number of potential constraints on effective public participation. These include:

- *Poverty*: involvement means time spent away from income-producing tasks;
- *Rural settings*: increased distances make communication more difficult and expensive;
- *Illiteracy*: or lack of written command of non-local languages, can inhibit representative involvement if print media are used;
- *Local values/culture*: behavioural norms or cultural practice can inhibit involvement by some groups, who may not feel free to disagree publicly with dominant groups (e.g., women *versus* men);
- *Languages*: in some areas a number of different languages or dialects may be spoken, making communication difficult;
- *Legal systems*: may be in conflict with traditional systems, and cause confusion about rights to and responsibilities for resources;

- *Interest groups*: may have conflicting or divergent views, and vested interests;
- *Confidentiality*: can be important for the proponent, who may be against early involvement and consideration of alternatives.

C. What biodiversity issues are relevant to SEA?

1. Biodiversity in SEA – different perspectives

17. The spectrum of SEA ranges from those with a focus on the biophysical environment to broadly sustainability-oriented SEA focussed on the social, economic and biophysical environments resulting in different perspectives on biodiversity in SEA. Although the Convention text is very clear on how biodiversity should be interpreted, day-to-day practice shows widely different applications. Some prominent differences are discussed below:

18. *Biodiversity conservation as nature conservation*. SEA traditionally focuses on the biophysical environment. Other instruments are used to represent the economic and social interests of stakeholders. Biodiversity therefore tends to be considered from a nature conservation perspective in which protection, rather than sustainable or equitable use of biodiversity, is highlighted. In this manner nature conservation becomes segregated from, and may potentially end up in conflict with, economic and social development.

19. The problem with the sectoral approach in conventional impact assessment is that responsibility for biodiversity is divided between a number of sectoral organizations. For example, the exploitation of fisheries resources and aquaculture all relate to (sustainable) use of biodiversity, but regulations and policies are defined by different entities that do not refer to their activities as sustainable use of biodiversity.

20. *Biodiversity for social and economic well-being*. In recent years, environmental assessment practices have been adopted in most developing countries. In these countries the biophysical environment, including biodiversity, is not only considered from a nature conservation perspective, but as the provider of livelihoods. Especially in rural areas the main objective of development is the social and economic improvement of the situation of poor communities. Both social/economic and biophysical environments are seen as complementary and consequently an integrated assessment approach has been developed in many of these countries. Biodiversity conservation and sustainable use are equally important issues in SEA; in societies characterized by unequal distribution of wealth, decision-makers must address the equitable sharing of benefits derived from biodiversity, including those derived from the utilization of genetic resources. Such integrated approaches reflect a broad perspective on biodiversity in accordance with the Convention and the Millennium Development Goals.

21. *Merging perspectives*. Both the integrated and sectorally divided approaches are converging as it is being realized that the environment, including its biodiversity components, provides goods and services that cannot be assigned to a sector (biodiversity provides multiple goods and services simultaneously) or a geographically defined area (goods and services are not limited to protected areas only). At the same time it is generally recognized that certain parts of the world are of such importance for the conservation of biodiversity, that these areas should be safeguarded for the future and require strict protective measures.

22. *Time and space*. From a biodiversity perspective, spatial and temporal scales are of particular importance. In conventional SEA, the planning horizon is often linked to economic planning mechanisms with short, politically influenced planning horizons. Assessing the impacts on biodiversity generally requires a biophysically relevant - i.e., much longer time horizon. Biophysical processes such as genetic erosion and evolutionary processes, effects of climatic changes and sea level rise, operate on far longer time scales and are rarely taken into account in conventional SEAs. A longer time horizon - of at least several decades - is required to address the fundamental processes regulating the world's biological diversity.

23. Similarly, flows of energy, water and nutrients link the world's ecosystems. Effects in an area under assessment may have much wider biodiversity repercussions. The most visible example is the linkage of ecosystems on a global scale by migratory species; biodiversity considerations may

consequently require a geographical focus that exceeds the area for which an SEA is carried out. This is especially true in the context of the deep and open ocean where scales and connectivities are frequently regional or global in nature.

