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Sixteenth meeting

Montreal, 30 April-5 May 2012

Item 6.2 of the provisional agenda*

REPORT OF JOINT EXPERT MEETING ON ADDRESSING BIODIVERSITY CONCERNS IN SUSTAINABLE FISHERIES

INTRODUCTION

1. At its tenth meeting, the Conference of Parties to the Convention on Biological Diversity adopted a new ten-year Strategic Plan for Biodiversity 2011-2020 with its Aichi Biodiversity Targets, in its decision X/2. Among 20 Aichi Biodiversity Targets, the Strategic Plan includes Target 6, which reads: “By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.”

2. Likewise, it was noted at the tenth meeting of the Conference of the Parties, in paragraph 53 of decision X/29 on marine and coastal biodiversity, an urgent need to further review, in accordance with international law, including the United Nations Convention on the Law of the Sea (UNCLOS), the impacts of unsustainable fishing, such as destructive fishing practices, overfishing, and illegal, unreported and unregulated (IUU) fishing, on marine and coastal biodiversity and habitats, building upon the initial efforts made in collaboration with the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP) and the Fisheries Expert Group of the Commission on Ecosystem Management of the International Union for Conservation of Nature (IUCN-CEM-FEG).

3. The Conference of the Parties also requested the Executive Secretary to collaborate with FAO, UNEP, regional fisheries management organizations (RFMOs), IUCN-CEM-FEG, and other relevant organizations, processes, and scientific groups, on the ad hoc organization of a joint expert meeting to review the extent to which biodiversity concerns, including the impacts on marine and coastal biodiversity of pelagic fisheries of lower trophic levels, are addressed in existing assessments and propose options to address biodiversity concerns and report on the progress of such collaboration at the sixteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), scheduled for 30 April – 5 May 2012.

4. Pursuant to the above request and with financial support from the Governments of Norway and Japan (through the Japan Biodiversity Fund), the Executive Secretary convened, in collaboration with FAO, UNEP and IUCN-FEG-CEM, the Joint Expert Meeting on Addressing Biodiversity Concerns in

* UNEP/CBD/SBSTTA/16/1.

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Sustainable Fishery, in Bergen, Norway, from 7 to 9 December 2011. The Government of Norway hosted the meeting and provided technical support, through the Institute of Marine Research of Norway, to the Secretariat of the Convention on Biological Diversity in its scientific preparation for the meeting.

5. To further facilitate effective deliberation of the meeting, the Secretariat commissioned a background study, with financial support from the UNEP Department of Environmental Policy Implementation (DEPI) and in collaboration with FAO, RFMOs and IUCN-FEG-CEM, to review the extent to which biodiversity concerns are addressed in existing assessments. The result of this study is compiled and submitted for consideration to the meeting in a note by the Executive Secretary (UNEP/CBD/JEM.BC-SF/1/2).

6. The meeting was attended by experts from Australia, Brazil, Canada, Ecuador, Japan, Malaysia, Norway, Philippines, Sudan, Uganda, the United Kingdom, the Food and Agriculture Organization of the United Nations, the Convention on the Conservation of the Antarctic Marine Living Resources (CCAMLR), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the North East Atlantic Fisheries Commission (NEAFC), the Southwest Indian Ocean Fisheries Commission (SWIOFC), UNEP/GRID-Arendal, IUCN-CEM-FEG, Conservation International, and International Collective in Support of Fish Workers. The full list of participants is attached as annex I.

ITEM 1. OPENING OF THE MEETING

7. Tore Nepstad, Director of Institute of Marine Research of Norway, opened the meeting at 9 a.m. on Wednesday, 7 December 2011. He provided a brief introduction to the work of the Institute of Marine Research, including its history, mandate and key scientific contribution to the overall marine resources and environmental management in Norway. He also highlighted the importance of marine resources to Norway and said that Norway was one of the world's largest producers of fish, and was the second largest exporter of seafood in the world. He concluded his statement by emphasizing Norway's commitments to international cooperation toward achieving better knowledge on, and sustainable management of, marine resources at a global scale.

8. On behalf of the Executive Secretary of the Convention on Biological Diversity, Jihyun Lee (Environmental Affairs Officer of the Convention) delivered the opening statement, highlighting the Strategic Plan for Biodiversity 2011-2020 and Aichi Biodiversity Targets, adopted by the Conference of the Parties to the Convention at its tenth meeting. She emphasized, in particular, Target 6 on sustainable fishery, outlined the guidance from the Conference of the Parties on addressing biodiversity concerns in sustainable fishery in collaboration with FAO, UNEP and RFMOs and elaborated the tasks given to this meeting. She also informed the participants about the 2012 International Day for Biodiversity on the theme of marine and coastal biodiversity, inviting them to join hands together with the Convention Parties and partners in the forthcoming global celebration and awareness-building activities, which would pave the way towards the high level segment panel on marine and coastal biodiversity at the eleventh meeting of the Conference of the Parties, to be hosted by India in October 2012.

