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Item 5.3 of the provisional agenda*

REPORT OF THE EXPERT GROUP MEETING ON OUTCOME- ORIENTED TARGETS FOR THE PROGRAMMES OF WORK ON THE BIOLOGICAL DIVERSITY OF INLAND WATER ECOSYSTEMS AND MARINE AND COASTAL ECOSYSTEMS

INTRODUCTION

1. The purpose of the meeting of the Expert Group was to assist the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) in setting scientifically and technically sound targets for the programmes of work on the biological diversity of inland water ecosystems and marine and coastal biological diversity (as part of a process responding to decision VI/26).

2. In decision VII/30, paragraph 12 (c), the Conference of the Parties requested that the integration of outcome-oriented targets into the programmes of work proceed according to the framework identified and the approach adopted in the annexes to that decision, identifying more precise targets, including, as appropriate, quantitative elements. Therefore, the targets should adhere as close as possible to those developed as part of the overall framework. Appropriate quantitative elements should be introduced where feasible. The proliferation of targets for the programmes of work should be avoided, and the selected targets should be challenging but realistic. Annex I to the current document summarizes guidance from the Conference of the Parties on how to apply the targets to the work programmes.

3. In developing the targets, consideration should be given to other conventions and processes that have developed or may develop outcome-oriented targets. Such processes include*, inter alia*, the Plan of Implementation of the World Summit on Sustainable Development and the outputs of the World Parks Congress. Particular note is made of the Ramsar Convention, which is the lead partner for the programme of work on the biological diversity of inland water ecosystems (and coastal wetlands). It is anticipated that the Ramsar Convention may set much more detailed targets which might function as "sub-targets" under the targets of the Convention on Biological Diversity.

4. The Expert Group considered and refined the draft proposals for outcome-oriented targets for the programmes of work on inland water ecosystems and marine and coastal biodiversity (UNEP/CBD/EG-OOTs/1/2 and 3, respectively).

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ITEM 1. OPENING OF THE MEETING

5. The Expert Group met from Monday, 25 to Wednesday, 27 October 2004. A list of participants is contained in annex IV below.

6. The Executive Secretary of the Convention on Biological Diversity opened the meeting at 9.30 a.m. on Monday, 25 October 2004. He welcomed and thanked the participants for attending, gave an overview of the background to the meeting, briefly described the expected outputs and thanked the Governments of the United Kingdom of Great Britain and Northern Ireland and the Netherlands for sponsoring the meeting.

7. The Expert Group members and observers then introduced themselves.

ITEM 2. ORGANIZATIONAL MATTERS

2.1. Election of Co-Chairs

8. The Expert Group elected as its Co-Chairs for the plenary session Mr. Richard Denis Robarts (UNEP/GEMS Water Programme) and Ms. Nyawira Muthiga (Kenya) who also served as Chairs for the working groups on inland waters and marine and coastal ecosystems respectively.

2.2. Adoption of the agenda

9. The Expert Group adopted the following agenda on the basis of the provisional agenda (UNEP/CBD/EG-OOTs/1/1):

1. Opening of the meeting.
2. Organizational matters:
    - 2.1. Election of officers;
    - 2.2. Adoption of the agenda;
    - 2.3. Organization of work.
3. Outcome-oriented targets for the programmes of work on the biological diversity of inland water ecosystems and marine and coastal biological diversity:
    - 3.1. Refinement of the proposals for the integration of outcome oriented targets into the programmes of work on: Inland water biological diversity; and Marine and coastal biological diversity;
    - 3.2. Identification of more precise targets, including as appropriate, quantitative elements for the programmes of work on: Inland water biological diversity; and Marine and coastal biological diversity.
4. Other matters.
5. Adoption of the report.
6. Closure of the meeting.

2.3. Organization of work

10. The Expert Group endorsed the proposed organization of work for the meeting annexed to the annotated provisional agenda (UNEP/CBD/EG-OOTs/1/1/Add.1).

11. The Group started its work in plenary, and then broke into two working groups: one considering targets for the programme of work on the biological diversity of inland water ecosystems and the other considering targets for the programme of work on marine and coastal biodiversity. The two groups

reconvened in plenary at periodic intervals to compare progress. The outputs from each working group were endorsed by the Expert Group working in plenary.

ITEM 3. OUTCOME-ORIENTED TARGETS FOR THE PROGRAMMES OF WORK ON THE BIOLOGICAL DIVERSITY OF INLAND WATERS AND MARINE AND COASTAL ECOSYSTEMS

12. Agenda item 3 was the main substantive item of the agenda. To initiate discussion, a representative of the Executive Secretary of the Convention on Biological Diversity reviewed the objectives of the Expert Group Meeting, the background and relevant Convention processes and decisions, as well as the expected outputs of the Meeting. The presentation was followed by discussion related to the overall mandate of the Expert Group.

13. Agenda item 3 contained two sub-items, each of which was considered for the specific cases of inland waters and marine and coastal biodiversity. Each sub-item was introduced by the Secretariat. Following this introduction, the Expert Group broke into two working groups in order to discuss the issues raised.

3.1. Refinement of the proposals for integration of outcome-oriented targets into the programmes of work on (a) inland water biological diversity; and (b) marine and coastal biological diversity

14. Under this agenda item, each working group discussed in general the draft proposals for outcome-oriented targets for the programmes of work on inland water ecosystems (UNEP/CBD/EG-OOTs/1/2) and marine and coastal biodiversity (UNEP/CBD/EG-OOTs/1/3). In particular, the working groups considered whether the draft proposals address all priority issues and whether the targets included are the best possible adaptations of the overall targets adopted by the Conference of the Parties in decision VII/30. The working groups considered the adequacy of the rationales for each target, and whether the proposed targets are measurable. The working groups amended the draft working documents, while adhering to the guidance given by the Conference of the Parties. The outcome of this process is contained in annex II (for outcome-oriented targets for the biological diversity of inland water ecosystems) and annex III (for the outcome-oriented targets for the biological diversity of marine and coastal ecosystems). The group invited the Secretariat to finalize these proposals, based upon the advice provided and through follow-up discussions as necessary, for the consideration of SBSTTA.

3.2. Identification of more precise targets, including as appropriate, quantitative elements for the programmes of work on: (a) inland water biological diversity; and (b) marine and coastal biological diversity

15. Under this agenda item, each working group was invited to discuss the quantitative elements of the specific targets for the programmes of work on inland water and marine and coastal biodiversity. The groups also developed rationale for the quantitative elements selected, and to finalize the draft working documents for adoption under item 5.

16. Final revisions to both documents were undertaken in plenary.

17. The outputs of the meeting were based upon revisions of the documents on the integration of outcome-oriented targets into the programme of work on biological diversity of inland water ecosystems (UNEP/CBD/EG-OOTs/1/2) and the integration of outcome-oriented targets into the programme of work on marine and coastal biological diversity (UNEP/CBD/EG-OOTs/1/3). The recommended revised draft outcome-oriented targets are reported in annexes II and III for inland waters and marine and coastal systems respectively.

18. The goals and targets listed in annexes II and III below are based upon those for the implementation of the Strategic Plan of the Convention as detailed in annex II to decision VII/30. Those

targets are quoted *verbatim* "overall targets", which are then applied to the programmes of work and only where necessary re-worded to make them more appropriate to these contexts.

ITEM 4. OTHER MATTERS

19. Under this item, participants were invited to raise other matters related to the subject matter of the meeting. The Executive Secretary was requested, where appropriate, to consider relevant observations and draft recommendations to SBSTTA at its tenth meeting taking into account related processes and the advice, if necessary, of the SBSTTA Bureau.

20. The two programmes of work overlap significantly, particularly in coastal areas. For example, "inland" and "coastal" ecosystems overlap where the lower sections of rivers enter the coastal zone (estuaries). Many inland water bodies (those on the landward side of the coastline) are located near the sea, often separated by only a few meters, and are often regarded as being "coastal". Inland water ecosystems are a major natural factor influencing the nature of coastal ecosystems (and *vice versa* for estuaries). Importantly, many of the influences upon, and threats to, coastal ecosystems arise through downstream impacts transmitted via rivers. This is especially the case for land-based sources of pollution entering coastal areas. Many migratory species (particularly diadromous fishes) depend upon both inland and marine or coastal environments, further enhancing the interdependency of these.

21. The Expert Group noted that the development and application of common or overlapping targets for the two programmes of work provides, *inter alia,* a very useful tool for strengthening attention to such linkages between the various ecosystems and helps to promote ecosystem based approaches.

22. For the purposes of definition, identification and classification of inland water ecosystems, and relevant coastal ecosystem types, the Conference of the Parties, at its seventh meeting recognized in decision VII/4, paragraph 27, that the Ramsar Classification of Wetland Types should be applied as an interim classification system. The Ramsar definition of "wetland" encompasses all inland water ecosystem types, including man-made ecosystems (for example, it includes river channels, lakes, reservoirs, estuaries and underground waters as wetlands) and coastal/marine water bodies to a depth of 6 meters below the low-water (tide) mark.

23. Where mentioned, quantitative targets refer to those thought to be ambitious but achievable by the year 2010, as a contribution to the 2010 biodiversity target. They are not meant to imply that these are the ultimate desired states.

24. The Expert Group noted with appreciation the progress made on indicators by the Scientific and Technical Review Panel of the Ramsar Convention, and suggested that the Scientific and Technical Review Panel of the Ramsar Convention be invited, for areas within its mandate and in line with the role of the Ramsar Convention established by decision III/21 as the lead implementation partner on wetlands for the Convention on Biological Diversity, to further develop the targets in the annexes to this report, as appropriate, through *inter alia,* their quantification and application to specific wetland types and biogeographic regions, and to link those targets with the indicators currently being developed.

25. The Group considered that, in order to support the adoption of targets by the Ramsar Convention, and therefore to strengthen the work of its Scientific and Technical Review Panel (STRP) on targets and indicators, the Conference of the Parties to the Convention on Biological Diversity should consider inviting the Conference of the Parties to the Ramsar Convention, for areas within its mandate and in line with the role of the Ramsar Convention established by decision III/21 as the lead implementation partner on wetlands for the Convention on Biological Diversity, to contribute to the implementation of the targets, to monitoring progress towards them, and to develop the targets further for specific application to wetlands.

26. For similar reasons, the Conference of the Parties to the Convention on Biological Diversity should consider inviting the regional seas conventions and action plans to take note of the outcome-oriented targets for the programme of work on marine and coastal biological diversity, and to

contribute to the implementation of these targets on the regional level as appropriate, and to monitoring progress towards them.

27. The drivers of threats to inland and coastal waters arise mainly externally and cannot be addressed solely within the context of the programmes of work on the biological diversity of inland water ecosystems and marine and coastal biodiversity. The Convention on Biological Diversity might consider strengthening the wording of decision VII/4 paragraph 11, requesting cross-referencing between the Programme of Work on the biological diversity of inland water ecosystems and other Work Programmes, by requesting that relevant targets for the Programmes of Work on the biological diversity of inland water ecosystems and marine and coastal ecosystems are fully taken into account and addressed in the development and application of outcome-oriented targets for other programmes of work, including those on forests, dry and sub-humid lands, mountains and, especially agricultural biodiversity. The most pressing need is to maintain or improve the quality and quantity of water in inland water ecosystems, which would also help mitigate the downstream impacts upon coastal areas of land-based pollution and unsustainable water use. The requirement is that the sectors fully take on board their responsibilities to contribute to the maintenance of the capacity of inland water and coastal and marine ecosystems to deliver their services and support human well-being.

28. The inland water and coastal and marine outcome-oriented targets should be incorporated as an appendix to the respective programmes of work adopted by decisions VII/4 and VII/5, and to ensure that they are fully linked with, and cross-referenced to, the objectives and activities of these programmes of work.

29. There is potential ambiguity with some terminology used in the overall targets. This causes difficulties in interpreting how they can be applied to the programmes of work. For example, problems were encountered by the working groups with the terms “ecoregion”, “protection” and “sustainable management”. Whilst definitions may exist for each, they remain problematic when applied in practice. These issues should be clarified early in the process of assessing progress towards the 2010 target. There is a need to harmonize interpretations between work programmes. Therefore consideration should be given to producing a “glossary” of terms to assist the process of application of targets and the development of indicators.

30. Goal 11 refers to capacity-building, but its two overall targets refer only to financial aspects and technology transfer. Consideration might be given to developing an additional target relating to developing internal capacity in developing countries. This should bear in mind existing activities in this regard under the Strategic Plan of the Convention.

31. A potential indicator for target 4.3 exists with the data for species listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The ongoing work on the development of indicators might make clearer reference to this source of information.

ITEM 5. ADOPTION OF THE REPORT

32. The Expert Group adopted its report, including annexes, on the basis of a draft presented by the Co-Chairs.

ITEM 6. CLOSURE OF THE MEETING

33. The meeting was closed at 1 p.m. on Wednesday, 27 October 2004.

Annex I

GENERAL APPROACHES FOR THE INTEGRATION OF TARGETS INTO THE PROGRAMMES OF WORK OF THE CONVENTION

The following steps would be carried out: for each thematic programme of work, and for other programmes of work, as appropriate:

(a) *Vision, mission and outcome-oriented targets*:

(i) Identification of the overall vision (or long-term goal) to be ultimately achieved for the biome/issue covered by the programme of work, consistent with the Purpose of the Strategic Plan;

(ii) Identification of a 2010 outcome-oriented global target specific to the scope of the programme of work and consistent with the mission of the Strategic Plan;

(iii) Identification of a limited number of outcome-oriented targets related to the status and trends of biodiversity and its components, threats to biodiversity, and goods and services provided by biodiversity and ecosystems within the scope of the programme of work. Where appropriate, quantitative sub-targets should be established. The targets should be assigned to a number of goals according to the proposed headings in annex I of decision VII/30. Where possible the sub-targets of annex 2 of decision VII/30 should be incorporated into the work programmes without modification to avoid unnecessary proliferation of targets. Where appropriate, identification of targets could draw upon the approach used to develop the Global Strategy for Plant Conservation. However, this process does not imply that all targets in annex I and II of decision VII/30 and the Global Strategy for Plant Conservation should be applied to every programme of work. Rather, targets may highlight broad strategic issues and/or particularly urgent priority issues, and each target should be associated with one or more indicators, which can draw upon existing data.

(b) *Relationship between the programme of work, its targets, and other processes:*

(i) Examination of how the programme of work contributes to particular Millennium Development Goals and associated targets;

(ii) A brief analysis of how the programme of work, and its targets, relates to the elements of the Plan of Implementation of the World Summit on Sustainable Development, categorizing such elements as follows:

- Elements to be integrated into the programme of work (these elements should be fully within the scope of the programme of work), specifying which of these represent outcome-oriented biodiversity related targets;
- Elements which complement the goals of the programme of work; and
- Elements representing goals to which the programme of work contributes;

(iii) A brief analysis of how the programme of work, and its targets, relates to the objectives, plans and targets of other multilateral environmental agreements and other relevant agreements, using the same categorization as in (b) (ii);

(c) *Intermediate output or process oriented targets, milestones and deadlines for the activities of the programme of work*:

(i) Identification of a number of process- or output-oriented targets, milestones and deadlines, relating to the specific objectives, programme elements, and/or

activities of the programme of work, according to the structure and needs of each programme of work.

Annex II

PROPOSED REVISED DRAFT GLOBAL OUTCOME-ORIENTED TARGETS FOR THE PROGRAMME OF WORK ON INLAND WATER ECOSYSTEM BIOLOGICAL DIVERSITY

I. RELATIONSHIPS BETWEEN THE PROGRAMME OF WORK ON THE BIOLOGICAL DIVERSITY OF INLAND WATER ECOSYSTEMS AND OTHER RELEVANT PROCESSES

A. Millennium Development Goals

1. The relationships between the programme of work on inland water ecosystem biological diversity and the Millennium Development Goals is explored in more detail in the note by the Executive Secretary on the subject prepared for the seventh meeting of the Conference of the Parties (UNEP/CBD/COP/7/20/Add.1).

2. The implementation of the revised programme of work on inland water ecosystem biological diversity makes a direct contribution to the achievement of the Millennium Development Goals (MDGs), and more specifically to targets 9 (To integrate the principles of sustainable development into country policies and programmes and to reverse the loss of environmental resources) and 10 (To halve by 2015 the proportion of people without sustainable access to safe drinking water).