24. *Opportunities and constraints* versus *cause-effect chains*. Biodiversity underpins ecosystem services on which human well-being relies. Biodiversity thus represents a range of opportunities for, and constraints on, sustainable development. Recognition of these opportunities and constraints as the point of departure for informing the development of policies, plans and programmes at a strategic level enhances opportunities to achieve optimal outcomes for sustainable development. The question at SEA level therefore is: "how does the environment affect or determine development opportunities and constraints?" This approach contrasts with the largely reactive approach adopted in project EIA, where the key question being asked is "what will the effect of this project be on the environment?"

25. Two broad approaches can be used in SEA: the reactive cause-effect chain approach where the intervention is known and the cause-effect chain are fairly clear (comparable to EIA), and the 'bottom up' opportunities and constraints of the natural environment approach where the environment effectively shapes the policy, programme or plan.

2. Biodiversity in this guidance

26. The most important features of the way biodiversity is interpreted in this guidance are summarized below:

(a) In SEA, biodiversity can best be defined in terms of the *ecosystem services* provided by biodiversity. These services represent ecological or scientific, social (including cultural) and economic values for society and can be linked to stakeholders. Stakeholders can represent biodiversity interests and can consequently be involved in an SEA process. Maintenance of biodiversity (or nature conservation) is an important ecosystem service for present and future generations, but biodiversity provides many other ecosystem services;

(b) *Direct drivers of change* are human interventions (activities) resulting in biophysical and social effects with known impacts on biodiversity and associated ecosystem services (see box 3. below);

(c) *Indirect drivers of change* are societal changes, which may under certain conditions influence direct drivers of change, ultimately leading to impacts on ecosystem services (see box 4. below);

(d) *Aspects of biodiversity*: To determine potential impacts on ecosystem services, whether the ecosystems providing these services are significantly affected by the policies, plans or programmes under study must be assessed. Impacts can best be assessed in terms of changes in composition (what is there), changes in structure (how is it organized in time and space), or changes in key processes (what physical, biological or human processes govern creation and/or maintenance of ecosystems);

(e) Three levels of biodiversity are distinguished: genetic, species, and ecosystem diversity. In general, the ecosystem level is the most suitable level to address biodiversity in SEA. However, situations exist where the other levels must be addressed.

3. Biodiversity "triggers" for SEA

27. To be able to determine whether a policy, plan or programme has potential biodiversity impacts, two elements are of overriding importance: (i) the affected area and ecosystem services linked to it, and (ii) the types of planned activities that can act as drivers of change in ecosystem services.

28. When any or a combination of the conditions below apply to a policy, plan or programme, the SEA of this policy, plan or programme requires special attention to biodiversity.

(a) *Important ecosystem services*. When an area affected by a policy, plan or programme is known to provide one or more important ecosystem services, these services and their stakeholders should be taken into account in an SEA. Biogeographical delineation of an area provides an essential context for obtaining biodiversity information; this requires identifying the ecosystems and water column and seabed-

use practices in the area, and the ecosystem services provided by these ecosystems or land-use types. For each ecosystem service, stakeholder(s) can be identified who are then invited to participate in the SEA process;

(b) *Interventions acting as direct drivers of change*. If a proposed intervention is known to produce or contribute to one or more drivers of change with known impact on ecosystem services, special attention must be given to biodiversity. If the intervention area of the policy, plan or programme has not yet been biogeographically defined (e.g., in the case of a sector policy), the SEA can only define biodiversity impacts in conditional terms: impacts are expected to occur if the policy, plan or programme affects certain types of ecosystems providing important ecosystem services. If the intervention area is known, it is possible to link drivers of change to ecosystem services and its stakeholders;

(c) *Interventions acting as indirect drivers of change*. When a policy, plan or programme leads to activities acting as indirect driver of change (e.g., for a trade policy, a poverty reduction strategy, or a tax measure), it becomes more complex to identify potential impacts on ecosystem services. In broad terms, biodiversity attention is needed in SEA when the policy, plan or programme is expected to substantially affect the way in which a society:

(i) Consumes products derived from living organisms, or products that depend on ecosystem services for their production;
(ii) Occupies areas of water; or
(iii) Exploits its natural resources and ecosystem services.