9. On behalf of Liv Holmefjord, Norwegian Director General of Fisheries, Per Sandberg delivered welcoming remarks. He highlighted the importance of bilateral, regional and global cooperation in addressing challenges in managing marine living resources. He said that controlling the exploitation rate and pattern was beneficial for the marine ecosystem at large. He also emphasized the importance of informed management actions, as well as engaging fishing communities in planning and implementing management actions, using the example of Norway's recent establishment of a moratorium for bottom trawling in the deep ocean – an area covering approximately 40 per cent of waters under Norwegian jurisdiction.

ITEM 2. ELECTION OF THE CO-CHAIRS, ADOPTION OF THE AGENDA AND ORGANIZATION OF WORK

10. After a brief self-introduction by participants, Reidar Toresen (Norway) and Hideki Nakano (Japan) were elected as the meeting co-chairs, based on proposal from Jake Rice (Canada), which was seconded by Monica Brick Peres (Brazil).

11. Participants then adopted the provisional agenda (UNEP/CBD/JEM.BC-SF/1/1) and the proposed organization of work as contained in annex II to the annotations to the provisional agenda (UNEP/CBD/JEM.BC-SF/1/1/Add.1).

12. The meeting was organized in plenary session and break-out group sessions. The Co-Chairs of the meeting nominated Jake Rice (Canada), David Smith (Australia) and Gabriella Bianchi (FAO) as rapporteurs for the plenary sessions/break-out group sessions, taking into consideration the expertise and experiences of the meeting participants and in consultation with the Secretariat of the Convention on Biological Diversity.

ITEM 3. REVIEW THE EXTENT TO WHICH BIODIVERSITY CONCERNS ARE ADDRESSED IN EXISTING ASSESSMENTS

13. For the consideration of this item, the meeting had before it a note by the Executive Secretary (UNEP/CBD/JEM.BC-SF/1/2) containing a background study.

14. Jake Rice provided a presentation on a background study, "The extent to which biodiversity concerns are addressed in existing assessments", by RFMO/As, and in their thematic assessments and policies. The summary of his presentation is contained in annex II.

15. The meeting participants were invited to review, through a themed presentation and open plenary discussion, the extent to which biodiversity concerns are addressed in existing assessments. The results of plenary discussions are contained in annex III.

ITEM 4. REVIEW THE IMPACTS ON MARINE AND COASTAL BIODIVERSITY OF PELAGIC FISHERIES OF LOWER TROPHIC LEVELS

16. For the consideration of this item, the meeting had before it two background papers prepared by Hein Rune Skjoldal (Norway) (UNEP/CBD/JEM.BC-SF/1/3) and Simon Jennings (United Kingdom) (available at <http://www.cbd.int/doc/?meeting=JEM-BCSF-01>), respectively.

17. Mr. Skjoldal gave a presentation titled "Ecological effects of fisheries on small pelagics".

18. Mr. Jennings provided a presentation titled "The effects of fisheries for low trophic level species on biodiversity and the prospects and options for mitigating these effects".

19. The summary of their presentations are contained in annex II.

20. The meeting participants were invited to review, through themed presentations and open plenary discussion, the impacts on marine and coastal biodiversity of pelagic fisheries of lower trophic levels. The results of plenary discussion are contained in annex IV.

ITEM 5. PROPOSE OPTIONS TO ADDRESS BIODIVERSITY CONCERNS IN SUSTAINABLE FISHERY MANAGEMENT AND RELATED ASSESSMENTS

21. For the consideration of this item, the following experts were invited to provide presentations on sharing national/regional/global experiences/lessons learned on options to address biodiversity concerns in sustainable fishery management and related assessments:

- (a) Ms. Bianchi opened with “Options to address biodiversity concerns in sustainable fisheries”;
- (b) Mr. Bjorn Krafft (CCAMLR) presented “Southern Ocean fisheries resources and management”;
- (c) Mr. Smith presented “Australian experiences in addressing biodiversity concerns in sustainable fisheries”;
- (d) Ms. Brick Peres presented “Brazilian experiences in sustainable fisheries”;
- (e) Mr. Nakano presented “Fisheries as a monitoring tool for the environment”;
- (f) Mr. Peter Gullestad (Norway) presented “Fisheries management regime and structural policy in Norway” (background paper available at <http://www.cbd.int/doc/?meeting=JEM-BCSF-01>);
- (g) Mr. Gil Adora (Philippines) presented “Addressing biodiversity concerns in sustainable fishery management in the Philippines”;
- (h) Mr. Jan Robinson (SWIOFC) presented “SWIOFC: example of challenges and opportunities”.

22. Building upon the plenary discussion under agenda items 3 and 4 as well as the experiences and lessons learned at global, regional and national levels on addressing biodiversity concerns in sustainable fishery as presented above, the meeting participants then split into two break-out groups in accordance with the subject matters considered under agenda items 3 and 4, respectively, to identify options to address specific biodiversity concerns in sustainable fishery management and related assessments:

- (a) Group 1: Extent to which biodiversity concerns are addressed in existing assessments;
- (b) Group 2: Impacts on marine and coastal biodiversity of pelagic fisheries of lower trophic levels.