3. Furthermore, through the provision of more sustainable goods and services derived from inland water ecosystem biological diversity, such as the promotion of more sustainable fisheries and aquaculture, it contributes indirectly or potentially to MDG target 2 (To halve, between 1990 and 2015, the proportion of people who suffer from hunger). It also contributes indirectly or potentially, through the increased control of pathogens and vectors of water-borne or water-based diseases to MDG target 8 (To have halted by 2015 and begun to reverse the incidence of malaria and other major diseases).

4. There are linkages to other MDGs which are discussed further in the note by the Executive Secretary on the programme of work of the Convention and the Millennium Development Goals (UNEP/CBD/COP/7/20/Add.1).

B. Plan of Implementation of the World Summit on Sustainable Development

5. The revised programme of work on inland water ecosystem biological diversity makes a direct contribution to the Plan of Implementation of the World Summit on Sustainable Development (WSSD) including, *inter alia*:

(a) Paragraphs 8 and 25: Halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water, as outlined in the Millennium Declaration, and the proportion of people without access to basic sanitation;

(b) Paragraph 26: Develop integrated water-resources management and water-efficiency plans by 2005, with support being provided to developing countries;

(c) Paragraph 31 (a): Maintain or restore indigenous wild-capture fisheries stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015;

(d) Paragraph 31 (d) as pertaining to inland water ecosystem biological diversity: Urgently develop and implement national and, where appropriate, regional plans of action, to put into effect the international plans of action of the Food and Agriculture Organization of the United Nations, including: the International Plan of Action for the Management of Fishing Capacity by 2005 and the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing by 2004;

Establish effective monitoring, reporting and enforcement, and control of fishing vessels, including by flag States, to further the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing; 1/

(e) Paragraph 32 (c) as pertaining to inland water ecosystem biological diversity: Develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use and watershed planning and the integration of marine and coastal areas management into key sectors; 2/

(f) Paragraph 44: The achievement by 2010 of a significant reduction in the current rate of loss of biological diversity;

(g) Paragraph 58 (g), indirectly or potentially: Develop community-based initiatives on sustainable tourism by 2004 and build the capacities necessary to diversify tourism products, while protecting culture and traditions and effectively conserving and managing natural resources.

C. Biodiversity-related conventions and United Nations organizations

6. The current note has been prepared, as a working draft, in collaboration with the Convention on Wetlands in the continuing effort to further streamline and coordinate activities, where relevant, between the two conventions. The revised programme of work on inland water ecosystem biological diversity is fully compatible with the provisions of the Convention on Wetlands (Ramsar, 1971) and several of its elements and activities are also reflected in the third joint work plan (2002-2006) between the Convention on Biological Diversity and the Convention on Wetlands (UNEP/CBD/COP/6/INF/14). This has included reference to Ramsar Resolution VIII.26, annex I, which refers to the 2003-2005 global implementation targets for the Convention on Wetlands which are arranged under 20 operational objectives. Those targets and objectives are largely process oriented and form a solid framework upon which activities to achieve the global targets set here may be operationalized. The two conventions are also continuing their collaboration on the important subject of harmonizing reporting.

7. The Scientific and Technical Review Panel (STRP) of the Convention on Wetlands has also recently undertaken reviews of a number of related subjects (e.g., wetland inventory and assessment; wise use concept and guidelines; water resource management; Ramsar site designation; managing Ramsar sites; communication, education and public awareness; and peatlands). Working Group number 6 on assessing the effectiveness of implementation of the Ramsar Convention is particularly relevant. The report of that group will be presented to the Standing Committee (of the Ramsar Convention) in January 2004 (ref. doc. SC30-7). This notes that the Ramsar Convention has not yet established global outcome-oriented targets and as a surrogate the paper takes the pillars of the general objectives in the strategic plan as interim global targets (i.e., wise use, wetlands of importance, international cooperation, implementation capacity, membership). The current development of global outcome-oriented targets under the Convention on Biological Diversity, therefore, presents an opportunity for the two conventions to further develop targets in synergy. In particular, the Ramsar Convention may wish to develop more specific targets for inland waters (and marine and coastal wetlands), which compliment those set under the Convention on Biological Diversity.

1/ These initiatives are focused primarily on coastal, marine and high seas fisheries but it is assumed for the purposes of this document that they are applicable, where necessary and appropriate, to inland waters – but the significant difference between exploitation patterns and methods between inland and marine fisheries are noted. The FAO Code of Conduct for Responsible Fisheries is another appropriate framework promoting improved management of fisheries, including for inland waters.

2/ It is assumed for the purposes of this document only that these goals in principle also apply to inland waters, as appropriate.

8. The Secretariat of the Ramsar Convention on Wetlands, and the STRP, have also undertaken a significant amount of work on indicators which will be utilized fully when indicators are developed for the current targets, including consideration of harmonizing and minimizing reporting requirements.

9. Furthermore, elements of the current document are variously relevant to provisions of other conventions, including in particular the Convention on Migratory Species (CMS), the World Heritage Convention (WHC), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Plant Protection Convention (IPPC), the United Nations Framework Convention on Climate Change (UNFCC) and the United Nations Convention to Combat Desertification (UNCCD).

10. The outcome-oriented targets presented are consistent with the Code of Conduct for Responsible Fisheries of the Food and Agriculture Organization of the United Nations (FAO) as it relates to inland water ecosystem biological diversity.

11. The implementation of the revised programme of work on inland water ecosystem biological diversity, and progress made towards its related goals, targets and provisions will contribute to the ongoing assessment of the World Water Assessment Programme (WWAP) and will be reflected in the next phase of the World Water Development Report (WWDRII).

II. VISION, MISSION, GOALS AND TARGETS OF THE PROGRAMME OF WORK ON THE BIOLOGICAL DIVERSITY OF INLAND WATER ECOSYSTEMS

A. Vision

12. The overall vision to which the revised programme of work on inland water ecosystem biological diversity makes a contribution is to sustain inland water ecosystem biological diversity and its capacity to sustain life on earth and the ecosystem goods and services it provides.

B. Mission

13. Consistent with the mission of the Strategic Plan of the Convention, the mission of the programme of work on inland water ecosystem biological diversity is to significantly reduce the rate of loss of inland water ecosystem biodiversity by 2010 at the global, regional and national level as a contribution to poverty alleviation and to the benefit of life on earth.

C. Goals and targets

14. The following goals and targets are based upon those for the implementation of the Strategic Plan of the Convention as detailed in decision VII/30 annex II. Those targets are quoted *verbatim* here as **Overall Targets**, which are then applied to the Programme of Work on inland water ecosystem biological diversity and where necessary re-worded to make them more appropriate to that context.

15. Where mentioned, quantitative targets refer to those thought to be ambitious but achievable by the year 2010, as a contribution to the 2010 biodiversity target. They are not meant to imply that these are the ultimate desired states.

16. For the purposes of definition, identification and classification of inland water ecosystems, the Conference of the Parties to the Convention on Biological Diversity (decision VII/4, paragraph 27) has recognized that the Ramsar Classification of Wetland Type should be applied as an interim classification for the implementation of the Programme of Work on the biological diversity of inland water ecosystems. The Ramsar definition of "wetland" includes all inland water ecosystem types, including man-made ecosystems (for example, it includes river channels, lakes, reservoirs, estuaries and underground waters as wetlands).

17. Activities required to achieve the targets include, *inter alia*, as listed in the programme of work on the biological diversity of inland water ecosystems (decision VII/4).

A. Protect the components of biological diversity

Goal 1: Promote the conservation of the biological diversity of ecosystems, habitats and biomes

Overall Target 1.1: At least 10 per cent of each of the world's ecological regions effectively conserved.

Application to inland water ecosystem biological diversity*: This target is not considered applicable to inland water ecosystems at present.*

Technical rationale

18. The application of a percentage-based target to areas or regions of inland water ecosystems is not considered appropriate because currently there is no reliable figure for the overall extent of inland ecosystem at the global level. Attempts to quantify this, using a variety of methods, have resulted in widely varying estimates, the highest of which is still considered an underestimate. Apart from a lack of data there are particular problems with trying to obtain "area" based estimates for fluvial systems (rivers) and wetlands with seasonally changing extents (e.g., floodplains or other areas intermittently flooded). Therefore, a percentage of an unknown quantity is not a meaningful figure.

19. The concept of ecological regions is also complex for inland waters. Any such categorization would need to be catchment (river basin) based, and there are many such regions, and even adjacent ones can differ significantly in their aquatic fauna and flora. Grouping by major biogeographic category might be possible but using different taxa would yield different results (for example, birds *versus* fish). The biogeographic distribution of river catchments, possibly into larger groupings, will be assisted by the forthcoming WWF inland water ecoregions assessment. It is likely that the ecoregions that would be appropriate for inland waters would not necessarily be the same as those using terrestrial criteria.

20. For inland waters the term "effectively conserved" requires that the entire catchment be managed in accordance with the need to maintain the ecological integrity of, and goods and services provided by, inland waters. It is therefore inappropriate, for this particular work programme, to suggest that any part of the catchment may be used in a fashion which undermines such integrity of inland waters. This is addressed more directly under target 5.1 (and 8.1). This does not imply that parts of a catchment cannot be developed or used sustainably by the sectors, but it does require that such use is planned and managed within the catchment context, taking into account downstream impacts on inland waters, consistent with the ecosystems approach. To suggest that 10 per cent, or even a considerably higher figure, of these ecosystems need to be effectively conserved, suggests that the remainder could continue to be extensively degraded and converted. This is not only contrary to the Convention but the Millennium Assessment makes it clear that such a trend would further constrain the achievement of the Millennium Development Goals.

21. The quality of data on ecosystem extent varies greatly by region and ecosystem type. Some reasonably robust sources of information do exist, but they are not usually global and only refer to specific ecosystem categories. However, such sources of data can be useful to provide indicators of trends in inland water ecosystems. For example, trends in peatland status and extent are a potentially useful indicator (see the note on indicators for assessing progres towards, and communicating the 2010 target at the global level (UNEP/CBD/SBSTTA/10/9)). The Ramsar Convention, and its Scientific and Technical Review Panel (STRP), are already working extensively on improving information on the status and trends of wetlands and relevant indicators. It is expected that this process will explore how to address this particular target in the longer term.

22. The objective of this target to conserve areas that are representative of the variety of ecoregions that exist, is accommodated under the wording of target 1.2 for inland waters (below), whilst targets 5.1 and 8.1 address achieving effective conservation within the ecosystem approach.

Overall Target 1.2: Areas of particular importance to biodiversity protected.

Application of the target to inland water ecosystem biological diversity: *Target 1.2: 275 million hectares of wetlands 3/ of particular importance to biodiversity protected, including representation and equitable distribution of areas of different wetland types across the range of biogeographic zones.*

Technical rationale

23. As per the rationale for target 1.1, a percentage based figure for area is not appropriate for inland water ecosystems. This quantitative area based target was derived from the target for area designated as Ramsar sites by 2010 (ref. Ramsar Strategic Plan 2003-2008), by using data only for inland water ecosystems. The Ramsar target is based on projections of previous site designation trends, plus an allowance for an ambitious but achievable increase in the rate of site designation. The resulting figure (2010 target for area of inland Ramsar sites) was then increased to account for non-Ramsar Parties and the fact that other protected areas, besides Ramsar sites, are common (data exist enabling an estimation of the latter with reasonable confidence).

24. This area based target does not require detailed wetland inventories but it is stressed that such should still be complied as a high priority. The Ramsar Convention has called upon its Parties to have at least initiated wetland inventories, including information on wetland importance and potential Ramsar sites, by 2005, to be used *inter alia* as the basis for establishing a strategy and priorities for future Ramsar site designations.

25. For the present purposes, "areas of particular importance" are those identified using the Ramsar site designation criteria (http://www.ramsar.org/key_criteria.htm), which can be used irrespective of whether a particular site is declared or not under the Ramsar Convention. These criteria, strictly speaking, refer to sites of international importance but the criteria can be applied directly, or modified as appropriate, at the national level. Equitable distribution across biogeographic zones refers to the need to ensure adequate representivity of different wetland types and amongst biogeographic zones.

26. For the purposes of the application of this target, "protection" is taken to include those areas under informal management systems, beyond the confines of officially designated protected areas, consistent with the Programme of Work on protected areas (e.g., activity 1.1.4 recognizes innovative types of protected areas such as those run by government agencies at various levels, co-managed protected areas, private protected areas, indigenous and local community conserved areas; activity 2.1.2 refers to recognizing and promoting a broad set of protected area governance types related to their potential for achieving biodiversity conservation goals in accordance with the Convention, which may include areas conserved by indigenous and local communities and private nature reserves).

27. Protected areas can be effectively conserved only if the larger ecosystems in which they are situated are managed to prevent or mitigate adverse impacts. This is particularly true of inland water protected areas. They are vulnerable to changes in water quality, quantity, and timing and volume of flows caused by activities often far beyond their boundaries. Thus, inland water protected areas must be part of a larger multi-sectoral management framework, such as integrated river basin management, that applies to the basin in which the protected area is located. This is in line with the adoption at the seventh meeting of the Conference of the Parties of the ecosystem approach as the primary framework for addressing the objectives of the Convention (decision VII/11, paragraph 2). These requirements are partly met under goals 5 and 8.

28. Indicators for this target already exist using data compiled by the Secretariat of the Ramsar Convention and they are currently being improved and elaborated by the Ramsar STRP. These can also be used as a measure for the related indicator (coverage of protected areas) for overall target 1.2 (see UNEP/CBD/SBSTTA/10/9).

3/ Recalling the preamble to this section that the Ramsar definition of "wetland" is used which is effectively the same meaning as "inland water ecosystems". The term is used for consistency with the Ramsar Convention where the current target originates.

Goal 2: Promote the conservation of species diversity

Overall Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.

Application of target to inland water ecosystem biological diversity: *This target can be applied directly to inland water ecosystem biological diversity without modification: Target 2.1: Reduce the decline of, and maintain or restore populations of species of selected taxonomic groups dependent upon inland water ecosystems.*

Technical rationale

29. The target is reworded to better reflect the presumed intention of the overall target.

30. It is assumed that "population" means both absolute number (abundance) of individuals and the number of distinct populations (and sub-populations) of individuals (the latter refers to genetic diversity).

31. Data on trends in species for inland water ecosystems are generally very difficult to obtain, and often inaccurate, although reasonably reliable data do exist for certain taxa. The target can be further refined and quantified in relation to specific taxa. Reliable data are often available for those taxa that are popular with special interest groups; for example, for at least many waterbirds, some groups of freshwater fish, aquatic mammals, most amphibians and many reptiles. The "sample of species" can be based on these existing sources of data but it will be biased. Unfortunately, knowledge is often absent for taxa that can be important for livelihoods, particularly of the rural poor, and therefore considerations of sustainable use. One problem is the very poor quality and quantity of global data at the species level for fisheries in inland waters. 4/

32. For the purposes of indicators, note is made that the target includes at least two different objectives (targets) – to "restore" and to "reduce decline or maintain". These are different things, the latter being much easier to obtain indicators for. Potential indicators for the overall target include "trends in abundance and distribution of selected species" and the "change in status of threatened species" (UNEP/CBD/SBSTTA/10/9). Data for these are available, *inter alia*, through the IUCN Red List and can be compiled for species dependent upon inland waters (although the data need to be scrutinized and adjusted because categorization is sometimes based upon taxonomic and not ecological criteria; for example many species of fish from "marine" taxa are actually threatened in freshwaters – e.g. sturgeon and salmon). The potential indicator "coverage of protected areas" has also been suggested for the overall target. This indicator is discussed in more detail under goal 1.2.

Overall Target 2.2: Status of threatened species improved.

Application of target to inland water ecosystem biological diversity: *Target 2.2: Known threatened and endangered species of plants and animals dependent inland water ecosystems conserved.*

Technical rationale

33. This target refers to the status of *known* threatened species – that is, for example, as per the IUCN Red List. The target for the Global Strategy for Plant Conservation is 60 per cent. However, the number of inland water dependent species listed is very likely a small fraction of those actually threatened. There is also a strong argument that if a species is known to be under threat then something should be done to improve its conservation status. Therefore the target should be 100 per cent.