Box 3. Direct drivers of change[6] *are human interventions (activities) resulting in biophysical and social/economic effects with known impacts on biodiversity and associated ecosystem services.*

Biophysical changes known to act as a potential driver of change comprise:

- *Extraction of living organisms* is usually selective, because only few species are of - human-defined, usually economic - value, and leads to changes in species composition of ecosystems, potentially upsetting the entire system. Fisheries are a common example.
- *Extraction of minerals, ore and water* can disturb the area where such extractions take place, often with cumulative effects.
- *Wastes (emissions, effluents, solid waste), or other chemical, thermal, radiation or noise inputs*: human activities can result in liquid, solid or gaseous wastes affecting water or air quality. Point sources and diffuse emissions have a wide area of impact as the pollutants are carried away by wind or water. The range of potential impacts on biodiversity is very broad.
- *Disturbance of ecosystem composition, structure or key processes*: Appendix 2 of the EIA guidelines contains an overview of how human activities can affect these aspects of biodiversity.

Some social changes can also be considered to be direct drivers of change, as they are known to lead to one of the above-mentioned biophysical changes (non-exhaustive):

- *Population changes* both permanent and temporary may lead to pollution and disturbance, harvest of living organisms, and introduction of alien species through means such as ballast water discharge (especially in relatively undisturbed areas).

Box 4. Indirect drivers of change[7] *are societal changes, which may under certain conditions influence direct drivers of change, ultimately leading to impacts on ecosystem services*

[6] ***Appendix 1 provides further elaboration of a list of direct and indirect drivers of biophysical changes and non-biophysical changes in marine and coastal areas, including marine areas beyond national jurisdiction.***

The performance of ecosystem services is influenced by drivers of change. In the Millennium Ecosystem Assessment (MA) conceptual framework, a "driver" is any factor that changes an aspect of an ecosystem. A direct driver unequivocally influences ecosystem processes and can therefore be identified and measured to differing degrees of accuracy. In the case of activities that have no obvious biophysical consequences, it becomes more complex to define impacts on ecosystem services. The MA conceptual framework provides a structured way of addressing such situations. Activities without direct biophysical consequences exert their influence through indirect drivers of change. These operate more diffusely, often by altering one or more direct drivers, and its/their influence is established by understanding its effect on a direct driver.

Indirect drivers of change can be:

- *Demographic*: e.g., population size and rate of change over time (birth and death rates), age and gender structure, household distribution by size and composition, migration pattern, level of educational attainment;
- *Economic* (macro): e.g., global economic growth and its distribution by country;
- *Socio-political*: e.g., democratization and participation in decision-making, decentralization, conflict resolution mechanisms, privatization;
- *Scientific and technological processes*: e.g., rates of investment in Research & Development, rate of adoption of new technologies, changes in productivity and extractive capabilities, access to and dissemination of information;
- *Cultural and religious values*: values, beliefs and norms influence behaviour with regard to the environment.

Actors can have influence on some drivers (endogenous driver), but others may be beyond the control of a particular actor or decision-maker (exogenous drivers).

[7] ***Appendix 1 provides further elaboration of a list of direct and indirect drivers of biophysical changes and non-biophysical changes in marine and coastal areas, including marine areas beyond national jurisdiction.***

D. How to address biodiversity in SEA

The assessment framework

29. Figure 1 depicts the conceptual framework used in these guidelines. It integrates the MA conceptual framework with a more detailed integrated impact assessment framework, describing pathways of activities to impacts. It positions the biodiversity triggers, i.e. (1) affected ecosystem services, and activities producing direct (2) or indirect (3) drivers of change in ecosystem services.
Activities resulting from a policy, plan or programme lead to biophysical changes and/or social/economic changes. Social/economic changes influence human well-being directly, but some of these changes may in turn also lead to biophysical changes (for example immigration of people leads to occupation of land). Within their spatial and temporal range of influence, biophysical changes may influence the composition or structure of ecosystems, or influence key processes maintaining these ecosystems. Activities resulting in these types of biophysical changes are referred to as direct drivers of change. The ecosystem services may be adversely affected, as will in turn be groups in society who depend on these services for their well-being. People may respond to changes in the value of ecosystem services and act accordingly, thus leading to new social/economic changes. Good participatory scoping and application of the best available scientific and local knowledge results in the identification of most relevant impacts and associated cause-effect chains that need further study in the SEA.