23. Each break-out group was tasked to address the following questions in their group discussion:

- (a) What are the key biodiversity issues and concerns to be addressed?
- (b) For each identified biodiversity issue/concern, what are the options that can be proposed regarding:
 - (i) Research, monitoring and data/information management;
 - (ii) Assessment and management measures; and
 - (iii) Governance/institutional changes.
- (c) For the options identified above, what are the capacity-building priorities?
- (d) For the options identified above, what are the possible roles the Convention on Biological Diversity and its network of experts can play, in particular in collaboration with FAO and RFMOs/RFMAs?

24. The results of the break-out groups were reported at the plenary for consideration. The meeting participants in the plenary session proposed options to address biodiversity concerns in sustainable fishery

management and related assessments. The results of plenary discussion are contained in annex III and IV, together with the results of the discussion under agenda items 3 and 4.

ITEM 6. OTHER MATTERS

25. Under this item, the meeting participants considered possible ways of publishing the background documents submitted to this meeting (e.g., CBD Technical Series or peer-reviewed scientific journals) in appreciation of their potential contributions to scientific discussion on the issues related to addressing biodiversity concerns in sustainable fishery management. The meeting then requested the Secretariat to work on possible options, subject to funding availability, in consultation with the authors of the background documents.

ITEM 7. ADOPTION OF THE REPORT

26. Participants considered and adopted, with amendments, the report of the workshop on the basis of a draft report prepared and presented by the Co-Chairs.

ITEM 8. CLOSURE OF THE MEETING

27. The Co-Chairs thanked the meeting participants for their valuable contributions toward successful meeting conclusions; rapporteurs and the Secretariat members for their hard works in preparing the draft meeting report; and experts who have contributed excellent background documents that enabled fruitful and effective meeting deliberations. The meeting participants thanked the Government of Norway and the Institute of Marine Research for their kind support and warm and generous hospitality. The meeting also appreciated the kind contributions of FAO, UNEP and the RFMOs for the scientific and technical preparations for the meeting background documents.

28. The meeting was closed at 5 p.m. on Friday, 9 December 2011.

Annex I

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*Annex II***SUMMARY OF THEMATIC PRESENTATIONS****Item 3****Mr. Jake Rice (Canada)**

Mr. Jake Rice gave a presentation on the extent to which biodiversity concerns are addressed in fisheries assessments. He showed the results of a background study undertaken in response to paragraph 53 of COP decision X/29, reviewing stock assessments of fourteen regional fisheries management organizations (RFMOs) to assess the extent to which they address biodiversity concerns. Mr. Rice presented a series of conclusions, which highlighted that individual assessments were not the best documents to focus on due to the overall low availability of data to address dynamics of recruitment, natural mortality and growth in annual stock assessments. Species relationships and environmental forcing were most robustly handled by harvest strategies, but there is still a need for better information on where harvest strategies come from, and how biodiversity is (or could be) addressed in them. Thematic reviews of by-catches and habitat impacts were fair and increasing, and explicit acknowledgement of biodiversity considerations was nearly universal in higher level policies and conventions. Finally, the specificity with which biodiversity considerations were addressed in policies and regulations increased with the maturity of the RFMOs.

Item 4**Mr. Hein Rune Skjoldal (Norway)**

Mr. Hein Rune Skjoldal made a presentation on the ecological effects of fisheries on small pelagics. He presented the most important small pelagic fisheries in Norway, and showed their long-term biomass trends influenced by intensive catch, ecosystem interactions and climate change, as well as their effect on zooplankton biomass fluctuations. Mr. Skjoldal also mentioned several important fisheries management aspects, including the ecosystem approach and stock and ecosystem assessments.

Mr. Simon Jennings (United Kingdom)

Mr. Simon Jennings presented on the effects of fisheries for low trophic level species on biodiversity and the prospects and options for mitigating these effects. He showed that with direct effects, fishing low trophic level species at the maximum sustainable yield (MSY) is very unlikely to place those species at risk of extinction or additional genetic constraints as they routinely recover from very low population abundance during natural fluctuations. With indirect effects, if fishing mortality rates on low trophic level species are set to meet targets for the abundance of dependent predators, they are expected to be lower than those that provide MSY for low trophic level species. Mr. Jennings also demonstrated that fluctuations in populations of low trophic level species are considerable, but harvest control measures that prevent fishing at lower biomass may help to minimize these fluctuations, promote recovery from low abundance and provide more food for dependent predators. However, such approaches could also increase variability in yields for the fishery. Finally, efforts to define acceptable fishing mortality rates for low trophic level species in an ecosystem context need to be informed by a debate on acceptable impacts on, and targets for, predator species.

Item 5**Ms. Gabriella Bianchi (FAO)**

Ms. Gabriella Bianchi presented options to address biodiversity concerns in sustainable fisheries. She highlighted the importance of fish as a food source and livelihood for millions of people across the globe, and particularly in developing countries. She emphasized that the global objective for the fishery sector, which is the most dependent on healthy ecosystems, is to conserve the fishery systems including all components related to ecological and human well-being. Sustainability principles and guidelines including biodiversity concerns, such as the FAO Code of Conduct for Responsible Fisheries, have been

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developed within various international and national legal and environmental instruments, but often systems for their enforcement are not in place. Assessments are required to improve fisheries management outcomes at all levels, and include both broad integrated assessments of a given fishery to specific assessments of key system components. She mentioned that the ecosystem approach to fisheries, and the risk-based approach for its implementation, is a flexible tool that can be adapted to various cultural contexts to handle situations with different levels of data availability and institutional capacity and is considered as the most appropriate framework for reconciling conservation and sustainable use in fisheries.