34. References to the conservation of species *ex situ* (e.g., for plants) is not considered feasible for most inland water ecosystem biological diversity (except certain plant groups – which are assumed to be considered under the Global Strategy for Plant Conservation). Although *ex situ* conservation techniques

4/ As acknowledged by the FAO itself (www.fao.org)

for other taxa (e.g., fish) are emerging (e.g., cryopreservation), the technology is more complex and there is limited confidence that *ex situ* conservation is sustainable for large numbers of taxa.

35. Many threatened species dependent upon inland water ecosystems are migratory. This requires that viable populations of such animals are maintained throughout their natural range and that migratory corridors between critical areas allow movements which enable the species to complete their natural life-cycles.

36. Potential indicators for this target include those as per target 2.2 including the provisions listed there. References to the need to correct the red list data, when referring to inland water dependent species, under goal 2.1 also apply here.

Goal 3: Promote the conservation of genetic diversity

Overall Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.

Application of the target to inland water ecosystem biological diversity: *Target 3.1: Further losses of known genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species dependent upon inland water ecosystems prevented and associated indigenous and local knowledge maintained.*

Technical rationale

37. Genetic diversity includes variation within and among populations. Genetic diversity within a population may be lost through reduction of overall population size caused by, for example, direct exploitation, habitat alteration and destruction, toxic materials, and invasive species. Loss of genetic variation reduces adaptability to rapid environmental change (either natural or human-induced), and the ability to recover from over-exploitation. Severe selective pressures (through fishing) may also cause loss of genetic diversity. Because most fisheries are selective in targeting the largest and oldest individuals, intensive fishing can reduce the age and size at which fish mature, potentially leading to genetic change. A major threat to genetic diversity in inland waters is the impact of aquaculture (through poor broodstock management, and in particular inappropriate hybridization, and the release of invasive genotypes into the wild).

38. This is an important target for inland waters due to: (a) the high level of genetic diversity occurring there (due mainly to the zoogeographic isolation of aquatic species between different catchments or sub-catchments); and (b) the high levels of threats from rapidly expanding aquaculture.

39. Because genetic diversity of species in inland water ecosystems as a whole is poorly known, the target focuses on exploited and cultured fish and other valuable species with known genetic diversity. Knowledge of genetic diversity in inland water ecosystems is available for a limited number of taxa. Therefore, the proportion of genetic diversity for which data are available is very small. The target of conserving all known genetic diversity is therefore proposed, consistent with the goal. This target is too broad to be able to identify meaningful quantified targets, although quantified targets might be developed for individual species groups, in particular species in commercial use in aquaculture (particularly salmoniids, tilapias and carps). More specific outcome-oriented targets, with indicators, can be developed and applied at the regional and national levels for these. Quantified targets could also likely be developed for major wetland dependant agricultural crops, and in particular rice, and for populations and sub-populations of migratory water birds.

40. The wording of the overall target has origins in agriculture and is strictly speaking not entirely appropriate for inland water ecosystems (for example, the species used in aquaculture are not normally termed “crops” or “livestock”). For clarity, it is assumed that this target refers wild species that form the

basis of harvest (mainly fisheries) and to domesticated species (mainly in aquaculture), including their wild relatives. The inclusion of wild relatives is important because a major issue is the impact of domesticated strains/varieties on wild genetic diversity (and that diversity may not be the basis of the main harvest).

41. Potential indicators for this target might include: status and trends in biogeographic populations of inland water dependent birds (and it is noted that this group represents a significant deviation from the concept that genetic information is only available for domesticated species or those in commercial use); a number of crops, and in particular rice; and several fish species (notably salmoniids, and probably also carps and tilapia). Also, a number of process indicators will help to identify progress towards conserving genetic diversity in situations where more direct outcome-oriented targets (with quantifiable indicators) are difficult to apply. For example: adoption and implementation of policies and procedures for the conservation of genetic diversity by the aquaculture and other relevant sectors (including monitoring implementation of the Code of Conduct for Responsible Fisheries of the FAO and application of the Addis Ababa principles and guidelines for sustainable use). 5/

5/ UNEP/CBD/SBSTTA/9/9 and relevant information documents.

B. Promote sustainable use

Goal 4: Promote sustainable use and consumption

Overall Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity 6/

Application of the target to inland water ecosystem biological diversity: *Sub-target 4.1.1: Products from inland water ecosystem biological diversity derived from sustainable sources; Target 4.1.2: Aquaculture areas in inland water ecosystems managed consistent with the conservation of inland water biological diversity.*

Technical rationale

42. This target is divided into two sub-targets to distinguish between areas managed for capture fisheries (etc.), which are often in "natural" habitats, and those areas under more intensive management used for culture. The targets may be similar but indicator information will very likely be quite different. It is necessary to separate trends in aquaculture from trends in capture fisheries.

43. This target is assumed to refer to "exploitation" of natural resources (that is, mainly capture fisheries but also hunting and gathering of non-fisheries products). "Sustainably managed" can refer to the need to manage the environment for sustainability (a high priority for sustaining production from inland waters), as opposed to sustainable exploitation (catching). Targets for sustaining the environment are addressed more directly mainly under goals 5 and 8.

44. There are significant differences between the status and trends of, and threats to, fisheries in marine and coastal *versus* inland water environments. Chief amongst these is that environmental degradation is the major threat inland, whereas over-exploitation is the main threat to the major marine fisheries. "Managed on the basis of sustainability" is very difficult to define for inland water ecosystem biological diversity because the two major problems of environmental degradation, and habitat loss, and over-exploitation are inter-dependent. The pattern of exploitation is also significantly different (the bulk of the marine catch is taken by large-scale intensive/commercial operations, whereas inland waters are exploited mainly by small scale operations with high levels of participation by indigenous and local communities). Therefore, management options differ significantly between the two. Comparisons between marine and inland fisheries should bear in mind these and other differences.

45. For inland waters, "products" should include all related benefits derived from inland water fisheries (etc.) and not be limited to products which are directly consumed (for example, including recreational fisheries).

46. The main biodiversity effects of aquaculture include habitat degradation, disruption of trophic systems, depletion of natural seedstock, transmission of diseases, and reduction of genetic variability. Pollutants, such as chemicals and drugs can also be detrimental to the aquatic ecosystem, while the need to feed cultured carnivorous fish protein caught from the wild leads to net loss of biodiversity, unless alternative feed sources are used. Inland waters are the main source of world aquaculture production and therefore achieving the target for this sector is a major priority. However, targets, indicators and management options are complicated by the difficulties of definitions and their application in practice – particularly as a large percentage of the production arises from mixed culture-capture activities (e.g., stock enhancement of large water bodies).

47. The FAO Code of Conduct for Responsible Fisheries is a good basis for management for sustainability of fisheries. A quantitative process oriented target could be set based upon number of

6/ The term "sustainably managed" is understood to mean "managed for sustainability" – that is the management objective is that the biodiversity or resources themselves are sustained (not that management itself is sustained).

Parties or ecosystems where that code is effectively implemented. The FAO Code of Conduct for Responsible Fisheries also provides principles and criteria for recognising sustainable fisheries which are elaborated further under this target for marine and coastal biological diversity in document UNEP/CBD/SBSTTA/10/8/Add.1.

48. Article 9 of the Code of Conduct for Responsible Fisheries of the Food and Agriculture Organization provides a set of voluntary principles and standards that, if applied, ensure that potential social and environmental problems associated with aquaculture development are duly addressed and that aquaculture develops in a sustainable manner. Effective site selection, including keeping some areas free of aquaculture in the context of integrated area management approaches, is an important precautionary measure. Management plans and measures will need to be applied to the transfer and management of broodstock, and the introduction of invasive genotypes into the environment, to prevent potential impacts on genetic diversity. This target acknowledges the contribution of aquaculture to food security while seeking to ensure that aquaculture operations are undertaken in a sustainable manner.

49. The two sub-targets (4.1.1 and 4.1.2) are effectively 100 per cent targets. The rationale for this includes: (i) that the overall target refers to a 100 per cent target by 2010, and therefore a lower target for inland waters is not justified; and (ii) because of the difficulties in ascertaining which fisheries or aquaculture activities are sustainable, compounded by very poor data for inland fisheries and overlaps between culture and capture, the only credible target is zero or 100 per cent (since any figure in between requires the status of all fisheries/aquaculture to be known, but the 100 per cent target can be assessed on the basis of whether existing data support it).

50. Indicators for this will be difficult to identify, partly due to the unreliability of FAO Fisheries Statistics for inland waters, compared with the data for marine fisheries. Indicators for aquaculture may be more forthcoming, particularly if the private sector extensively adopts product certification.

Overall Target 4.2: Unsustainable consumption of biological resources, or that impacts upon biodiversity, reduced.

51. This target is regarded as being technically the same as target 4.1. The criterion for unsustainable consumption is unsustainable production. It is however noted that drawing attention to the need to moderate consumption is desirable in terms of public awareness raising.

Overall Target 4.3: *No species of wild flora or fauna endangered by international trade.*

Application of target to inland water ecosystem biological diversity: *This target applies directly without qualification or change: Target 4.3: No species of wild flora or fauna dependent upon inland water ecosystems endangered by international trade.*

Technical rationale

52. Trade in inland water species continues to increase and includes food trade, ornamental trade (for example aquarium fish and plants), and curio trade (for example skins and shells). A large variety of animals, and some plants, is included in this trade and especially fish, reptiles (particularly crocodiles and turtles) and amphibians (especially frogs). Unsustainable trade may have a number of biodiversity effects resulting from destructive collection practices, the introduction of alien species, and over-harvesting. These include the threat of extinction. However, sustainable trade brings significant benefits to indigenous and local communities in predominately rural, low-income areas.

53. The fisheries and aquaculture activities that supply such trade would be managed using the same criteria for other types of fisheries and aquaculture (see target 4.1). The Convention on International Trade of Endangered Species of Fauna and Flora (CITES) is an important international mechanism for regulating trade, and provides a way for importing countries, which are often creating the demand for products, to share responsibility with the source countries for ensuring that trade is sustainable.

54. A potential indicator for this exists with the data for CITES listed species.

C. Address threats to biodiversity

Goal 5. Pressures from habitat loss, land-use change and degradation, and unsustainable water use, reduced

Overall Target 5.1: Rate of loss and degradation of natural habitats decreased.

Application of the target to inland water ecosystem biological diversity: *Target 5.1: Rate of loss and degradation of inland water ecosystem habitats, especially through unsustainable water use, are decreased.*

Technical rationale

55. Unsustainable water use is a critically and increasingly important issue for the maintenance of inland water ecosystems. An integrated management approach is essential, and is in line with the WSSD Plan of Implementation, amongst others. The critical role that freshwater plays in underpinning sustainable development has been well established by the Millennium Assessment.

56. Pressures on inland water ecosystems from pollution, habitat loss, land-use change and degradation, and unsustainable water use often originate from activities not wholly within the purview of the inland waters programme of work, including forestry, mining, agriculture, industry, etc. It is imperative that all relevant programmes of work, particularly forest, mountain, grassland, and arid ecosystems, consider adverse impacts on inland water ecosystems and include steps to reduce and mitigate those impacts. This is consistent with decision VII/4, paragraph 11, of the Conference of the Parties, which encourages Parties, other Governments and organizations to ensure cross-referencing to, and coherence with, the other thematic programmes of work while implementing the programme of work on the biological diversity of inland water ecosystems.

57. It is critical to include specific reference to "unsustainable" use of water under this target (consistent with the goal). Water use is a major driver of change to both ecosystem quality and quantity. Direct attention to water as a major area of concern also helps align the Programme of Work better with similar concerns in related initiatives (for example, both the WSSD and the MDGs refer specifically to the need to improve water policies and management). Quantitative sub-targets may be feasibly set for water quality and quantity.

58. The increasingly used Index of Biotic Integrity (IBI) can be examined for possible immediate application as an indicator for this target, at least for some example areas/countries/regions. Also, the United Kingdom Freshwater Biological Association is establishing a Freshwater Life database (http://www.freshwaterlife.info/), which may be able to contribute in a similar manner to UNEP-GEMS Water for water quality (www.gemswater.org). "Water quality" (freshwaters) is currently being explored as an indicator for the "overall targets" (UNEP/CBD/SBSTTA/10/9). The indicator will also explore using "water quantity" (i.e., levels of water extractions etc.) as a complimentary indicator.

Goal 6: Control threats from invasive alien species

Overall Target 6.1: Pathways for major potential invasive alien species controlled.

Application of the target to inland water ecosystem biological diversity: *This target can be applied to inland water ecosystem biological diversity directly: Target 6.1: Pathways for major potential invasive alien species in inland water ecosystems controlled.*

Technical rationale

59. The control of pathways is regarded as the most effective way to address the problem of invasive alien species in inland water ecosystems. The main sources of introductions include deliberate releases or escapes from aquaculture and related fisheries activities and inter-basin water transfers.

60. Pathways need to be identified, evaluated and managed to reduce risk of invasion using best practices. Significant advances have been made in management of ballast water, and the rapid entry into force and effective implementation of the International Convention on the Control and Management of Ships' Ballast Water and Sediments by IMO member States is a priority activity to reach this target. This target is also related to target 3.1 because accidental introduction of cultured organisms may have an impact on genetic diversity of wild species.

61. There is some evidence that inland water ecosystems are particularly vulnerable to the impacts of invasive alien species in that the likelihoods of establishment and significant socio-economic impacts are high. Inland water ecosystems are also faced with potentially increased risks due to the rapidly expanding aquaculture sector – but this has not been systematically assessed relative to other ecosystems.

62. The requirements for inland water ecosystem biodiversity are considered little different to those for most other ecosystems. The relevant pathways are also similar, although there may be differences in the relative importance of the various potential pathways. One consideration for inland water ecosystem biological diversity is that many alien species, once introduced, are very difficult to subsequently manage (particularly for submerged taxa such as fish and invertebrates). In effect this means that priority should be given to preventing introduction by controlling pathways.

63. Potential indicators for some taxa are available through the FAO Database on Invasive Alien Species (DIAS) and related data kept in FISHBASE.

Overall Target 6.2: Management plans in place for major alien species that threaten ecosystems, habitats or species.

Application of the target to inland water ecosystem biological diversity: *This target can be applied directly to the programme of work on inland water ecosystem biological diversity: Target 6.2: Management plans in place for major alien species that threaten inland water ecosystems, habitats or species.*

Technical rationale:

64. Despite improved control of pathways (target 6.1), invasive alien species still pose significant threats to inland water ecosystems. The development and implementation of management plans (covering prevention, containment, eradication and control) is an important priority. Further rationale for this target, and required activities, is provided for the same target for marine and coastal biodiversity (UNEP/CBD/SBSTTA/8/Add.1).

65. The target for plants (UNEP/CBD/COP/7/20/Add.3) is quantified "...for at least 100 major alien species....". Such a quantified target has not been proposed for inland water biological diversity since it is considered: (a) that there are very many more than the 100 potential target alien species, including a large number of plants (but the number is not currently assessed), and (b) in theory, "management plans" should be in place for all major alien species.

66. Potential indicators for some taxa are available through the FAO Database on Invasive Alien Species (DIAS) and related data kept in FISHBASE.

Goal 7. Address challenges to biodiversity from climate change and pollution

Overall Target 7.1: Maintain and enhance resilience of the components of biodiversity to adapt to climate change.

Application of the target to inland water ecosystem biological diversity: *This target can be applied directly to the programme of work on inland water ecosystem biological diversity: Target 7.1: Maintain and enhance resilience of the components of inland water ecosystem biodiversity to adapt to climate change.*

Technical rationale:

67. Ecosystems and species that are healthy have an improved capacity to both resist and recover from periodic disturbances, such as extreme droughts and floods. This target seeks to maintain ecosystem resistance and resilience to climate change through controlling and minimizing other major human-induced impacts on inland water ecosystems.

68. Relevant activities include the application of sound management practices in an ecosystem context. Representative networks of inland water protected areas, together with improved catchment management, should be designed to offer resilience in the face of climate-induced threats. A particularly important aspect of this target is the need to maintain corridors (pathways) for the movement of migratory species.

69. An important feature of inland water ecosystems is the ability of relatively intact systems to mitigate the impacts of climate change. For example, intact, unregulated river basins, which maintain floodplain connectivity, contribute significantly to mitigating the impacts of catastrophic flooding. Similarly intact wetlands along the coast mitigate against the impact of cyclones. These aspects are covered more directly under goal 8.1.