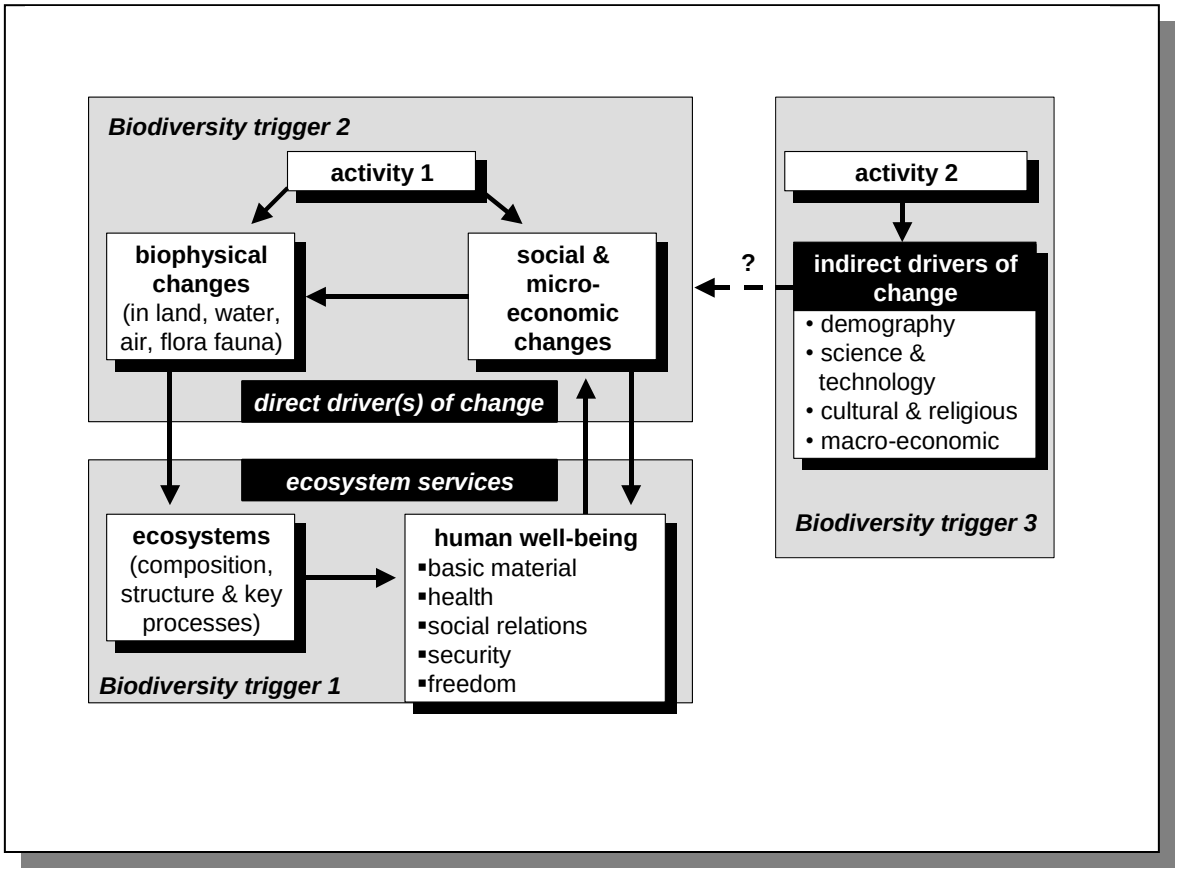

Figure 1. Assessment framework (explanation in main text)

30. Identifying impacts on ecosystem services resulting from indirect drivers of change is a more challenging task as the links between indirect and direct drivers of change have not yet been fully established.

Identifying potential biodiversity impacts through biodiversity triggers

31. *Trigger 1*: The area influenced by the policy, plan or programme provides important ecosystem services:

(a) *Focus*: Area-oriented policies, plans or programmes without precisely defined activities. Biodiversity can be described in terms of ecosystem services providing goods and services for the development and/or well-being of people and society. The maintenance of biodiversity (for future generations or because biodiversity is considered to have an intrinsic value) is often emphasized as a special ecosystem service, described in terms of conservation status of ecosystem, habitats and species, possibly supported by legal protection mechanisms;

(b) *This trigger is often associated with* the 'bottom up' opportunities and constraints of the natural environment approach, as may be used in marine spatial planning where interventions are potentially wide-ranging and the objective is to develop suitable water column and seabed uses in line with the natural conditions;