Mr. Bjørn Krafft (CCAMLR)

Mr. Bjørn Krafft made a presentation on the Southern Ocean fisheries resources and management. He started by showing contemporary evidence of historical intensive exploitation of marine resources in the Southern ocean, including fish, whales and other marine and terrestrial mammals, as well as seabirds. With growing international concern, especially with regards to the high potential of the krill fishery, legal and environmental instruments and bodies were put in place to protect those resources, including CCAMLR, which was signed in 1980. Mr. Krafft described the overall structure of the Commission and its main current focus, which is the overall development of feedback-management procedures for the krill fishery. The Ecosystem Monitoring Programme (CEMP), monitoring colonies of land-based predators as indicators of general ecosystem health, and CCAMLR's work on SSMUs (small scale management units), were also presented.

Mr. David Smith (Australia)

Mr. David Smith shared Australian experiences in addressing biodiversity concerns in sustainable fisheries. He presented national policy drivers and harvest strategies targeted at stopping overfishing and rebuilding overfished stocks, while trying to maintain ecologically and economically sustainable stocks, especially for key commercial species. Mr. Smith demonstrated that ecological risk assessment (ERA) and spatial management represent key tools in support of ecosystem-based fishery management (EBFM). He also showed technical examples and applications of the use of management strategy evaluation (MSE) in fisheries management, and described the applicability of Models of Intermediate Complexity for Ecosystem assessments (MICE).

Ms. Monica Peres (Brazil)

Ms. Monica Peres shared Brazilian experiences in sustainable fisheries. She explained that fisheries assessment, management, monitoring and enforcement represent important challenges in the country due to a growing population, extremely high regional differences and weak legal and institutional framework for fisheries management. She highlighted some notable examples of Marine Protected Areas (MPA) effectiveness that can be used to promote ecosystem-based management at the national level. Extractive Reserves (RESEX) are especially good examples of fisheries management at the local scale. They are bottom-up initiatives, created at the demand of traditional and organized fisheries communities, targeting sustainable exploitation of natural resources in public territories. RESEX are managed by the communities, with traditional management tools that usually include no-take areas and fishery closures. They are recognized as being successful in guaranteeing environmental conservation, and cultural richness as well as income and food security for coastal and riverside communities. Ms. Peres mentioned that other conservation tools such as Red List assessments, action plans and identification of biodiversity hotspots should contribute valuable information and important recommendations to fisheries management in the country in a near future, as well as provide baseline information for marine protected area (MPA) management. Sustainable fisheries should be considered as an important tool to increase food security and eliminate extreme poverty of coastal and riverside communities.

Mr. Hideki Nakano (Japan)

Mr. Hideki Nakano made a presentation on fisheries as a monitoring tool for the environment. Using past and present data from North Atlantic swordfish and shark stock assessments, he illustrated the relevance

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of using precise and representative fishery statistics for environmental monitoring, by showing long-term increasing trends of biomass, catch rates and fishing grounds distribution for the two fisheries. He also demonstrated that ERA and productivity, susceptibility and vulnerability ranks can be used to determine management priorities. Mr. Nakano described mitigation measures implemented by the International Commission for the Conservation of Atlantic Tunas (ICCAT) to deter seabirds from fishing fleets, which can be applied to many other regional fisheries management organizations (RFMOs).

Mr. Peter Gullestad (Norway)

Mr. Peter Gullestad presented a practical approach towards an ecosystem-based fisheries management in Norway. He presented the fisheries management regime and structural policy in Norway and emphasized that international collaboration was vital in fisheries management. He illustrated past and current trends of important stocks of pelagic and ground fish species in the country, explaining that their recovery could be attributed to improved exploitation patterns, introduction of structural measures to reduce overcapacity, optimisation of long-term economic output, and incorporation of additional ecosystem considerations in management as scientific knowledge became available. Mr. Gullestad then presented two tables summarizing and grading stock data and fishery issues relevant to the development of an EBFM, currently used by the Norwegian Government as the basis for decisions on which new or improved measures should be prioritized in the future with respect to regulatory development.

Mr. Gil Adora (Philippines)

Mr. Gil Adora presented on addressing biodiversity concerns in sustainable fishery management in the Philippines. He provided participants with facts and figures on the rich and diverse coastal and marine biodiversity of the Philippines, and presented national biodiversity issues and concerns, such as declining fisheries, biodiversity loss and overfishing. Mr. Adora described several existing initiatives, programmes and activities currently in place to address those issues, such as various national agencies, legislations, administrative orders, as well as marine protected areas and biodiversity-related programmes and projects.