Overall Target 7.2: Reduce pollution and its impacts on biodiversity.

Application of target to inland water ecosystem biological diversity: *This target applies directly to inland water ecosystem biological diversity: Target 7.2: Reduce pollution and its impacts on inland water ecosystem biodiversity.*

Technical rationale

70. Land-based activities are a major source of threats to the resilience, productivity and biodiversity of inland water ecosystems. Threats from land-based activities include pollution from municipal, industrial and agricultural wastes and run-off, as well as atmospheric deposition. For the present purposes, "pollution" includes eutrophication (particularly increases in dissolved nitrogen and phosphorus), acidification and sedimentation. Pollution sources may also be diffuse or point. The reduction below natural levels of compounds (e.g., nutrients or sediments) can also be problematic.

71. The problems of pollution are largely brought about by unsustainable activities on land. This points to the need to ensure adequate attention to the requirements of inland water ecosystem biological diversity throughout all goals and targets as applied to other thematic areas. That is, this target (as well as some others) cannot be addressed through the programme of work on inland water ecosystem biological diversity alone. Inland water ecosystems probably present the strongest case for the effective application of the ecosystems approach. Most of the pollution entering marine and coastal ecosystems (see UNEP/CBD/SBSTTA/10/8/Add.1) enters those environments from inland waters. Solving marine pollution largely centres on solving pollution problems for inland waters.

72. This target refers specifically to "water quality". Water quality is already identified as an indicator of progress towards the overall target (UNEP/CBD/SBSTTA/10/9). Water bird population trends are a potential indicator. Some species, for example, are known to become more abundant in eutrophic wetlands.

C. Maintain goods and services from biodiversity to support human well-being

Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods

Overall Target 8.1: Capacity of ecosystems to deliver goods and services maintained.

Application of target to inland water ecosystem biological diversity: *This target applies directly to inland water ecosystem biological diversity.*

Technical rationale

73. This target is recognized as overarching Vision for the Programme of Work on the biological diversity of inland water ecosystems (see UNEP/CBD/SBSTTA/10/8).

74. This target can be seen as an application of the target set forward in paragraph 29 (d) of the Plan of Implementation of the World Summit on Sustainable Development, which encourages the application of the ecosystem approach by the year 2010. Management of inland water ecosystems (including land based activities which affect them) at the ecosystem scale can best maintain ecosystem capacity to deliver goods and services. The Millennium Assessment (MA), and its synthesis reports for the Ramsar Convention and for the Convention on Biological Diversity, stress that this is the critically important and essential approach if human well-being and poverty reduction is to be delivered in the future. They stress the major importance and high value of wetland ecosystem services, and particularly provisioning, cultural and regulation services, and that conversion of naturally-functioning wetlands to other uses greatly reduces their long-term value, for often only short-term and lesser sectoral gain.

75. Consideration of indicators for this target should bear in mind that progress towards achieving all the other targets (using indicators for those) is an indicator of progress towards achieving this target. An important service provided by inland water ecosystems is to mitigate against the impacts of climate change (e.g., intact river systems mitigate against catastrophic floods). This provides an important link to targets relating to climate change (target 7.1). A very useful indicator for this is the frequency and severity (costs) of catastrophic climatic events (as tracked, for example, by flood insurance premiums).

Overall Target 8.2: Biological resources, that support sustainable livelihoods, local food security and health care, especially of poor people, maintained.

Application of target to inland water ecosystem biological diversity: *This target applies directly to inland water ecosystem biological diversity: Target 8.2: inland water biological resources, that support sustainable livelihoods, local food security and health care, especially of poor people, maintained.*

Technical rationale

76. Livelihoods dependency on the biological diversity of inland water ecosystems can be very high, especially for the rural poor in developing countries. The review of the status and trends of biological diversity of inland water ecosystems (CBD Technical Series number 11) also indicates that these resources are in rapid decline globally. Sustainable use of such resources can directly contribute to poverty alleviation, and can be in conformity with the Millennium Development Goals (MDGs). Inland water biological diversity contributes to livelihoods through subsistence, artisanal, traditional, customary, and commercial fishing and harvesting (for food or for construction, pharmaceutical and other materials). In addition, non-extractive activities, such as tourism, recreational fishing and aquaculture, enhance livelihoods when undertaken in a sustainable manner. Globally, the bulk of the people engaged in inland fisheries are poor and many are without alternative livelihood options. The maintenance of healthy inland water ecosystems is therefore directly linked to the well-being of inland communities.

77. "Sustaining livelihoods" is a complex concept for inland water ecosystem biological diversity, in particular because the water itself can be used in a number of potentially conflicting ways to "improve" livelihoods of different communities or interest groups. Nevertheless, increased attention needs to be given to the livelihoods of people who currently depend directly upon biological resources derived from inland water ecosystems. For example, if not properly and carefully implemented, water management activities can re-allocate the benefits of water resources from existing to new users, with a net loss in socio-economic value. This is invariably accompanied by a loss of the livelihoods benefits of biodiversity and the undermining of the sustainability of biodiversity at the local level.

78. The rationales for targets under goals 1, 2, 4, 5, 7 and 8.1 include activities to reach this target. Sustainability of local livelihoods and biodiversity are linked to local consumption of local products. Incorporating information relevant to local livelihoods into valuations of inland water ecosystems could help guide overall decisions concerning advantages of keeping the benefits of biodiversity at the local level, as opposed to, for example, favouring initiatives that may be positive to the economy but not necessarily to the quality of life of local people. The Ramsar STRP is currently producing guidelines for undertaking such valuations.

79. This target is also related to the targets under goals 9 and 10.

80. Indicators for this target will be problematic. Indicators exist for the status and trends in he biodiversity (see for example goals 1 and 2) but data for livelihoods dependency are less readily available. The FAO fisheries statistics, as currently compiled, are not only unreliable but misleading for such analyses.

E. Protect traditional knowledge, innovations and practices

Goal 9 Maintain socio-cultural diversity of indigenous and local communities

Overall Target 9.1: Protect traditional knowledge, innovations and practices.

Application of target to inland water ecosystem biological diversity: *This target applies directly to inland water ecosystem biological diversity: Target 9.1: Protect traditional knowledge, innovations and practices associated with the biological diversity of inland water ecosystems.*

Overall Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing.

Application of target to inland water ecosystem biological diversity: *This target applies directly to inland water ecosystem biological diversity: Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing, regarding the biological diversity of inland water ecosystems.*

Combined technical rationale for targets 9.1 and 9.2

81. Indigenous, traditional and local communities have a wealth of knowledge about biodiversity and its sustainable management, and in many countries the biodiversity of inland water ecosystems underpins livelihoods and food security. Application of sustainable local and traditional knowledge in the management of biological resources may also promote the maintenance of local and traditional knowledge systems. This target is consistent with target 9 of the Millennium Development Goals (to integrate principles of sustainable development into country policies and programmes and to reverse the loss of environmental resources) and Agenda 21.

82. Measures to address the decline in associated indigenous and local knowledge should be implemented consistent with the Convention's programme of work on Article 8(j) and related provisions. Fair and equitable sharing of benefits also plays a potentially important role in poverty eradication and environmental sustainability, consistent with the goals and targets of the Millennium Development Goals. World-wide experience has shown that local and indigenous communities must be empowered to ensure that their knowledge is applied in policy development and management. Traditional knowledge, particularly oral knowledge, on practices such as the use of traditional fishing gear, is easily lost, and documenting local knowledge is important for its protection. Access to information helps enable indigenous and local communities to participate in biodiversity management processes. In addition, communities should be guaranteed the right of access to resources upon which they depend.

83. In terms of indicators, it is unlikely that the issues and requirements are different in inland waters than any other ecosystem. Reliable indicators for this target will be difficult to find. The AHTEG on indicators has already referred the matter to the Ad Hoc Open Ended Working Group on Article 8(j) and related provisions (see UNEP/CBD/SBSTTA/10/9).

F. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Goal 10: Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Overall Target 10.1: All transfers of genetic resources are in line with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements.

Application of target to inland water ecosystem biological diversity: *Applies directly without modification: Target 10.1: All transfers of genetic resources derived from inland water ecosystems are in line with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements.*

Overall Target 10.2: Benefits arising from the commercial and other utilization of genetic resources shared with the countries providing such resources.

Application of target to inland water ecosystem biological diversity: *Applies directly without modification: Target 10.2: Benefits arising from the commercial and other utilization of genetic resources derived from inland water ecosystems shared with the countries providing such resources.*

Combined technical rationale for targets 10.1 and 10.2

84. Knowledge of the potential value of the genetic resources of inland water ecosystems is very poor but there is no reason to suggest it is less than for other ecosystems. Examples of the benefits derived from genetic resource transfer are already well established and include that most aquaculture production globally, the bulk of which comes from inland waters, is based upon the use of alien species or genotypes (and therefore has been transferred).

85. In order to assist Parties, Governments and relevant stakeholders with the implementation of the access and benefit-sharing provisions of the Convention, the Conference of the Parties adopted at its sixth meeting the Bonn Guidelines on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits arising from their Utilization. These voluntary guidelines are meant to assist Parties and relevant stakeholders when establishing legislative, administrative and policy measures on access to genetic resources and benefit-sharing and/or when negotiating contractual arrangements for access and benefit-sharing. Additionally, in accordance with decision VII/19, an international regime on access and benefit-sharing is to be negotiated by the Ad Hoc Open-ended Working Group on Access and Benefit-Sharing. Against this background, this target aims to ensure that national systems established to implement the access and benefit-sharing provisions of the Convention also cover access to inland water genetic resources and the fair and equitable sharing of benefits arising out of the utilization of these resources, in accordance with the Convention.

86. Indicators for this will be developed as for those for the overall targets (UNEP/CBD/SBSTTA/10/9). Consideration should be given to disaggregating data for inland water genetic resources.

G. Ensure provision of adequate resources

Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention

Overall Target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.

Application of target to inland water ecosystem biological diversity: *Applies directly without modification: Target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on the biological diversity of inland water ecosystems under the Convention, in accordance with Article 20.*

Overall Target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.

Application of target to inland water ecosystem biological diversity: *Applies directly without modification: Target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on the biological diversity of inland water ecosystems under the Convention, in accordance with its Article 20, paragraph 4.*

Combined technical rationale for targets 11.1 and 11.2

87. The lack of financial resources, capacity, and sustainable technological resources are consistently cited by Parties as the main impediments for the effective implementation of the Convention and its provisions. In addition, development of improved economic instruments and social institutions is needed. The effective implementation of actions to reach these targets will require the availability of new financial and technological resources, as well as capacity building. In addition, best use should be made of existing resources in both developing and developed countries, and developed countries may also need to refocus additional resources towards the conservation and sustainable use of biodiversity. Transfer of knowledge is an important component of this target and may occur both from developed countries to developing countries, and *vice versa*. Increased communication and the formation of partnerships and regional networks are vital for the achievement of these targets, as are education, public awareness and access to information.

88. There is increasing confirmation, including from the Millennium Ecosystem Assessment (MA) that inland water ecosystems and the services they provide for human well-being and poverty reduction are being seriously compromised by over-exploitation, and that the quantity and quality of the ecosystem resources are deteriorating even more rapidly that are other terrestrial ecosystems. There is therefore a case for urging particular attention to securing further resources to reduce the rate of loss of these critically important ecosystems. To address this, the Programme of Work on the biological diversity of inland water ecosystems recognises the need for a focus on capacity building for ecosystem based, basin-scale, management approaches (e.g. IRBM). This should be achieved, for example, through spatial planning and integrated water resource management mechanisms, working through and with sectors such as agriculture and forestry developments so as to improve efficiency of water use and the maintenance of environmental flows to inland waters, as the basis of securing their continuing role in maintaining the hydrological cycle.

89. Indicators for this target will be developed as for those for the overall targets (UNEP/CBD/SBSTTA/10/9). Consideration should be given to disaggregating data for inland water resources.

90. The language of the goal clearly states the intent to improve the capacity of developing country Parties to effectively implement their commitments under the Convention. The targets refer only to the transfer of financial and technical resources from developed to developing countries. However, the goal also implies efforts to increase internal capacity of developing countries through training and development of financial mechanisms such as user fees and payment-for-environmental-services schemes that will provide internal financial resources for inland water ecosystem management. Attention to the need to develop internal capacity (using national resources) is given in the Strategic Plan of the Convention.

Annex III

PROPOSED REVISED DRAFT GLOBAL OUTCOME-ORIENTED TARGETS FOR THE PROGRAMME OF WORK ON MARINE AND COASTAL BIOLOGICAL DIVERSITY

I. RELATIONSHIPS BETWEEN THE PROGRAMME OF WORK ON MARINE AND COASTAL BIOLOGICAL DIVERSITY AND OTHER RELEVANT PROCESSES

A. Millennium Development Goals

1. The implementation of the programme of work on marine and coastal biological diversity makes a direct contribution to the achievement of the Millennium Development Goals (MDGs), specifically its target 9, namely, to integrate principles of sustainable development into country policies and programmes and to reverse the loss of environmental resources. Through its promotion of sustainable fisheries and aquaculture, the programme of work also contributes to target 2, which is to halve, between 1990 and 2015, the proportion of people who suffer from hunger.

B. Plan of Implementation of the World Summit on Sustainable Development

2. The following targets of the Plan of Implementation of the World Summit on Sustainable Development (WSSD) are completely consistent with the programme of work on marine and coastal biological diversity, and have been integrated (either directly or in a modified format as appropriate) into the programme of work:

(a) *Paragraph 30 (d)*: Encourage the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem 7/ and decision V/6 of the Conference of the Parties;

(b) *Paragraph 31 (a)*: Maintain or restore (fisheries) stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015;

(c) *Paragraph 32 (c)*: Develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use; and watershed planning and the integration of marine and coastal areas management into key sectors; 8/

(d) *Paragraph 33 (d)*: Make every effort to achieve substantial progress by the next Global Programme of Action conference in 2006 to protect the marine environment from land-based activities

(e) *Paragraph 36 (b)*: Establish by 2004 a regular process under the United Nations for global reporting and assessment of the state of the marine environment, including socio-economic aspects, both current and foreseeable, building on existing regional assessments.

(f) *Paragraph 44*: The achievement by 2010 of a significant reduction in the current rate of loss of biological diversity.

91. In addition, the programme of work on marine and coastal biological diversity makes a direct contribution to the implementation of the following paragraphs of the Plan of Implementation of the World Summit:

7/ See Food and Agriculture Organization of the United Nations document C200/INF/25, appendix I.

8/ This wording is also consistent with SBSTTA recommendation VIII/3 A.

(a) *Paragraph 31 (d)*: Urgently develop and implement national and, where appropriate, regional plans of action, to put into effect the international plans of action of the Food and Agriculture Organization of the United Nations (FAO), in particular the International Plan of Action for the Management of Fishing Capacity 9/ by 2005 and the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing 10/ by 2004. Establish effective monitoring, reporting and enforcement, and control of fishing vessels, including by flag States, to further the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing;

(b) *Paragraph 58 (g)*: Develop community-based initiatives on sustainable tourism by 2004 and build capacities necessary to diversify tourism products, while protecting culture and traditions and effectively conserving and managing natural resources.

C. Biodiversity-related conventions, United Nations organizations and other relevant regional and international organizations and processes

92. The programme of work on marine and coastal biological diversity is consistent with the relevant provisions of the United Nations Convention on the Law of the Sea, the marine and coastal components of the Ramsar Convention on Wetlands, the regional seas programmes and action plans, the International Coral Reef Initiative, the Code of Conduct on Responsible Fisheries of the Food and Agriculture Organization of the United Nations, the Reykjavik Declaration on Responsible Fisheries in the Marine Environment, and activities of the Intergovernmental Oceanographic Commission (IOC) of UNESCO.

93. In addition, elements are relevant to provisions of other conventions, including, *inter alia*, the Convention on Migratory Species, the Convention under the International Maritime Organization (Marpol), the World Heritage Convention and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

94. The programme of work on marine and coastal biological diversity also takes note of current regional initiatives, such as those undertaken by the regional seas programmes and action plans, and by regional fisheries organizations and conventions, such as, *inter alia*, the South East Asian Fisheries Development Center (SEAFDEC), Westerns and Central Pacific Fisheries Convention (WCPFC), the Indian Ocean Tuna Commission (IOTC), and the Commission for the Conservation of Southern Blue Fin Tuna (CCSRT).