(c) *Summary of procedure*:

(i) Identify ecosystems and water column and seabed-use types in the area to which the policy, plan or programme applies. Identify and map ecosystem services provided by these ecosystems or water column and seabed-use types;

(ii) Identify which groups in society have a stake in each ecosystem service; invite such stakeholders to participate in the SEA process. Identification and valuation of ecosystem services is an iterative process initiated by experts (ecologists, natural resources specialists), but with stakeholders playing an equally important role. The frequency of reliance on ecosystem goods or services should not necessarily be used as an indication or measure of their value, because ecosystem services on which local communities rely even on an occasional basis can be critical to the resilience and survival of these communities during surprise or extreme natural conditions;

(iii) For absent stakeholders (future generations), identify important protected and non-protected biodiversity which is representative of species, habitats and/or key ecological and evolutionary processes (for example by applying systematic conservation planning or similar approaches);

(iv) Ecosystem services identified by experts but without actual stakeholders may represent an unexploited opportunity for social, economic or ecological development. Similarly, ecosystem services with conflicting stakeholders may indicate overexploitation of this service, representing a problem that needs to be addressed.

32. *Trigger 2*: The policy, plan or programme is concerned with interventions producing direct drivers of change:

(a) *Focus*: As explained above, interventions resulting from a policy, plan or programme can directly, or through socio-economic changes, lead to biophysical changes that affect ecosystems and services provided by these ecosystems. Impacts on ecosystem services can only be defined as potential impacts, since the location of the intervention or the area where its influence is noticed may not be known;

(b) *This trigger is often associated with* policies, plans or programmes without defined geographical areas of intervention, such as sectoral policies, or policies, plans or programmes producing social/economic drivers of change which cannot be geographically demarcated;

(c) *Summary of procedure*:

(i) Identify drivers of change, i.e., activities leading to biophysical changes known to affect biodiversity (e.g. bottom trawling, seabed mining);

(ii) Within the administrative boundaries (province, state, country) to which the policy, plan or programme applies, identify ecosystems sensitive to the expected biophysical changes. Within these administrative boundaries sensitive ecosystems can be identified. The SEA must develop a mechanism to avoid, mitigate or compensate potential negative impacts on these ecosystems, including the identification of less damaging alternatives.

33. *Triggers 1 and 2 combined*: The policy, plan or programme concerns activities producing direct drivers of change in an area with important ecosystem services:

(a) *Focus*: Knowledge of the nature of interventions and the area of influence allows relatively detailed assessment of potential impacts by defining changes in composition or structure of ecosystems, or changes in key processes maintaining ecosystems and associated ecosystem services;

(b) *This combination of triggers is often associated with* SEAs carried out for programmes (resembling complex, large-scale EIAs). Examples are detailed spatial plans, programme-level location and routing alternatives or technology alternatives;

(c) *Summary of procedure*: The procedure is a combination of the procedures for trigger 1 and 2, but the combination allows for greater detail in defining expected impacts:

(i) Identify direct drivers of change and define their spatial and temporal range of influence;

(ii) Identify ecosystems lying within this range of influence (in some cases species or genetic level information may be needed);

(iii) Describe effects of identified drivers of change on identified ecosystems in terms of changes in composition or structure of biodiversity, or changes in key processes responsible for the creation or maintenance of biodiversity;

(iv) If a driver of change significantly affects either composition, or structure, or a key process, there is a very high probability that ecosystem services provided by the ecosystem will be substantially affected;

(v) Identify stakeholders of these ecosystem services and invite them to participate in the process. Take into account the absent (future) stakeholders.

36. *Trigger 3*: The policy, plan or programme is concerned with interventions affecting indirect drivers of change. ***More research and case materials are needed to elaborate this biodiversity trigger for marine and coastal areas, including marine areas beyond national jurisdiction.***

Appendix 1 provides further elaboration of a list of direct and indirect drivers of biophysical changes and non-biophysical changes in marine and coastal areas, including marine areas beyond national jurisdiction.