Mr. Jan Robinson (SWIOFC)

Mr. Jan Robinson made a presentation on SWIOFC as an example of challenges and opportunities. He described the composition, structure and mandate of SWIOFC, as well as the status of fisheries it assesses, and emphasized that strong national and regional policies to develop offshore small and large pelagic fisheries represent an opportunity for addressing biodiversity issues in an ecosystem approach to fisheries (EAF) context in that region. He also highlighted the need for alternatives for data- and capacity-limited settings, and the possibility of building harvest-control rules on ERA/PSA and avoiding ecological collapse by linking control rules to ecological thresholds. Mr. Robinson concluded by mentioning that mitigation of by-catch and gear management are socially and economically acceptable and technologically attainable, and that policy and governance should be coherent and relevant and account for differences in conservation, economic and social values among fisheries.

Annex III

MEETING CONCLUSIONS ON THE EXTENT TO WHICH BIODIVERSITY CONCERNS ARE ADDRESSED IN EXISTING ASSESSMENTS AND OPTIONS TO ADDRESS BIODIVERSITY CONCERNS

Overarching conclusions

1. The meeting agreed on seven overarching conclusions which set the context for interpreting the results of the review:

(a) Fisheries affect biodiversity at all scales. The most significant issues are those failures or absence of management that have not achieved sustainable use nor ensured that impacts of fisheries on biodiversity are within safe ecological limits.

(b) Fisheries management agencies have been aware of, and to varying extents working on, these biodiversity considerations for some time. The FAO Code of Conduct and its supporting documents, in particular the FAO Guidelines on EAF, recognize the importance of explicitly including ecosystem considerations in fisheries management. If the guidance in these documents was fully implemented, biodiversity considerations would be better addressed.

(c) Notwithstanding progress that has been made on addressing some biodiversity impacts relative to some fisheries, we are still very far from achieving full implementation of the guidance referred to in paragraph 2.

(d) Fisheries management bodies at all levels are the right bodies to be responsible for managing fisheries, including the impacts of fisheries on biodiversity. However, there is a need for: (i) enhanced capacity of these fisheries management agencies; (ii) constructive interagency collaboration; and (iii) full and meaningful participation of a wide range of biodiversity experts and relevant stakeholders in the fisheries management process.

(e) There is a need for enhancement of the mandates of the governance and assessment components of fisheries management bodies where this has not already happened, so that biodiversity considerations are explicitly a core part of their work and accountability, not just mentioned in their mandates. There also has to be an overall will and resources to enable fisheries management agencies to deliver the full mandate.

(f) Regional cooperation among fisheries (and other) agencies becomes even more important as mandates are enhanced.

(g) Appropriate approaches for addressing biodiversity considerations in fisheries management will be situation specific and depend greatly on the capacities and information available. The management agencies should always use the best available information, and substantial progress can be made even in very data-limited situations.

Treatment of biodiversity considerations in assessments

What are the core biodiversity concerns evaluated in existing assessments?

2. The meeting identified the following:

- (a) Ensuring adequate availability of target stock as prey for dependent predators;
- (b) Not compromising the ability of target stock to fill its ecological role as predator and competitor;
- (c) Ensuring by-catches are within safe ecological limits;

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(d) Ensuring habitat impacts are sustainable;

(e) Fishery depends on healthy ecosystems, so management must take consideration of fishery impacts on the ecosystem being harvested and other human activities must also be sustainable;

3. At the level of target species, genetic diversity and population diversity can be affected by fisheries. The request by the Conference of the Parties in its X/29 decision did not ask for this concern to be addressed and they are not fully addressed in this document.

4. FAO defines fishery management as “The integrated process of information gathering, analysis, planning, consultation, decision-making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulation or rules which govern fisheries activities in order to ensure the continued productivity of the resources and the accomplishment of other fisheries objectives”. We use this definition as used by FAO.

How are these core biodiversity issues taken into consideration in fisheries assessments?

5. There is little explicit attention to these issues in stock assessments. However it is consistent with the expert reviews (e.g., ICES 2002¹, 2004² and 2010³), which have found it is necessary to be extremely knowledge- and data-rich in order to incorporate ecosystem considerations analytically into individual stock assessments.

6. The above expert reviews have concluded that biodiversity issues related to the ecological role of target species in fisheries are often treated in setting the harvest strategies for the target species. The review found explicit consideration of the needs of predators in setting exploitation rates for stocks of several “forage species”, and implicit consideration of the ecological role of the species in setting the harvest strategies for many other stocks. However the treatment of biodiversity considerations in setting harvest strategies for target species is not done nearly as often, as completely, nor as explicitly as is needed.

7. The review found more attention to these biodiversity issues in thematic treatment by the science advisory groups of fisheries management bodies, such as RFMOs. Reports on by-catches and habitat impacts of specific fisheries, in particular, were frequently found in RFMO publications, and reported for many national fisheries management agencies. This is consistent with by-catches and habitat impacts being associated with a fishery as a whole, and not with one individual stock harvested by the fishery. However, the depth of treatment of the impacts was highly variable among reports, and often little more than a narrative about the nature of the possible impacts, and a call for more focused study and monitoring.

8. The review found fairly full attention to the major biodiversity considerations in the RFMO conventions and overarching high-level policies. However, in some cases the priority that the fisheries management agencies could give to the biodiversity commitments in the RFMO conventions and policies was constrained by these documents giving explicit primacy to single-species MSY or other harvest goals for the target species.