II. VISION, MISSION, GOALS AND TARGETS OF THE PROGRAMME OF WORK ON MARINE AND COASTAL BIOLOGICAL DIVERSITY

A. Vision and mission

95. The vision and mission of this programme of work have already been adopted by the Conference of the Parties in annex 1, sections A and B, of decision VII/5.

B. Goals and targets

96. In accordance with decision VI/9, the targets presented here should be viewed as a flexible framework within which national and/or regional targets may be developed, according to national priorities and capacities, and taking into account differences in diversity between countries. Parties and Governments are invited to develop national and/or regional targets, and, as appropriate, to incorporate them into relevant plans, programmes and initiatives, including national biodiversity strategies and action plans.

9/ Rome, Food and Agriculture Organization of the United Nations, 1999.

10/ Ibid., 2001.

97. Actions to reach these targets should be undertaken in the context of the ecosystem approach, which is the primary framework for the implementation of the Convention. The importance of the ecosystem approach in ensuring the long-term productivity and sustainability of marine and coastal living resources and environments, as well as contributing to sustainable development and poverty alleviation, has also been highlighted by the World Summit on Sustainable Development. Of particular importance to the targets presented here is paragraph 29 (d) of the Plan of Implementation of the World Summit on Sustainable Development, which encouraged the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem and decision V/6 of the Conference of Parties to the Convention on Biological Diversity. In addition, the programme of work on marine and coastal biological diversity promotes the application of ecosystem-based management, including through integration of coastal management activities with watershed management, highlighting the interconnectedness of coastal, marine and inland water ecosystems, and thus the linkages to the programme of work on inland water ecosystems biodiversity.

98. The effective implementation of actions to reach these targets will require capacity-building and financial resources for developing country Parties, in particular the least developed and small island developing States among them. Therefore, Parties, other Governments, the financial mechanism, and funding organizations are invited to provide adequate and timely support towards work aimed at achieving these targets. In addition, there is a need for cooperation within and between regions and countries, for the provision of livelihood options for coastal communities that depend largely on fisheries resources, and for ensuring the fair and equitable sharing of benefits arising from the use of marine and coastal genetic resources.

C. Protect the components of biodiversity

Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes

99. The World Summit on Sustainable Development, in paragraph 32 (c) of its Plan of Implementation, adopted a target of developing a representative network of marine and coastal protected areas by 2012. Subsequently, this target was also adopted in paragraph 19 of decision VII/5 and paragraph 18 of decision VII/28. The present target and target 1.2 should be viewed in the context of this 2012 target.

Overall target 1.1: At least 10 per cent of each of the world's ecological regions effectively conserved

Application to marine and coastal ecosystems: *At least 10% of each of the world's marine and coastal ecological regions effectively conserved*

Technical rationale

100. The purpose of the present target is to: (i) increase the area of marine environment effectively conserved; (ii) increase the representation of different ecosystems in areas that are effectively conserved, including ecosystems under-represented to date, such as those in areas outside of national jurisdiction, where any protected areas should be established consistent with international law, and based on scientific information; and (iii) increase the effectiveness of existing marine and coastal protected areas and other managed areas. Effective conservation in this context refers to area-based measures, for example marine protected areas and other means of protection, for which management plans exist. As indicated in decision VII/5, marine protected areas are one of the essential tools and approaches in the conservation and sustainable use of marine and coastal biodiversity. Marine protected areas can be either: (i) marine and coastal protected areas where threats are managed for the purposes of biodiversity conservation and/or sustainable use and where extractive uses may be allowed; or (ii) representative areas where extractive uses are excluded and other human pressures minimized (see decision VII/5, para. 21). Such areas must be effectively managed if they are to guarantee conservation and sustainable use, and may be designated according to IUCN categories. They can be designated either by legal means or through

custom, and should respect the roles and rights of indigenous and local communities. Other measures, such as fisheries management areas, and the prohibition of destructive practices (such as bottom trawling) may also contribute to effective protection. In order to be truly effective, and in accordance with decision VII/5 paragraph 21, marine and coastal protected areas should be embedded in a framework of sustainable management practices and actions to protect biodiversity over the wider marine and coastal environment. Such well-functioning integrated marine and coastal area management regimes also significantly contribute to the conservation goals of this target. Other measures, such as managing land-based sources of marine pollution, can also contribute towards those goals.

101. Ecological regions (ecoregions) have been defined by the World Wide Fund For Nature (WWF) as "relatively large units of land or water containing a distinct assemblage of natural communities and species, with boundaries that approximate the original extent of natural communities prior to major land-use change". Others have defined ecoregions as areas of ecological potential based on combinations of biophysical parameters such as climate and topography. For the purposes of this target, the entire ocean can be split into two broad areas: shelf regions and open ocean regions. The shelf region has been divided into Large Marine Ecosystems (LMEs), which can be used as a classification measure for the purposes of this target. WWF has also developed an ecoregional classification that applies to coastal and marine shelf areas. In addition, many countries have developed their own ecoregional classification systems. Therefore, the ecological regions under this target, for global and regional purposes, could be assessed using an appropriate combination of Large Marine Ecosystems, WWF ecoregions, and larger biogeographic units for pelagic and abyssal ocean areas. If a country wishes to conduct a national assessment, it may choose to use its own ecoregional classification system. A finer scale analysis would require (i) a globally accepted classification system of marine and coastal ecosystems; (ii) increased knowledge about the distribution of most of these ecosystems; and (iii) assessment of the total area covered by these ecosystems.

102. Only a very small amount, less than 0.5 per cent, of worlds' oceans are currently protected. This target aims to address the severe under-representation of marine ecosystems in the global protected areas system, and is consistent with paragraph 32 (c) of the Plan of Implementation of the World Summit on Sustainable Development, as well as paragraph 19 of decision VII/5, and paragraph 18 of decision VII/28, all of which adopted a target of developing a representative network of marine and coastal protected areas by 2012. The target is also consistent with the recommendations of the World Parks Congress. In addition, recent research findings 11/ indicate that approximately 20-30 per cent of each marine habitat type should be protected in order to achieve sustainable use of living resources. The 10 per cent figure cited here is lower than the optimum 20-30 per cent quoted in most references, and should therefore be viewed as an intermediate, policy-relevant, target, while the needs for long term protection would be determined taken into account the status and unique characteristics of each ecological region. The 10 per cent target adopted by the seventh meeting of the Conference of the Parties in decision VII/30 was originally conceived for 2-dimensional terrestrial systems. In the marine environment, this target could be interpreted in a 3-dimensional context. However, at the present time, it can only be measured 2-dimensionally.

103. This target aims at implementing the precautionary approach through protecting representative examples of ecosystem types of which relatively little is currently known. In this context, management action should not be delayed in the hope of acquiring perfect knowledge and scientific understanding. On

11/ For example, Roberts, C.M., B.S. Halpern, Rr. Warner, and S. Palumbia (2002) Designing marine reserve networks: why small, isolated protected areas are not enough. Conservation Biology in Practice 2: 9-17: J.A. Bohnsack11 B. Causey, M.P. Crosby, R.B. Griffis, M.A. Hixon, T.F. Hourigan, K.H. Koltes, J.E. Maragos, A. Simons and J.T. Tilmant (2000) A rationale for minimum 20-30% no-take protection. Proceedings of the 9th International Coral Reef Symposium, Bali, Indonesia, 2000; Botsford, L.W. and S.D. Gaines (2001) Dependence of sustainability on configuration of marine reserves and larval dispersal distance. Ecol,ogy Letters. 4: 144-150; Mangle. M. (2000) On the fraction of habitat allocated to marine reserves. Ecology Letters 3(1): 15-22.; Lindholm, J.P., P.J. Auster, M. Ruth, and L. Kaufman (2000) Modeling the effects of fishing and implications for the design of marine protected areas: Juvenile fish responses to variations in seafloor habitat. Conservation Biology 15: 424-437; Bohnsack, J.A. (2000) A comparison of the short term impacts of no-take marine reserves and minimum size limits. Bulletin of Marine Science 66: 615-650.

the contrary, better use of existing knowledge can be made in the design process, and management approaches adjusted in light of monitoring and research efforts that are oriented towards providing the necessary feedback for management. The target also implies greatly increasing the protection provided for ecosystems that have so far been under-represented in marine and coastal protected areas globally. Areas outside national jurisdiction should be considered separately under this target. These areas contain a large amount of biodiversity that is highly threatened, and should therefore be afforded urgent and increased protection through international cooperative efforts and in the context of international law if the 10% target to be reached. For areas outside of national jurisdiction, the World Parks Congress in recommendation 5.23 put forward a target figure of five high-seas marine protected areas by the year 2008. Such marine protected areas should be scientifically significant and globally representative, and, in accordance with decisions VII/5 and VII/28, be established consistent with international law and based on scientific information. Adequate monitoring and enforcement should also be implemented. The Fifth Meeting of the United Nations Open-ended Informal Consultative Process on Oceans and Law of the Sea, in addressing the issue of marine protected areas beyond national jurisdiction welcomed decision VII/28, and suggested that the Ad Hoc Open-ended Working Group on Protected Areas explore options for cooperation for establishment of marine protected areas beyond national jurisdiction, consistent with international law, including the United Nations Convention on the Law of the Sea (UNCLOS), and on the basis of the best available scientific information. The Consultative Process also encouraged the participation of oceans experts in the Working Group.

104. This target should be implemented in a broader context of the ecosystem approach, by which effective integrated marine and coastal area management (IMCAM), or equivalent approaches, should be applied to the entire marine and coastal environment. The development of ocean policies can provide a framework for sustainable management for both countries and regions. On a larger scale, strengthening regional systems that maintain the structure and functioning of marine and coastal ecosystems can be undertaken in the context of various Regional Seas conventions and programmes, and coordinated with relevant global conventions like the Ramsar and World Heritage conventions.

Activities to reach this target should be implemented together with those associated with goals 4, 5, 7 and 8, which emphasize the need for a sustainable management framework for all human activities. Communication, education and outreach activities are also important to the success of this target.

Overall target 1.2: Areas of particular importance to biodiversity protected

Application to marine and coastal ecosystems: *Particularly vulnerable marine and coastal habitats and ecosystems, such as tropical and cold water coral reefs, seamounts, mangroves, seagrasses and other vulnerable ecosystems effectively protected.*

Technical rationale

105. The purpose of this target is to protect particularly vulnerable and irreplaceable marine and coastal habitats and ecosystems as a matter of urgency (whereas target 1.1 focuses on effectively protecting representative ecosystems). These habitats and ecosystems include areas that are important to globally threatened, congregatory, and restricted range species, which require urgent attention.

106. The Conference of the Parties has consistently emphasized the importance of coral reefs and their vulnerability, as is evident in the language of decisions VII/5, VI/3, V/3 and IV/5. In keeping with these decisions, this target aims to provide increased protection for vulnerable ecosystems, such as coral reefs, mangroves, estuaries, seamounts, breeding areas, spawning aggregations and nursery areas. Although the target specifies these particular ecosystems, which are consistent with operational objective 2.3 of the programme of work on marine and coastal biological diversity (decision VII/5, annex I), it also recognizes that there are many other vulnerable marine and coastal ecosystems, and that action to protect them should also be taken in the context of this target.

107. Destructive practices are main threats to several of these habitats and ecosystem and should urgently be addressed. They include dynamite fishing, removal of coral for building purposes, bottom trawling, and other such practices adversely affecting the marine environment. This target aims to protect 100%, or as much as possible, of these vulnerable and irreplaceable habitats and ecosystems from such destructive practices by the year 2010.

108. Recent data from the Global Coral Reef Monitoring Network (GCRMN) and Coral Reef Degradation in the Indian Ocean (CORDIO) project suggests that reefs that are highly protected and are not stressed were better able to recover from bleaching events. 12/

109. Many, if not all, of the estimated 100,000 or more oceanic seamounts may be unique islands of deep-sea biodiversity. In particular, the upper slopes and peaks of seamounts are home to newly discovered species that appear to exist nowhere else. In just one expedition to the Tasman and Coral Seas in the South Pacific, for example, scientists reported that 16-36 per cent of the 921 species of fish and other benthic macrofauna collected on 24 seamounts were new to science. Destructive fishing activities in these areas could bring about extinctions of entire groups of organisms that are still undiscovered. Damage from bottom trawling is also reported to be the main threat to cold water coral reefs, resulting in mechanical damage which breaks up the reef structure. According to a recent report by UNEP-WCMC, 13/ cold-water corals grow slowly at only a tenth of the growth rate of warm-water tropical corals, and build beautiful but fragile 3-dimensional lace work structures, which are particularly vulnerable to impacts, such as damage from heavy deep-sea fishing gear. Some reefs in the East Atlantic have already been destroyed, and most others show scars from trawling. The immediate and urgent need to manage risks to marine biodiversity of seamounts and cold water coral reefs, through, e.g. elimination of destructive practices, has been highlighted by the seventh meeting of the Conference of the Parties, and by a number of other international forums, including the Fourth and Fifth Meetings of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, third informal consultation of States Parties to the Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, as well as the World Parks Congress (recommendation 5.2.3 and the Congress document on emerging issues (UNEP/CBD/SBSTTA/9/INF/21/Add.4)), the 2003 Defying Ocean's End Conference, the Tenth Deep-Sea Biology Symposium, and the Second International Symposium on Deep Sea Corals. In addition, the International Coral Reef Initiative has now included cold water coral reefs into its agenda.

110. Effective protection in regards to seamounts and cold water coral reefs can be achieved through the prohibition of certain activities detrimental for their biodiversity, such as bottom trawling, and through application of tools, such as marine protected areas. These actions also contribute to the effective protection of tropical coral reefs. In its decision VII/5, the Conference of the Parties called upon the United Nations General Assembly and other relevant international and regional organizations "…to urgently take the necessary short-term, medium-term and long-term measures to eliminate/avoid destructive practices", including "interim prohibition", on a case by case basis, of destructive practices in areas with seamounts, hydrothermal vents, cold water corals and other vulnerable ecosystems. In addition, the Fifth Meeting of the Informal Consultative Process on Oceans and Law of the Sea proposed that the General Assembly urge States, either directly or through competent regional fisheries management organizations (RFMOs), to take similar action. Implementation of the decision of the Conference of the Parties and the Consultative Process recommendation would provide a framework for necessary activities aimed at reaching this target (decision VII/5, paragraph 61 and fifth Consultative Process recommendation 6 (a)). Additionally, the implementation of effective monitoring and enforcement regimes are vital for ensuring the effective application of this target. In the context of this target, protection of seamounts from destructive practices in areas outside of national jurisdiction requires international cooperation through the processes mentioned above, as well as through other relevant

12/ E.g. Hughes, T.P., Baird, A.H., Bellwood, D.R., Card, M., Connolly, S.R., Folke, C., Grosberg, R., Hoegh-Guldberg, O., Jackson, J.B.C., Kleypas, J., Lough, J.M., Marshall, P., Nyström, M., Palumbi. S.R., Pandolfi, J.M., Rosen, B. and J. Roughgarden (2003) Climate Change, Human Impacts, and the Resilience of Coral Reefs. Science, vol. 301: 929-933

13/ UNEP-WCMC (2004) Cold-water Coral Reefs: Out of Sight - No Longer Out of Mind. UNEP-WCMC publication.

international and regional processes. Action to protect seamounts within Exclusive Economic Zones can be undertaken by individual parties.