Figure 2 provides a summary overview of the way in which potential biodiversity impacts of a policy, plan or programme can be identified. It starts with the identification of potential biodiversity triggers in the policy, plan or programme to be analysed, including: (i) an area with valued ecosystem services; (ii) activities affecting direct drivers of change; (iii) activities affecting indirect drivers of change; or a combination of (i) and (ii) where activities with known drivers of change influence a known area with valued ecosystem services. If one of these triggers is present in the policy, plan or programme, the flow chart shows the type of information that can and should be obtained in the SEA process. The link between indirect and direct drivers of change is characterized by complex interactions, many of which are presently subject to intense research efforts worldwide.

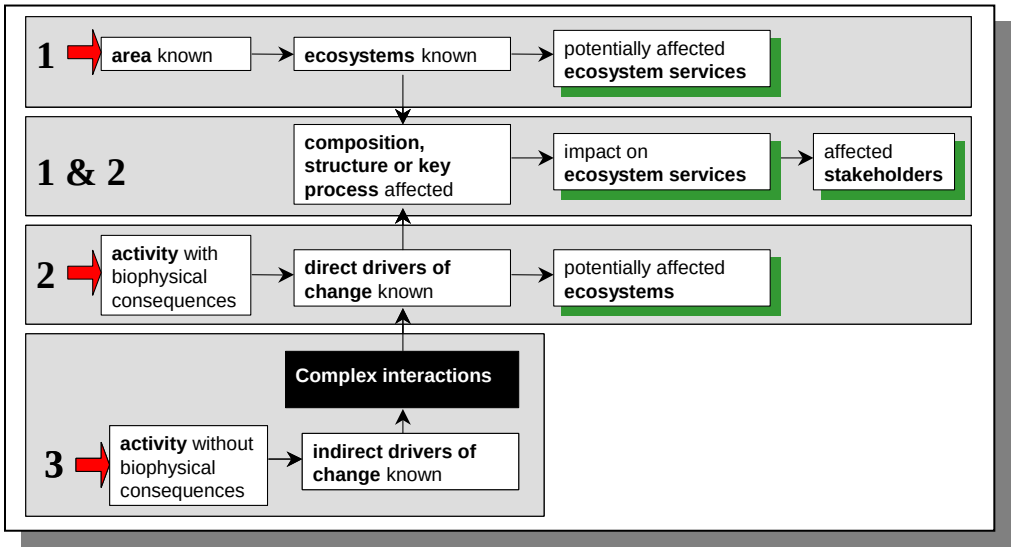

Figure 2. Summary overview of procedure to define biodiversity impacts starting with one or a combination of biodiversity triggers.

Appendix 1

Direct and indirect drivers of biophysical changes and non-biophysical changes for the purpose of applying SEA in marine and coastal areas

The following drivers may affect marine ecosystems and their components directly (e.g., increasing mortality, habitat loss or increasing pollution) or indirectly (e.g., habitat fragmentation, introduction of alien species, diseases, etc).

Commercial activities

- ***Trade/shipping patterns***
- ***Fisheries***
- ***Extraction of non-living resources***
- ***Bioprospecting***
- ***Climate change mitigation and adaptation***
- ***Infrastructure, e.g., seabed cables and pipelines***
- ***Waste disposal***

Social-economic patterns and trends

- ***Consumption patterns (e.g., coral jewellery; eco-labelled fish)***
- ***Popular perceptions of charismatic vs. non-charismatic species (cetaceans vs. sea cucumbers) and ecosystems (coldwater reefs vs. abyssal muddy plains)***
- ***Economic demands causing pressure to increase exploitation of resources***
- ***Climate-change-driven resource exploitation***

Scientific and technological changes

- ***Technological improvements, e.g., improved navigation, changes to fishing gear***
- ***Improved mapping and visualization capabilities (e.g. autonomous underwater vehicles)***
- ***Precision sampling and experimental testing of hypotheses (e.g. remotely operated vehicles)***
- ***Research on ecosystems beyond areas of national jurisdiction and dissemination (or not) of results and effects on the availability of and accessibility to the new resources identified by the research***
- ***Collection of information on activities in the ocean (e.g. observers on fishery vessels, long term cabled environmental observatories)***
- ***Geoengineering***

Governance and management system drivers

- ***National regulations and international instruments***
- ***Marine spatial planning within national jurisdiction can have effects in marine areas beyond national jurisdiction***
- ***Management of resources within and beyond national jurisdiction (e.g. straddling stocks, genetic resources)***