9. Underneath the policy commitments of the fisheries management agencies to address biodiversity considerations, it is implementation that is highly variable, and often inadequate. Greater maturity and experience of these agencies generally leads to more coverage of biodiversity issues in their actual assessment and management practices. However limitations on knowledge of the ecosystems and the

¹ ICES 2002. Report of the Study Group on Incorporation of Process Information into Stock Recruitment Models, Lowestoft, UK, 14-18 January 2001. ICES CM 2002/C:01.

² ICES 2004. Report of the Study Group on Growth, Maturity and Condition in Stock Projections (SGGROMAT), Aberdeen, UK, 19–23 January 2004. ICES CM 2004/D:02. Copenhagen.

³ ICES 2010. Report of the Benchmark Workshop on Roundfish (WKROUND), Copenhagen, Denmark, 9–16 February 2010. ICESCM 2010/ACOM: 36.

fisheries, and on capacities for assessments and management can impede the achievement of the high-level biodiversity goals of the agencies as per the above paragraph 8.

10. For small-scale fisheries, RFMOs and other agencies responsible for their management often already have biodiversity measures in place as part of routine activities, both implicitly and explicitly. This was thought to be because biodiversity considerations are often more intrinsically part of those fisheries, which are often multi-species and adaptive or opportunistic.

11. The initiatives on an ecosystem approach to fisheries (EAF), led by FAO and its partners, help address these issues in target species. Moreover, the EAF acknowledges explicitly that ecosystem and biodiversity issues should be a central part of implementation of the EAF, having equal status with target species considerations. Many institutional, assessment, and management initiatives that are part of EAF will have benefits for biodiversity as well as target species, even if developed primarily to address problems associated with sustainable use of the target species.

Options for enhancing the treatment of biodiversity considerations in fisheries policy, assessment and management

Options for institutional change

12. All the EAF components promoting institutional strengthening will help with addressing biodiversity issues.

13. There is a need for greater coherence in the roles of agencies for fisheries management and for conservation of biodiversity (and with other sectoral management agencies) in management.

14. There is a need for greater coherence between conservation and fisheries policies within and among jurisdictions for fisheries management and biodiversity conservation. This should be supported by the recognition and integration of agreed international, regional or national biodiversity targets into respective policies.

15. There is a corresponding need for integration of their choices and application of tools for management, enforcement and surveillance, to take advantage of possible synergies and avoid conflicts among measures being applied by different agencies.

16. The explicit agreements on cooperation between CITES-FAO and OSPAR-NEAFC are good examples of possible approaches to improving coherence among agencies in their efforts at monitoring, assessments, and application of regulatory and management measures.

17. Context-specific decentralization of decision-making, where appropriate, will allow bottom-up management initiatives to bring biodiversity considerations into fisheries, where community concerns for biodiversity are present.

18. Marine spatial planning provides a process and approach for more integrated planning of human activities, including fisheries, and conservation of biodiversity. Processes, including marine spatial planning processes, need to be created or strengthened, where fisheries and biodiversity considerations are taken into account in coherent ways across sectors.

19. Within Parties, the national focal points of the CBD should ensure that CBD documents relevant to fisheries should be forwarded to the agencies responsible for fisheries policy and management within the country. Likewise the national focal points of FAO and RFMOs should do the same for documents they receive that are relevant to the national agencies responsible for environment or biodiversity conservation.

20. Processes and mechanisms to promote much greater transboundary cooperation are needed. Even when issues of fisheries target species may be possible to address within range states, associated biodiversity concerns may extend well beyond the range states.

21. Policies for fishing capacity management and reduction, and for addressing harmful subsidies, need to be designed to take into account the full range of biodiversity outcomes, not just improving the status of the target species and the performance of the fisheries. This will often require considering potential biodiversity impacts of displaced fishing capacities, and the biodiversity impacts of possible alternative livelihood choices of people affected by the policies.

22. Capacity-building is needed everywhere, including increasing public awareness and training in these biodiversity issues.

Options for management processes and measures

23. Fisheries should all have management plans or their equivalents. Conservation and biodiversity objectives for the fisheries must be explicit in these fisheries management plans, and have an equal status in those plans. These fisheries management plans must also address social and economic impacts of measures in ways that are integrated with the target species and biodiversity impacts of the fisheries.

24. The accountability for fisheries management agencies to achieve biodiversity objectives should be as high as the accountability of those agencies for achieving fisheries objectives.

25. When harvest strategies are set, they should take into account both fisheries and biodiversity outcomes, and existing and new harvest strategies should be evaluated for sustainability and robustness relative to all the outcomes and objectives for fisheries, and not just fishery harvest outcomes and objectives. Exploitation patterns of fisheries should be evaluated relative to biodiversity impacts of the fisheries and not just the impacts of the fishery on the target species.

26. To the extent that community empowerment and engagement is appropriate for a fishery, the definition of “stakeholders” must ensure those with biodiversity interests have fully legitimate status in the community processes.