111. Mangroves are highly productive, dynamic, and ecologically critical marine systems, which are important for nutrient cycling and fluxes, primary and secondary productivity, pollution control, hydrological balance, nursery areas for marine organisms, and critical habitats for many birds and mammals. In addition, mangroves play a key role in stabilizing land, cycling nutrients and provide fuelwood, timber, and fisheries resources. They also buffer land from storms, providing safe havens for humans. Many mangrove areas have become degraded worldwide, and habitat conversion of mangrove is widespread. Mangroves are converted to sites for aquaculture and for agriculture and affected by removal of trees for fuelwood and construction material, changes to hydrology in either catchment basins or nearshore coastal areas, excessive pollution, and rising sea levels. As a result, approximately 35 per cent of mangrove forests have been lost during the last two decades at the rate of 2.1 per cent per year. 14/ Integrated management of watersheds, land-use planning and impact assessment are key to protecting these coastal ecosystems. Management conducted in an ecosystem context will be most effective in addressing loss and degradation of coastal areas, and would include identification of key threats and implementation of management that is integrated across all sectors. It would involve coordinated pollution controls, development restrictions, fisheries management and scientific research. The protection of coastal habitat must figure prominently in ecosystem-based fisheries-management. 15/

112. Seagrasses are highly productive and widely distributed habitats that have importance as nursery areas and as food for many species. Seagrasses also play a role in trapping sediments and stabilizing the shoreline. They are impacted by land-based nutrients and sediments, as well as by boat anchors, land reclamation and other construction in the coastal zone, dredge-and-fill activities and destructive fishing practices. Climate change may also have an effect on seagrass distribution. Despite these threats, seagrasses are currently afforded little protection16, and major losses of seagrass habitats have occurred in many parts of the world.

113. Activities to reach this target should be implemented together with those associated with goals 4, 5, 7 and 8, which emphasize the need for a sustainable management framework for all human activities. In addition, more research is needed to identify areas of importance to marine and coastal biodiversity, including developing scientific methodology for selection of such areas. Communication, education and outreach activities are also important to the success of this target.

Goal 2. Promote the conservation of species diversity

Overall target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups

Application to marine and coastal ecosystems: *Reduce the decline of, maintain or restore populations of species of selected marine and coastal taxonomic groups*

Technical rationale

114. This target aims to protect populations of species that are currently declining, but not yet threatened or endangered. In particular, the target refers to reducing the decline in, and maintaining and restoring, populations of selected species for which population data exist such as marine mammals, seabirds, fish stocks, molluscs, elasmobranchs (sharks and rays), and reptiles. It should also be noted that there is a lack of information about the status of many marine and coastal species, and that increased

14/ Valiela I., Bowen J.L. and J.K. York(2001) Mangrove Forests: One of the World's Threatened Major Tropical Environments. BioScience, 1 October 2001, vol. 51, no. 10, pp. 807-815(9). American Institute of Biological Sciences

15/ Pauly, D., Christensen, V., Guenette, S., Pitcher, T.J., Sumaila, U.R., Walters, C.J., Watson, R. and D. Zeller (2002) Towards sustainability in world fisheries. Nature 418:689-695.

16 M. Spalding, M. Taylor, C. Ravilious, F. Short, E. Green (2003) World Atlas of Seagrasses. UNEP-WCMC publication.

investment into the assessment and monitoring of such species is needed in the context of this target. The IUCN Red List provides a framework for a comprehensive assessment of marine species.

115. As indicated under the rationale for target 4.1, marine mammals, seabirds and marine turtles are caught as by-catch, resulting in a decline in their populations. Habitat loss can also have a major impact, as is the case with salt water crocodiles and marine turtles, which are impacted by loss of nesting habitat. Direct exploitation has resulted in the decline of many fish, molluscs and reptiles. In addition, sharks are impacted by the unsustainable practice of shark finning. Pollution and habitat degradation may contribute to the decline in the populations of these species.

116. The target put forward in paragraph 31 (a) of the Plan of Implementation of the World Summit on Sustainable Development calls for maintenance or restoration of fisheries stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015. This target has also been included in the elaborated programme of work on marine and coastal biological diversity as activity (h) under operational objective 2.1 (decision VII/5 annex I). If this target is to be reached by 2015, substantial progress towards it would need to be achieved by the year 2010. The elaborated programme of work puts forward a number of activities, including the implementation of the FAO Code of Conduct on Responsible Fisheries, application of the ecosystem and precautionary approaches and development of marine and coastal protected areas, which can be undertaken as measures towards achieving the target. The Plan of Implementation of the World Summit on Sustainable Development also states that there is a need to apply a variety of measures. Paragraph 32 (c) calls on countries to develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use; and watershed planning and the integration of marine and coastal areas management into key sectors. Protection of spawning aggregations and nursery areas are also important for reaching this target. Each of these tools and approaches together with appropriate reduction in the level of fish catches and the application of precautionary approach, can contribute towards this target, though none of them alone may be enough to reach it. In addition, appropriate economic incentives (reduction of subsidies) should be applied, and any new fisheries should be appropriately assessed for sustainable fishing levels. Paragraph 31 (d) of the WSSD Plan of Implementation also calls for countries to urgently develop and implement national and, where appropriate, regional plans of action, to put into effect the FAO international plans of action. For example, the International Plans of Action for the Conservation and Management of Sharks, for Reducing Incidental Catch of Seabirds in Longline Fisheries, and for the Management of Fishing Capacity are particularly relevant in this context. The same paragraph calls for establishment of effective monitoring, reporting and enforcement, and control of fishing vessels, including by flag States, to further the international plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing. This target is related to target 4.1, which addresses sustainable fisheries.

Overall target 2.2: Status of threatened species improved

Application to marine and coastal ecosystems: *Known globally threatened and endangered marine and coastal species, with particular attention to migratory and transboundary species and populations, effectively conserved.*

Technical rationale

117. Reaching the overall target of significant reduction of the current rate of marine and coastal biological diversity loss by the year 2010 will require the effective maintenance and recovery of threatened species, including those listed in the IUCN Red List of Threatened Species (currently 737 marine species), in networks of protected areas or through other appropriate and effective management measures over the wider seascape. It will also require increased and urgent efforts to identify marine species whose life history or habitat requirements make them vulnerable to extinction and to add them to the lists of globally threatened and endangered species, where necessary, as well as to intensify efforts to

prevent such vulnerable species from becoming globally threatened or endangered. It should be noted that as awareness of threatened and endangered marine and coastal species increases, it is likely that more of them will become listed, and current efforts, such as the Census of Marine Life, will likely increase our knowledge of existing marine species, as well as of their vulnerability. Because of this, the target refers to all *known* species. In this context, explicit management for uncertainty in our knowledge base is also essential. Methods to estimate the degree of threat to which yet unknown species are exposed should be employed where possible.

118. It is also important to note that there is a need to conduct regular assessment and monitoring of the status of these species to ensure that this target is being achieved. Several organisations are on hand to provide support to assessment and monitoring.

Activities undertaken to reach this target should be coupled with efforts to identify, by 2010, species that are globally endangered and threatened. Specific activities to reach this target include both species and ecosystem-based conservation efforts, such as the use of effective MCPAs covering a representative selection of habitats within each biogeographical region, while ensuring connectivity between those MCPAs. Conservation measures should fully take into account species' life cycles and life history, by ensuring that a species is protected throughout its life cycle. Other measures, such as efforts to reduce and eliminate by-catch of endangered and threatened species also contribute towards this target. Furthermore, the distribution of some species, as well as the habitats utilized by them, may change as a result of climate change, increasing the need to have MCPAs that are large and distributed. Activities should be coordinated with relevant international agreements like CITES, CMS and protocols on protected species/areas under the Regional Seas Conventions/Programmes.

119. This target has been adapted from the 2003 World Parks Congress recommendation 5.04, which calls for all threatened species to be included in protected areas by the year 2012. If this recommendation is to be achieved, measures (whether through protected areas or other management action) to protect 80-90 per cent of known threatened and endangered species should be in place by the year 2010. In the longer term, measures should be undertaken to conserve, *in situ,* 100 per cent of all known threatened and endangered species. Activities to reach this target should be implemented together with those associated with goals 1, 4, 5, 7, and 8, in order to emphasize the need to undertake species management in an ecosystem context.

Goal 3. Promote the conservation of genetic diversity

Overall target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained

Application to marine and coastal ecosystems: *Further losses of known genetic diversity of exploited wild fish and other wild and cultured marine and coastal species prevented.*

Technical rationale

120. Genetic diversity can mean variation within populations and between populations. Genetic diversity within a population is lost through reduction of population size caused by, for example, direct exploitation (as is the case in species targeted by unsustainable fisheries), habitat alteration and destruction, toxic materials, and invasive species. The loss of genetic diversity in the seas and coastal areas is not well documented, but is thought to be substantial because historical over-fishing has caused massive reduction in the abundance of large consumer species. 17/ Small populations contain less genetic variation than large ones, reducing their adaptability, for example, to climate change, and their ability to

17/ Jackson, J.B.C., Kirby, M.X., Berger, W.H., Bjorndal, K.A., Botsford, L.W., Bourque, B.J., Bradbury, R.H., Cooke, R., Erlandson, J., Estes, J.A., Hughes, T.P., Kidwell, S., Lange, C.B., Lenihan, H.S., Pandolfi, J.M., Peterson, C.H., Steneck, R.S., Tegner, M.J. and R.R. Warner (2001) Historical overfishing and the recent collapse of coastal ecosystems. Science, Vol 293, pp. 629-638.

recover from over-exploitation, as is thought to be the case with the northern right whale. Furthermore, because most fisheries are selective in targeting the largest and oldest individuals, intensive fishing can reduce the age and size at which fish mature, leading to genetic change. For example, a recent study on northern Atlantic cod provides evidence that genetic change, caused by heavy fishing pressure, which selected against genotypes that predispose cod to mature later and larger, preceded the collapse of the stock. 18/ Moreover, mariculture activities may use selected strains and/or exotic species which can interact genetically or otherwise impact the local population (e.g. through hybridisation).

121. This target aims to conserve genetic diversity among and within populations as well as rare genotypes in order to increase the capability of populations and individual species to adapt to rapid environmental change. Because genetic diversity of marine and coastal species is poorly known, the target itself focuses strongly on exploited fish and other valuable species with known genetic diversity, such as, for example, salmon and sea turtles. Special attention should also be given to the genotypes of endangered species or populations. However, losses of unknown genetic diversity are likely common, and therefore this target should be interpreted in the precautionary context. For example, relatively unknown ecosystems, such as hydrothermal vent communities and seamounts, may contain genetic diversity that is both unique and has potentially important economic applications, linking this target to target 1.2. Activities to reach this target (including the maintenance of general habitat character, removal of severe selective pressures and prevention of escapes of alien species) should be implemented together with those associated with goals 1, 2, 4, 5, 7, and 8, particularly as loss of unrecorded and unknown genetic diversity is likely to occur simultaneously to that known to occur with exploited species.

D. Promote sustainable use

Goal 4. Promote sustainable use and consumption

Overall target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with conservation of biodiversity

Application to marine and coastal ecosystems (subtarget 4.1.1): *A minimum of 70 % of all exploited fisheries products derived from sources that are sustainably managed, and unsustainable uses of other marine and coastal species minimized*

Technical rationale

122. According to recent statistics of the Food and Agriculture Organization of the United Nations, 47 per cent of global fisheries are fully fished, while 18 per cent are overfished and 9 per cent depleted. In addition, 90 per cent of large predatory fish biomass worldwide has been lost since pre-industrial times 19/ and the mean trophic level of fisheries landings globally have declined at a rate of approximately 0.1 per decade. 20/ Overfishing affects habitats, food webs and non-target species, yet the impacts on biodiversity on the level of ecosystems, species and genes are poorly researched.

123. The rising demand for seafood has resulted in the targeting of deep oceans for new species through practices that are often destructive to biodiversity. In addition, by-catch of many seabirds, turtles and marine mammals presents a serious threat. High impact fishing (including bottom trawling, long lining, gill netting, and dynamite fishing) causes damage to the biodiversity of sensitive deep sea habitats, such as tropical and cold-water coral reefs and seamounts, and other ecosystems. Damage from bottom trawling is reported to be the main threat to cold water coral reefs. Mechanical damage kills coral and

18/ Olsen, E.M., Heino, M., Lilly, G.R., Morgan, M.J., Brattey, J., Ernande, B. and U. Dieckmann (2004) Maturation trends indicative of rapid evolution preceded the collapse of the northern cod. Nature, Vol 428: 932-935.

19/ Myers, R.A. and B. Worm (2003) Rapid Worldwide Depletion of Predatory Fish Communities. *Nature*, vol 423: 280-283.

20 Pauly, D, Christensen, V., Dalsgaard, J., Froese, R., and F. Torres (1998) Fishing Down Marine Food Webs. *Science*, vol 279: 860-863.

breaks up the reef structure, resulting in removal of habitat for marine life and an alteration of water and sediment processes.

By-catch amounts to approximately 30 million tonnes of sea life each year, and it is estimated that about 25 per cent of catches worldwide are discarded. By-catch of albatross and other marine mammals threatens some species with extinction, while sharks, particularly blue sharks, are threatened by the unsustainable practice of shark-finning. A number of techniques for prevention of by-catch have been developed, and activities undertaken to reach this target would include the wide application of such techniques and practices.

124. This target as it relates to fisheries should be viewed as a step towards achieving the target put forward in paragraph 31 (a) of the Plan of Implementation of the World Summit on Sustainable Development. The target of the World Summit on Sustainable Development aims to achieve maintenance and restoration of fish stocks to levels that can produce maximum sustainable yield, and in particular in relation to depleted stocks this should be done on an urgent basis and where possible no later than 2015. This would imply that 70 – 80 per cent sustainability would need to be reached by 2010, if the 2015 target is to be achieved. The long term goal, in accordance with the WSSD Plan of Implementation, is for all fishery products to be derived from sustainable sources.

125. Sustainability in this context can be defined through the Code of Conduct for Responsible Fisheries of the Food and Agriculture Organization of the United Nations. Article 7 of the Code of Conduct for Responsible Fisheries sets out fisheries management principles for long-term conservation and sustainable use of fisheries resources. Based on the Code of Conduct, the Marine Stewardship Council (http://www.msc.org/) has put forward principles and criteria for sustainable fisheries. The principles and criteria reflect the recognition that a sustainable fishery is based on (i) the maintenance and re-establishment of healthy populations of targeted species; (ii) the maintenance of the integrity of ecosystems; (iii) the development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects; and (iv) compliance with relevant local and national laws and standards and international understandings and agreements. The Agreement for the Implementation of the Provisions of the United Nations Convention on Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement) contains principles related to sustainable, ecosystem-based fisheries management, but it needs to be more widely ratified and implemented. It should also be applied to all high seas fish stocks, not just those that are highly migratory or straddling. Paragraph 31 (b-f) of the Plan of Implementation of the World Summit also puts forward a number of actions that will contribute to the achievement of this target.

126. It should be noted that parts of the industry are already moving in this direction. For example, Unilever, the world's leading supplier of fast moving consumer foods, has committed itself to buy fish only from sustainable stocks by 2005. In addition, many traditional, indigenous and local communities have for generations employed environmentally sustainable and selective fishery practices.

127. This target is related to the targets under goal 1, as marine and coastal protected areas present a key tool for achieving sustainable fisheries. It is also related to target 2.1 on reducing the decline of fish stocks. However, as indicated under the rationale for target 8.1, achieving sustainable fisheries and eliminating destructive impacts will require broader efforts to develop and implement a sustainable fisheries management framework in an ecosystem context that incorporates the protection of marine biodiversity.

Application to marine and coastal ecosystems (subtarget 4.1.2): *90% of mariculture facilities operated consistent with the conservation of biodiversity.*

Technical rationale

128. The Ad Hoc Technical Expert Group on Mariculture stated that all forms of mariculture affect biodiversity at the genetic, species and ecosystem level. The main effects include habitat degradation, disruption of trophic systems, depletion of natural seedstock, transmission of diseases, and reduction of genetic variability. In addition, the need to feed cultured carnivorous marine fish wild caught protein leads to net loss of biodiversity, unless alternative feed sources are used. This practice may also affect food security of coastal communities in places where small pelagic fisheries are being diverted to the fishmeal sectors, which provide a higher price than what could be obtained locally. 21/ Pollutants, such as chemicals and drugs can also be detrimental to the marine ecosystem. While mariculture output is still dwarfed by the tonnage of farmed freshwater organisms, it is growing worldwide, and has become an important contributor to the world's food supply.