27. When alternate tools are available to deliver fishery outcomes, the tools adopted should be those that deliver the best biodiversity outcomes. Spatial tools, including fisheries spatial tools, have a unique role in delivering some biodiversity outcomes because they can reduce fishing impacts on some types of biodiversity, even when other tools are not used.

28. Capacity-building for all aspects of management is a particular priority.

Options for assessment and monitoring

29. Tools for assessment in data-poor situations exist and their wider use would pay benefits for both addressing biodiversity considerations and ensuring sustainable use of the target species. However, further work is required, particularly the development of harvest strategies in data-poor situations.

30. It often proved difficult to find information on RFMOs and other fisheries management agency websites regarding their treatment of biodiversity considerations in their work. There is scope for greater transparency in reporting such work, as well as in its conduct.

31. Assessment of the impacts of fisheries on biodiversity is important, and should be routine practice as called for by the Conference of the Parties to the Convention on Biological Diversity in its decision IX/20 and the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas.⁴

32. Little evidence was found that fishery management agencies have tested the robustness of their harvest strategies and management measures with regard to taking biodiversity considerations into account. Such testing should be a routine part of evaluating harvest strategies and management tools.

33. Similarly little evidence was found that fisheries management agencies have tested the biodiversity outcomes of harvest strategies and management measures that have been in place long

⁴ <http://www.fao.org/docrep/011/i0816t/i0816t00.htm>.

enough for their effectiveness to be evaluated. Such performance testing is a core component of adaptive management relative to EAF, and should become routine practice.

34. Directed research is needed on how to avoid deleterious ecological states and rebuild stocks in the developing world where controlling access and effort in the fisheries is socio-economically difficult costly measures for stock enhancement and for controlling access to fisheries are not available.

35. Particular focus should be given to natural regulatory mechanisms that maintain biodiversity, in relation to fishing patterns and practices.

36. Directed research is needed in how to integrate biodiversity outcomes in systems for allocation of user rights to fisheries.

37. The inherent limitation in current analytical assessment techniques underscores the importance of carrying out complementary ecosystem assessments.

38. To understand the wider socio-economic and political drivers and pressures on a fishery, its resources and biodiversity, assessments should extend beyond biological and ecological considerations to broader assessment of socio-ecological systems.

Particular roles for the Convention on Biological Diversity

39. The CBD can promote and encourage an improved environment for good collaboration among biodiversity conservation experts and fisheries experts.

40. The CBD and its networks of experts have expertise in biodiversity assessments and in selecting practical indicators for status and trends in biodiversity. The CBD can make this expertise available to fisheries assessment and management agencies.

41. The expert community of the CBD can contribute to modelling work and other studies of longer term ecosystem-scale changes due to climate change, aggregate impacts of multiple uses, and other scenarios. Their results can be made available to the sectoral regulatory agencies, including fisheries agencies, when they are dealing with factors such as the robustness of harvesting strategies.

42. The CBD should be vigilant for opportunities to initiate or support pilot projects where these different communities can come and work together, and illustrate the concrete benefits of collaboration.

43. The CBD can be a major contributor of expertise to capacity-building initiatives for any agency, including fisheries management agencies, dealing with biodiversity considerations.

Annex IV

**MEETING CONCLUSIONS ON THE IMPACTS ON MARINE AND COASTAL
BIODIVERSITY OF PELAGIC FISHERIES OF LOWER TROPHIC LEVELS AND OPTIONS
TO ADDRESS BIODIVERSITY CONCERNS**

Overview

1. Small pelagic fish of lower trophic levels play an important role in marine ecosystems by providing links between lower and higher trophic levels. They feed primarily on zooplankton, and they are themselves eaten by larger fish as well as seabirds and marine mammals. Most low trophic level species are relatively small (typically less than 30 cm), have short life spans and their recruitment and population dynamics are strongly driven by short-term variability as well as long-term change in the environment.
2. The differences between high and low abundance can be two orders of magnitude or more. When both fishing and natural variation interact to influence population abundance, populations can fall to 1/1000 of their peak abundance before recovering. Recovery is usually a response to reduced fishing mortality and/or favourable environmental conditions (Beverton, 1990⁵).
3. Available science suggests that fluctuations in small pelagic fish species are primarily driven by the environment but that ineffectively managed fisheries can hasten or intensify collapses (Freon et al., 2005⁶).
4. Several species and types of small pelagic fish commonly co-occur forming quite complex systems particularly in their response to environmental drivers. Data shows strongly differential responses and sometimes switching.
5. According to FAO statistics small pelagics make up about 40% (36 million tonnes in 2008) of global fisheries landings. Clupeoids (herring, sardines and anchovies) contribute more than half of this.
6. Markets for fishery products on stocks of small pelagics have been variable, and when markets for the products are high, fishing pressure on these stocks can increase substantially.
7. For widely-distributed pelagic stocks, use of the ecosystem approach to management, including application in fisheries, involves broader ecosystem assessment (including human drivers and social aspects) as a basis for credible scientific advice to inform adaptive management. Management of fisheries for small pelagics needs to be an integral part of the broader ecosystem approach to the management of identified large marine ecosystems.

Impacts of fishing

8. The impacts on biodiversity of fishing low trophic level species can be divided into direct and indirect effects. The former relate to impacts on the fished populations and the latter to effects on the food webs of which these populations are part.
 - (a) Direct effects:
 - (i) Decreases in abundance;
 - (ii) Changes in spatial distribution;
 - (iii) Changes in stock structure and possibly genetic structure.

⁵ Beverton RJH. 1990. Small marine pelagic fish and the threat of fishing: are they endangered? *Journal of Fish Biology* 37 (Supplement 1):5-16.

⁶ Fréon, P., Cury, P Shannon, L, Roy C (2005). Sustainable exploitation of small pelagic fish stocks challenged by environmental and ecosystem changes. *Bulletin of Marine Science*, 76: 385-462.

- (b) Indirect effects:
 - (i) Effects on other species in the pelagic complex;
 - (ii) Effects on predator species, including seabirds and marine mammals;
 - (iii) Effects on food web processes;
 - (iv) By-catch;
 - (v) Effects on bottom habitat for some fisheries.

Monitoring, Research and Assessment

9. As with all fisheries, basic information on stock structure, abundance, distribution, population parameters, and spatial dynamics is required. However, small pelagics have a number of specific characteristics that need to be considered in research and assessment.

10. Information of special importance in these assessments includes:

- (a) Environmental and physical forcing to enable changes in stock abundance to be assessed;
- (b) Food web dynamics;
- (c) Understanding the mechanisms of transition from one dominant component to another in the pelagic complex.

11. Fishery-dependent methods of abundance estimation are often of limited value because catch rates per unit of effort (CPUE) in these fisheries can often stay stable while the status of the stock declines substantially.

12. Small pelagic stocks are assessed with a variety of approaches including quantitative assessment models and fishery independent biomass estimates using methods such as acoustics and egg surveys.

13. Stock assessments should ideally be part of, and supported by, broader ecosystem assessments including physical drivers (3-D representation) and spatial/temporal overlap with prey and predators.

14. The meeting participants concluded that there is a clear need for further development of assessment methods for low value and/or data-poor fisheries. The robustness of such methods could be formally tested using management strategy evaluation.

Harvest Strategies and Management

15. Harvest strategies for these fisheries and stocks include:

- (a) Biomass and fishing mortality strategies;
- (b) Setting minimum biomasses below which fisheries cannot occur;
- (c) Setting catches based on some proportion of historical levels.

16. There are a few examples where management agencies have already established minimum biomass thresholds in their management plans for low trophic level species and/or have used technical measures to reduce competition between fisheries and predators for low trophic level species. Cases were identified where stock assessments and/or harvest strategies have explicitly taken into account broader biodiversity concerns but it is unclear how widespread this is.

17. The importance of adaptive management and rapid response to variable abundance is stressed. It has been shown that intensive fishing when the stock is also declining due to environmental drivers can cause rapid depletion and possibly delay recovery. When both fishing and natural variation interact to influence population abundance, populations can fall to 1/1000 of their peak abundance before

recovering. It is important to develop an early warning and response system in order to avoid rapid declines.

18. There may be special challenges to managing fisheries on small pelagic stocks that undergo rapid changes in productivity in response to changes in environmental conditions. If the stocks have been productive for some years, the fisheries on them may be economically and socially very important, and rapid reductions in catches (or even closures) could have substantial social and economic impacts. Consequently rapid management changes are often hard to implement in such fisheries, and effective methods are needed to ensure management responds swiftly to signs of reduced productivity, even when there is still uncertainty about the stock's productivity level.

19. Many low trophic level species, especially small pelagic fishes, show very strong relationships between distribution and abundance. Consequently, abundance decreases are often linked to range decreases. Thus declining abundance can have the greatest effects on predators and food webs at the margins of the range. This has implications for spatial management of the target species and for interactions between prey and predators. Generally management plans do not explicitly take this into account.

20. It is an issue that may need to be considered if the availability of low trophic level species at a particular site had to be maintained at some specified level and if this specified level was dependent on total population size.

21. Similarly to assessment methods, robust harvest strategies for data-poor and/or low-value small pelagic fisheries require further development and testing.

22. Management of developing fisheries (in particular) in small pelagic stocks need to be conservative given the uncertain status, variability in the harvested stocks and key role these species play in supporting biodiversity.

Institutional change

23. The participants considered issues around governance but concluded that, in general, issues were common to other fisheries and not unique to small pelagic fisheries.

24. Institutional capacity in international cooperation and research management and data exchange need to be strengthened.

Capacity-building and development priorities

25. In addition to the capacity-building need identified in annex III, the meeting identified these additional issues that could contribute to improved management of small pelagic fisheries and their impacts on biodiversity, particularly in data-poor situations:

- (a) Development of cost-effective observational technologies to support fishery independent biomass estimation;
- (b) Taxonomic guides to support species identification in catch and by-catch;
- (c) Training in qualitative and semi-quantitative risk assessment methods.

Role of the Convention on Biological Diversity

26. Because of the important role that small pelagics play in marine ecosystems and concerns regarding indirect impacts on biodiversity, it would be useful for the CBD, in collaboration with FAO and CITES, to promote the sharing of relevant information between conservation and fishery communities and facilitate the collaboration between their respective networks of experts.