129. No internationally agreed criteria have yet been developed specifically for the environmental regulation of aquaculture operations, but many national and regional regulations and laws, largely based on scientifically accepted environmental criteria, have been adopted. Article 9 of the Code of Conduct for Responsible Fisheries of the Food and Agriculture Organization provides a set of voluntary principles and standards that, if applied, ensure that potential social and environmental problems associated with aquaculture development are duly addressed and that aquaculture develops in a sustainable manner. Effective site selection, including keeping some areas free of mariculture in the context of integrated marine and coastal area management approaches, is an important precautionary measure. The transfer of broodstock can have possible impacts on genetic diversity, linking this target with target 3.1. Management plans and measures will need to be applied to prevent potential impacts on genetic diversity. This target acknowledges the contribution of mariculture to food security while seeking to ensure that mariculture operations are undertaken in a sustainable manner. Because mariculture can be controlled, and national, regional and international guidelines and mechanisms are in place, the percentage in the target should be higher than for capture fisheries. A 90% target should be achievable by 2010. The long term goal is for all mariculture facilities to operate consistent with conservation of biodiversity.

Overall target 4.2: Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced

Some aspects of this target are addressed under target 4.1

Overall Target 4.3: No species of wild flora and fauna endangered by international trade

Application to marine and coastal ecosystems: *No species of wild marine and coastal flora and fauna endangered by international trade*

Technical rationale

130. Global surveys indicate that international trade in marine species, particularly corals and coral reef species, continues to increase. Trade in marine species includes food trade (for example fish and lobsters), ornamental trade (for example aquarium fish, corals and other invertebrates), and curio trade (for example shells, such as triton). It is estimated that the value of the marine ornamental trade is approximately US$200-330 million per year, with 80 per cent of the trade in stony corals and 50 per cent of the trade in marine fish going to the United States, with the rest going mainly to the European Union (EU), and, to a lesser extent, Japan. 22/ Ornamental marine species are collected and transported mainly from Southeast Asia, but also increasingly from several island nations in the Indian and Pacific Oceans. Unsustainable marine ornamental species trade may have a number of biodiversity effects resulting from destructive collection practices, the introduction of alien species, over-harvesting and the lack of scientific information for many species collected, and the threat of extinction of target species. Destructive

21/ Tyedmers, P. (2004) Fisheries and energy use, Cleveland, C. (ed.) Encyclopedia of Energy. Academic Press/Elsevier Science. Vol.2

22/ Wabnitz, C., Taylor, M., Green, E., and T. Razak (2003) From Ocean to Aquarium. UNEP-WCMC, Cambridge, UK.

harvesting practices include the use of sodium cyanide and other chemicals. Although illegal in most countries, cyanide is often used to capture reef fish for the live food fish and aquarium trades, and its use continues to spread geographically. Use of cyanide is associated with the physical degradation and destruction of the portion of the reef where the fishes being caught are hiding. Collection of coral pieces may cause many more colonies to be damaged and broken than are actually harvested. Introduction of aquarium fish species to areas where they do not occur naturally may cause them to become invasive, as is the case with the introduction of lionfish (*Pterois volitans*), a native to the Indo-Pacific Region, to the East Coast of the United States. In addition, severe human health impacts, from unsafe diving practices, occur in collectors for the live reef fish and aquarium trade. However, aquarium trade undertaken in a sustainable manner can bring benefits to local communities in predominately rural, low-income coastal areas. In addition, because the aquarium industry as a whole is relatively low volume yet very high value, it can potentially provide an incentive to conserve reef habitats. 23/

131. Sustainable ornamental fisheries would be managed in such a way that they are biologically sustainable (harvested species are replenished in their natural habitat at the same or greater rate than they are collected), do not conflict with other resource users and keep post-harvest mortalities to a minimum. In addition, habitat damage and impacts to other species are minimized, species unsuitable for aquaria are not collected, and trade is conducted in an equitable manner. 24/ The use of certification schemes for the marine aquaria trade can be an important tool to reach this target as it relates to ornamentals. The Marine Aquarium Council (MAC) is an international, third-party certification system, which provides the means to verify that industry operators employ responsible, environmentally sound practices, and that the collected marine organisms are healthy. A certification system can also ensure the provision of sustainable livelihoods in coastal villages with limited natural resources. The improvement and further development of mariculture of marine ornamentals may also reduce the pressure on coral reef ecosystems.

132. On a broader scale, the Convention on International Trade of Endangered Species of Fauna and Flora (CITES) is an important international mechanism for regulating trade. CITES is also a way for importing countries, which are often creating the demand for products, to share responsibility with the source countries for ensuring that trade is sustainable. Currently species listed under CITES include 2000 species of hard (stony) corals, black coral, giant clams, queen conch, sea turtles, humphead wrasse, all dolphins, all great whales, basking shark, whale shark, great white shark, seahorses, all sturgeon species, six fur seal species and all coelacanths. CITES listings have a potential role in promoting management and sustainable use of marine species and products. Therefore the protection of additional species threatened by international trade through listing or strengthened protection, based on the precautionary approach and scientific information, presents an important tool for reaching this target. Local trade can also have biodiversity impacts, linking this target to target 8.2. As indicated under targets 2.1 and 3.1, there is a need for increased investment in the assessment of status of marine and coastal species in order to determine the threats to them.

Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced

Overall Target 5.1: Rate of loss and degradation of natural habitats decreased

***Application to marine and coastal ecosystems*:** *Rate of loss and degradation of natural marine and coastal habitats, in particular mangroves, seagrasses and other important coastal habitats, decreased.*

Technical rationale

133. Habitat degradation is a major cause of biodiversity loss in the marine and coastal environment. According to *the third Global Environment Outlook (GEO-3)*, the driving force for physical alteration of habitats is ill-planned, and accelerating, social and economic development in coastal areas, which itself

23/ Ibid.

24/ Ibid.

results from such increasing pressures as population, urbanization and industrialization, maritime transport and tourism. Estimates show that almost 50 per cent of the world's coasts are currently threatened by development-related activities. Approximately 40 per cent of the human population now live within 100 kilometres of the coast, and the density of people living in coastal areas (approximately 100 people per square kilometre) is much higher than in inland areas (approximately 38 people per square kilometre). 25/ In addition, most of the world's megacities and large population centres are on the coast. The increase in coastal populations and economic activities is leading to an expansion of the direct use of coastal resources and negative human-induced changes to ecosystems. Mangroves, other coastal wetlands, seagrasses and coral reefs are particularly threatened. According to the 2001 report *A Sea of Troubles*, produced by the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), half of the world's wetlands and over half of the world's mangrove forests were lost during the twentieth century. The loss of mangroves leads to coastal erosion and loss of nursery areas, causing widespread detrimental effects on biodiversity. Coral reefs are threatened by a number of human impacts, such as land-based sources of pollution and sedimentation, climate change, shipping and tourism. Additionally, all vulnerable seabed habitats are threatened by destructive fishing practices, such as use of explosives and bottom trawling. The rationale for target 1.2 describes such impacts and mitigation measures in more detail.

134. Other important marine and coastal habitats include breeding, spawning and nesting areas, migratory routes, and other such areas important to different stages of the life history of species. This target also aims to increase protection of breeding, nursery and spawning areas by implementing time/area closures and other effective protection measures for these areas, including elimination of destructive fishing practices and gear. This acknowledges that the protection of breeding, nursery and spawning grounds is a critical step in the creation of sustainable fisheries and in the development of an ecologically functional marine protected areas network (and links it with overall target 4.1). The protection of nursery areas is also essential for threatened species and for wide-ranging migratory species where national and regional systems may be necessary, linking this target with target 2.2. Such activities should be undertaken in the context of the ecosystem approach. Protection of nursery and spawning areas has been identified as a priority activity in decision IV/5 of the Conference of the Parties, and in paragraph 32 (c) of the Plan of Implementation of the World Summit.

135. It should also be noted that degradation and destruction of natural habitats, along with the cumulative impact of unsustainable practices (extraction, pollution, nutrient enrichment, etc.) may lead to changes in community structure, for example outbreaks sea urchins and phase shifts from coral dominated to algal dominated communities. In this context, maintaining the structure and functions of natural ecosystems is important for the resilience of those ecosystems, linking this target with target 7.1.

136. Activities to reach this target include the implementation of effective integrated marine and coastal area management, in conjunction with watershed management, and environmentally sound coastal planning, as elaborated in the rationales for targets 1.1 and 1.2. Interconnectivity between habitats vital to the life history stages of a species should be considered in planning the management intervention. Marine protected areas implemented in parallel with initiatives to reduce the destructive capacity of fishing gear, for example through introduction of low-impact gear designs and establishment of areas where use of destructive gear is prohibited, could be significant measures for seabed habitat protection. This target is connected to target 2.1, which deals with protection of vulnerable ecosystems.

Goal 6. Control threats from invasive alien species

Overall target 6.1: Pathways for major potential alien invasive species controlled.

Application to marine and coastal ecosystems: *Pathways for major potential invasive alien species in marine and coastal ecosystems controlled*

25/ CIESIN, 2000 data

Technical rationale

137. The main sources of introductions of invasive alien species into the marine environment are considered to be ballast water from ships, fouling of ships, mariculture, intentional and unintentional release of live organisms, and migration through canals. Therefore, controlling these vectors is likely to have the greatest effect in reducing the number and severity of invasions. However, this target also recognizes that other sources of introductions exist (for example trade in marine species, and aquarium releases or escapes, and introductions through oil platforms. Alien species can also be introduced through international travel, including cruise ships and air travel) and that controlling all pathways through effective regulation is important. As part of this process, pathways need to be identified, evaluated and managed to reduce risk of invasion using best practices.

138. Significant effort has been and is being expended on addressing the ballast water vector, including the recent adoption of the International Convention on the Control and Management of Ships' Ballast Water and Sediments by IMO member States; the GEF/UNDP/IMO GloBallast Programme; significant ballast water research and development; and various national measures. The rapid entry into force and effective implementation of the ballast water Convention should be a priority activity to reach this target. Development and effective implementation of new ballast water treatment technologies to eliminate the need for open-ocean exchange will also be necessary.

139. Although ballast water is still a priority issue, focus should also be given to addressing other vectors. Necessary activities would include the further development of regulations, programmes and measures to control the introduction of alien species through fouling of ships, mariculture, intentional and unintentional release, canals and other vectors. Regarding mariculture, which is a source of alien species through escapes from hatcheries and mariculture operations, there is a need for national and regional approaches based on scientifically accepted environmental criteria, as indicated in the rationale under target 4.1.2. An additional mariculture-related pathway is the accidental introduction of genetically modified organisms, which can have a potential impact on local biodiversity. Mariculture species, which are closely related to wild species, can also pose a potential threat to the viability of the natural population. In this context, the present target is related to target 3.1 on genetic diversity and target 4.1.2 on sustainable use.

140. The control of pathways is regarded as the most effective way to address the problem of invasive alien species in the marine environment, as eradication of an already established species is extremely difficult, if not impossible. This target is adapted from paragraph 34 (b) of Plan of Implementation of the World Summit.

Overall target 6.2 Management plans in place for major alien species that threaten ecosystems and habitats and species

Application to marine and coastal ecosystems: *Management plans in place for major alien species that threaten marine and coastal ecosystems, habitats or species.*

Technical rationale

141. In spite of measures being taken to control pathways (target 6.1), invasive alien species may enter the marine and coastal environment. In such cases, development and implementation of management plans will help keep alien species populations to low levels that allow recovery of biodiversity values. In general, the term "management" is used to cover prevention, containment, eradication and control actions.26/

142. Once established, the eradication of such species is difficult. The tropical green algae *Caulerpa taxifolia* was introduced to the Mediterranean in the 1980s through an aquarium release, and now covers thousands of hectares along the coasts of France, Spain, Italy and Croatia. 27/ The lionfish (*Pterois*

26/ Cooperative Initiative on Island Invasive Alien Species: http://www.issg.org/islandIAS.html#IslandIAS

27/ The International Maritime Organizations (www.imo.org)

volitans) is a new invasive species in the east coast of the United States. Its impact on the native communities is not yet well understood, but it will be difficult, if not impossible to eradicate. Management actions will focus on research on its potential distribution and life history characteristics, as well as on public outreach and awareness raising aimed at reporting sightings and prevention of future invasions28. In some cases, invasive alien species can be managed to prevent damage to the biodiversity in an area. For example, the Alaskan king crab in Norway is maintained as a resource in limited areas, and eradicated from other areas, in accordance with a comprehensive management plan.

143. Island ecosystems with a high degree of endemism are particularly vulnerable to alien invasive species, and many island ecosystems have been irretrievably altered by such invasions. For example, insects, disease organisms, snakes, weeds, and other pests are considered the single greatest threat to Hawaii's economy and natural environment and to the health and lifestyle of Hawaii's people. Islands are more likely to suffer catastrophic loss of biodiversity as a result of invasions, but are also more likely to respond to successful eradication and border control methods to reduce or remove threats. In accordance with this target, management plans should be developed for all major alien species. Management plans relating to the transfer of live organisms used in mariculture and trade should also be in place as a mechanism to prevent alien invasions. The IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (http://www.iucn.org/themes/ssc/pubs/policy/invasivesEng.htm), and the CBD Guiding Principles on this issue provide a general framework for management, while additional information is also available through the Global Invasive Species Programme (www.gisp.org).

Goal 7. Address challenges to biodiversity from climate change and pollution

Overall target 7.1: Maintain and enhance resilience of the components of biodiversity to adapt to climate change

Application to marine and coastal ecosystems: *Maintain and enhance resilience of the components of marine and coastal biodiversity to adapt to climate change*

Technical rationale

144. Ecosystems that are healthy have a significant capacity to both resist and recover from periodic disturbances, such as coral-bleaching events or population collapses due to shifts in currents and changes in sea temperature. Ecosystems in a compromised state have limited capacity to do so. In the case of coral reefs, the destruction of associated habitats, such as mangroves and seagrass beds, which serve as nursery areas for many reef species, contributes to the limited capacity of coral-reef ecosystems to recover from natural or human-induced impacts. As noted in decision V/3 of the Conference of the Parties, most coral reefs are located in developing countries, and the majority of the people living near coral reefs are often extremely poor. Thus, even minor declines in the productivity of coral-reef ecosystems as a result of coral bleaching events could have dramatic socio-economic consequences for local people who depend on coral-reef services. A similar issue applies in areas such as the Pacific coast of South America, where El Niño/La Niña cycles have major effects on the fisheries on which many poor communities and many seabirds and marine mammals depend. Other impacts on affected species such as Humboldt penguins can remove their ability to recover from these periodic climate events, particularly if human-induced climate change alters those cycles.

145. Recent monitoring data suggest 29/ that coral reefs that are protected from other external stress factors are better able to recover from climate-change induced coral bleaching events, linking the implementation of this target to those under goal 1. Sustaining the capacity of coral reefs to generate goods and services requires improved protection of coral reef resilience, which is lost through the

28/ NOAA Center for Coastal Fisheries and Habitat Research (http://shrimp.ccfhrb.noaa.gov/lionfish/)

29/ Wilkinson, C. (Ed) (2002) Status of Coral Reefs of the World: 2002; Linden, O., Souter, D., Wilhelmsson, D and D. Obura (Eds) (2002) Coral Reef Degradation in the Indian Ocean – Status Report 2002.

combined effects of climate change and other human impacts30. Climate change is also likely to impact other ecosystems, such as seagrasses, mangroves and other wetlands.

146. This target seeks to maintain ecosystem resistance and resilience to climate change through controlling and minimizing other major human-induced impacts on coastal ecosystems and species resulting from a variety of causes including overexploitation, coastal development, destructive fishing practices, land-based pollution, coral mining, marine-based pollution, and recreational misuse. It also aims to minimize the impact of climatic events, such as coral bleaching, on coastal communities dependent on marine and coastal resources for their livelihoods. Relevant activities may include identification and institution of additional and alternative measures for securing the livelihoods of people who directly depend on the services provided by the affected ecosystems. The application of sound management practices, including marine and coastal protected areas and integrated marine and coastal area management, are integral for achieving this target. Representative networks of marine and coastal protected areas should be designed to offer resilience in the face of climate-induced threats, including through maintaining connectivity between more highly protected areas and providing for replication of habitat and ecosystem types. The updated coral bleaching workplan (decision VII/5 appendix 1) provides activities that can be undertaken to reach this target. Additional information is provided in the *Reef Manager's Guide to Coral Bleaching.* These activities should be implemented together with those related to those under goals 1, 2, 3, 4, 5, 6 and 8. It may also be appropriate to institute specific recovery programmes to assist some affected species using best practices, for example, by significantly reducing predation or by-catch of penguin populations during the recovery period.

Overall target 7.2: Reduce pollution and its impacts on biodiversity

Application to marine and coastal ecosystems: *Reduce land-based and seabased sources of marine pollution and their impacts of biodiversity*

Technical rationale

147. Land-based activities are a major source of threats to the health, productivity and biodiversity of the marine environment. The term "health" in this context should be interpreted as the ability of an ecosystem or population to regenerate from damage and stress, and could be considered to be equivalent to the term "resilience". Threats from land-based activities include pollution (municipal, industrial and agricultural wastes and run-off, as well as atmospheric deposition), nutrient enrichment (particularly increases in dissolved nitrogen and phosphorus) and physical alteration and destruction of habitats. According to a recent report by the United Nations Environment Programme, land-based sources of marine pollution have lead to a substantial worldwide increase in hypoxic events and areas, highlighting the urgent need to address this issue. 31/

148. Marine pollution originating from non-coastal sources include oil spills and ocean dumping. Oil tankers transport some 1,800 million tonnes of crude oil around the world by sea32. Although major oil spills are infrequent, their impacts are severe and widespread when they do occur, impacting various components of the ecosystem and ultimately affecting human well-being through interruptions in food supply as well as diminished amenity for several years. The effects on biodiversity are caused by the physical nature of the oil (physical contamination and smothering) and by its chemical composition (toxic effects and tainting). An estimated 313,000 containers of low-intermediate radioactive waste dumped in the Atlantic and Pacific Oceans pose a significant threat to deep sea ecosystems should the containers leak. Marine debris is another pervasive pollution problem adversely impacting species and habitats, and may also result in "ghost fishing" (lost or abandoned fishing gear that continues to catch fish). Finally,

30 Hughes, T.P. et al (2003) Climate change, human impacts and the resilience of coral reefs. Science, Vol 301; 929-933.

31/ United Nations Environment Programme (2004) GEO Yearbook 2003.

32 The International Maritime Organizations (www.imo.org)

light and noise pollution impact turtles and cetaceans, while unsustainable mariculture can be a source of both land-based and seabased pollution (linking this target with target 4.1.2).

149. The application of this target is consistent with paragraph 33 of the Plan of Implementation, and progress towards it can be achieved through effective application of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, regional instruments, programmes and processes, and other appropriate means, such as the relevant components of UNCLOS, IMO and the London Convention. This activity is also listed as proposed activity (c) under operational objective 1.2 in decision VII/5 annex 1. More specifically, the World Summit on Sustainable Development in its plan of implementation lists a number of related actions, which include proper coastal land use, watershed planning, and integration of integrated marine and coastal area management into key sectors. In this context, there is a need for effective strategies for waste reduction and management in order to reduce land-based pollution and offshore dumping, and a need for adequate port reception facilities for wastes from ships. Provisions under existing regional programmes and/or conventions (such as, *inter alia*, OSPAR, International North Sea Conferences, Trilateral Protection of the Wadden Sea, HELCOM, Barcelona Convention, Istanbul Convention, Cartagena Convention) or legislation (such as, *inter alia*, within the European Community) as well as world-wide conventions (such as the POPs Convention) provide powerful instruments to reach this target. IMO's Particularly Sensitive Sea Areas (PSSAs) provide another measure to reduce the likelihood of accidents, such as oil spills. Increased monitoring and integrated marine and coastal area management provide additional measures towards reaching this target. Target 1.1 provides additional response measures that can be used towards achieving this target.

E. Maintain goods and services from biodiversity to support human well-being

Goal 8. Maintain capacity of ecosystems to deliver good and services and support livelihoods

Overall target 8.1: Capacity of ecosystems to deliver goods and services maintained.

Application to marine and coastal ecosystems: *Capacity of marine and coastal ecosystems to deliver goods and services maintained*

Technical rationale

150. Marine and coastal ecosystems deliver a range of goods and services. These include: (i) provision of protein supply through fish to 6.2 billion people globally as well as other food sources like seaweed; (ii) provision of livelihood and employment for at least 150 million people, particularly in the developing world; (iii) functionality of healthy marine ecosystems that cycle nutrients, including from land run-off into food chains that ultimately supply fish and other products for human consumption; (iv) generation of significant tourism income and support to international commerce; (v) provision of effective barriers to mitigate/protect against severe storms and erosion; and (vi) acting as the major component of global climate regulation. For example, coral reefs provide protection to coastal areas from ocean waves. This protective function alone has an estimated value of US$ 9 billion. [33]/ Other coastal and marine ecosystems, such as mangroves, also have high economic value. For example, the annual market value of seafood supported by mangroves has been calculated to range from $750 to $16,750 per hectare. [34]/

151. Given the substantial economic values provided by marine biodiversity, the costs involved in its conservation and sustainable use are negligible. For example, a recent study estimated that a global network of marine protected areas meeting the World parks Congress target of conserving 20-30 per cent of the world's seas might cost between $5 billion and $19 billion annually to run and would probably

33/ Cesar, H., Burke, L. and L. Pet-Soede (2003) The economics of worldwide coral reef degradation. WWF.

34/ Ronnback, P. (1999) The ecological basis for economic value of seafood production supported by mangrove ecosystems. Ecological Economics 29(2):235-252.

create around one million jobs. 35/ The costs could also be offset by likely social gains from increasing sustainability of fisheries and securing vital ecosystem services, if such measures are taken in partnership with local communities and indigenous people and contribute directly to poverty alleviation and local food security.

152. The World Parks Congress concluded that given the level of threat worldwide to marine ecosystems, there is an urgent need for action to protect and restore ocean health and productivity. This is reinforced by the growing evidence of fisheries decline and collapse, and the increasing pressures on coastal resources as a result of 40 per cent of the world's population living within 100 kilometers of the coast. Furthermore, the growing reach of technology means that the last natural refuges are becoming accessible.

153. Management of marine and coastal resources is always undertaken in the context of scientific uncertainty, and because of this, management action that is precautionary in nature, based on the best available science, and is applied on a broad ecosystem scale can best maintain ecosystem capacity to deliver goods and services. This target can be seen as an application of the target set forward in paragraph 30 (d) of the Plan of Implementation of the World Summit on Sustainable Development, which encourages the application of the ecosystem approach by the year 2010. The ecosystem approach is the primary framework for the implementation of the Convention, and its importance in ensuring the long-term productivity and sustainability of marine and coastal living resources and environments has been highlighted, for example, by the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem, the World Summit on Sustainable Development, the United Nations General Assembly and the recent Fifth Meeting of the United Nations Open-Ended Informal Consultative Process on Oceans and the Law of the Sea. The ecosystem approach also takes into consideration the societal needs of communities dependent on biodiversity resources, and promotes the fair and equitable sharing of the tangible and intangible benefits of biodiversity. It recognizes that humans with their cultural diversity are an integral component of many ecosystems.

Overall target 8.2: Biological resources that support sustainable livelihoods, local food security and health care, especially for poor people maintained.

Application to marine and coastal ecosystems: *Marine and coastal biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained*

Technical rationale

154. According to Agenda 21, "marine living resources provide an important source of protein in many countries and their use is often of major importance to local communities and indigenous people. Such resources provide food and livelihoods to millions of people and, if sustainably utilized, offer increased potential to meet nutritional and societal needs, particularly in developing countries." Sustainable use of such resources can directly contribute to poverty alleviation, and can be in conformity with the Millennium Development Goals (MDGs) as noted in annex I to decision VII/5 (basic principles). In this context, it should be noted that the lives of the majority of fisherfolk, particularly in developing countries, are characterized by high levels of poverty and vulnerability.

155. Marine and coastal resources contribute to local livelihoods through subsistence, artisanal, traditional, customary, commercial and recreational fishing; mining and construction material; harvesting for aquarium and ornamental trades; and harvesting for pharmaceutical trades. In addition, non-extractive activities, such as tourism and aquaculture, enhance the livelihoods of coastal people, when undertaken in

35/ Balmford, A., Gravestock, P, Hockley, N., McClean, C. and C. Roberts (2004) The worldwide costs of marine protected areas. PNAS, Vol. 101, No. 26.

sustainable and participatory ways. It is therefore not surprising that coastal areas generally have higher per capita GNP and better life expectancy than inland areas.

156. Coastal systems generate a variety of seafood products, such as fish, mussels, crustaceans, sea cucumbers and seaweeds. 36/ Capture fisheries within coastal waters (waters down to 50m depth) account for $34 billion in yields annually. Fisheries and fish products provide direct employment to nearly 27 million people. 37/ Globally, the bulk of the people employed in fisheries are poor and many are without alternative sources of work and sustenance. In addition, fish and fishing are important to the cultural life of many coastal communities. The maintenance of healthy marine and coastal ecosystems is therefore directly linked to the well-being of coastal communities. The issues of access, equity and sustainability are important for local communities, and particular attention may be required within the ecosystem approach to address the capacity of nearshore areas to produce resources for those who cannot access more remote areas.

157. Coral reefs, for example, are found on the coasts of the world's most heavily populated developing countries and provide food and security for millions of people. Potential net benefits from coral reefs have been estimated in the order of $30 billion per year, if coral reefs were well-managed and intact. Potential reef fishing benefits are estimated at US$ 5.7 billion annually, while tourism and recreation benefits are estimated to be US$ 9.6 billion. 38/ Recreational fishing is a major industry in many parts of the world, and coral reef based recreational fisheries generate over $100 million annually. Coral reefs are also a potential source of pharmaceutical products, and are already used for HIV and cancer treatments. The pharmaceutical industry has discovered potentially useful substances among the seaweeds, sponges, corals, sea cucumbers and sea anemones inhabiting coral reef ecosystems. 39/

158. Tools to reach this target include marine and coastal protected areas, particularly community-based areas, the application of integrated marine and coastal area management, including regulating the harvesting of marine resources and mariculture, and controlling physical degradation and pollution from land-based and sea-based activities. Sustainability of local livelihoods and biodiversity are linked to the consumption of local products at the local level. Incorporation of information relevant to local livelihoods into economic indices could help guide overall decisions concerning advantages of keeping the benefits of biodiversity at the local level, as opposed to, for example, favouring initiatives that may be positive to the economy but not necessarily to the quality of life of local people. This target is related to the targets under goals 9 and 10, while the response measures are detailed in the targets under goals 1 and 2.

F. Protect traditional knowledge, innovations and practices

Goal 9: Maintain socio-cultural diversity of indigenous and local communities

Overall target 9.1: Protect traditional knowledge, innovations and practices

***Application to marine and coastal ecosystems**: Protect traditional knowledge, innovations and practices associated with marine and coastal biological diversity*

Overall target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing

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36/ Moberg, F. and C. Folke (1999) Ecological goods and services of coral reef ecosystems. Ecological Economics 39(2):271-284; and Ronnback, P. (1999) The ecological basis for economic value of seafood production supported by mangrove ecosystems. Ecological Economics 29(2):235-252.

37/ FAO 2002

38/ Cesar, H., Burke, L. and L. Pet-Soede (2003) The economics of worldwide coral reef degradation. WWF.

39/ Carte, B.K. (1996) Biomedical potential of marine natural products. Bioscience 46(4): 271-286; and Moberg, F. and C. Folke (1999) Ecological goods and services of coral reef ecosystems. Ecological Economics 39(2):271-284.

Application to marine and coastal ecosystems: *Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing, regarding marine and coastal biological diversity*

Combined technical rationale for targets 9.1 and 9.2

159. Indigenous, traditional and local communities have a wealth of knowledge about biodiversity and its sustainable management, and in many countries marine and coastal biodiversity underpins livelihoods and food security. For example the concept of sanctuaries and untouchable places is present among indigenous populations of many different ethnic groups. 40/ Application of sustainable local and traditional knowledge in the management of biological resources may also promote the maintenance of local and traditional knowledge systems. Traditional knowledge, particularly oral knowledge, on practices such as use of traditional fishing gear, is easily lost, and documenting local knowledge is important for its protection. World-wide experience has also shown that local and indigenous communities must be empowered to ensure that their knowledge is applied in marine and coastal biodiversity management, highlighting the need for both bottom-up and top-down approaches to management. 41/ Their right to access to information should be guaranteed enabling indigenous and local communities to effectively participate as stakeholders in biodiversity management processes, for example in the establishment and management of marine and coastal protected areas, and to benefit from the goods and services of biodiversity. In addition, communities should be guaranteed the right of access to resources. For example, in many cases tourism and mariculture developments limit the access of local communities to beaches and thus to their traditional fishing grounds.

160. This target is consistent with target 9 of the Millennium Development Goals (to integrate principles of sustainable development into country policies and programmes and to reverse the loss of environmental resources) and Agenda 21. Measures to address the decline in associated indigenous and local knowledge should be implemented consistent with the Convention's programme of work on Article 8(j) and related provisions. Fair and equitable sharing of benefits also plays a potentially important role in poverty eradication and environmental sustainability, consistent with the goals and targets of the Millennium Development Goals.

G. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Overall target 10.1: All transfers of genetic resources are in line with the Convention on Biological Diversity, International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements.

Application to marine and coastal ecosystems: *All transfers of genetic resources derived from marine and coastal biological diversity are in line with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements*

Overall target 10.2: Benefits arising from the commercial and other utilization of genetic resources shared with countries providing such resources

Application to marine and coastal ecosystems: *Benefits arising from the commercial and other utilisation of genetic resources derived from marine and coastal biological diversity shared with the countries providing such resources*

40 Report of the Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas

41/ Kelleher, G (2000) Proceedings from the International Coral Reef Symposium, Bali, Vol 2, P. 609.

Combined technical rationale for targets 10.1 and 10.2

161. The pharmaceutical industry has discovered potentially useful substances among the seaweeds, sponges, corals, sea cucumbers and sea anemones inhabiting coral reef ecosystems. In addition, other ecosystems, such as hydrothermal vents, contain novel genetic resources that may be of use to the pharmaceutical and other industries.

162. In order to assist Parties, Governments and relevant stakeholders with the implementation of the access and benefit-sharing provisions of the Convention, the Conference of the Parties adopted at its sixth meeting the Bonn Guidelines on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits arising from their Utilization. These voluntary guidelines are meant to assist Parties and relevant stakeholders when establishing legislative, administrative and policy measures on access to genetic resources and benefit-sharing and/or when negotiating contractual arrangements for access and benefit sharing. Against this background, this target aims to ensure that national systems established to implement the access and benefit-sharing provisions of the Convention, also cover access to marine and coastal genetic resources and the fair and equitable sharing of benefits arising out of the utilization of these resources, in accordance with the Convention. In addition to the international regime on benefit sharing, governments have the responsibility of ensuring that indigenous and local communities share benefits from the utilization of local resources.

163. It should be noted however that genetic resources in the deep seabed in areas outside of national jurisdiction are not covered by the access and benefit-sharing provisions of the Convention, and that this issue may deserve further consideration in the context of decision VII/5 and in accordance with the legal framework set up by the United Nations Convention on the Law of Sea.

H. Ensure provision of adequate resources

Goal 11.1: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention

Overall target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.

Application to marine and coastal ecosystems: *New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on marine and coastal biological diversity under the Convention, in accordance with Article 20*

Overall target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20, paragraph 4.

Application to marine and coastal ecosystems: *Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on marine and coastal biological diversity under the Convention, in accordance with its Article 20, paragraph 4*

Combined technical rationale for targets 11.1 and 11.2

164. The lack of financial resources, capacity, and sustainable technological resources are consistently cited by Parties as the main impediments for the effective implementation of the Convention and its provisions. In addition, development of improved economic instruments and social institutions is needed. Therefore, the undertaking of activities to reach the targets listed here are dependent on the availability of such resources. It should be noted, though, that transfer of inappropriate technology has caused habitat

and fish stock destruction in some developing countries, and therefore the emphasis under this target is placed on activities related to transfer of sustainable technologies.

165. In addition to new and additional financial resources, best use should be made of existing resources in both developing and developed countries, and developed countries may also need to refocus additional resources towards the conservation and sustainable use of biodiversity. Transfer of knowledge is also an important component of this target and may occur both from developed countries to developing countries, and vice versa. Increased communication and the formation of partnerships and regional networks are vital for the achievement of the targets listed in this document, as are capacity building, including education, public awareness and access to information.

Annex IV

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