Marine and coastal biological diversity

Review of the programme of work on marine and coastal biodiversity

The Conference of the Parties

1. *Takes note* that progress has been made in the implementation of the programme of work at the national, regional and global levels and that facilitation of implementation has been undertaken by the Secretariat;

2. *Recognizes* that the programme of work on marine and coastal biological diversity must incorporate a diverse range of tools and approaches and address the three objectives of the Convention, and notes the need to ensure integration between the programmes of work on protected areas and on marine and coastal biological diversity, and in particular the programme element on marine and coastal protected areas, to ensure effective coordination in their implementation;

3. *Agrees* that the programme of work on marine and coastal biological diversity should be applied and interpreted consistently with national law, and where applicable, international law, including the United Nations Convention on the Law of the Sea;

4. *Decides* that the programme elements of the programme of work still correspond to global priorities, which are not fully implemented, and therefore *extends* the time period of the programme of work by an additional six years, taking into account the multi-year programme of work of the Conference of the Parties up to 2010;

5. *Notes* that the programme of work has been refined to take into account recent developments and new priorities and *endorses* for the guidance of Parties and any other relevant organizations or bodies the elaborated programme of work as presented in annex I to the present decision and its appendices 1-5, noting that Parties will implement those suggested activities that are consistent with their national priorities;

6. *Welcomes* the entry into force of the Agreement on the Conservation of Albatrosses and Petrels, and *notes* the adoption of the International Convention for the Control and Management of Ships' Ballast Water and Sediments under the International Maritime Organization and *encourages* Parties to the Convention on Biological Diversity and other Governments to consider ratifying these treaties;

7. *Agrees* that further technical advice is required to support the implementation of the programme elements related to sustainable use and to support the work of developing countries in achieving sustainable use of their marine and coastal areas, including in relation to tourism and fishing, and *requests* the Executive Secretary to work with the Food and Agriculture Organization of the United Nations and other relevant organizations to develop that advice and support;

8. *Taking into account* the report of the Ad Hoc Technical Expert Group on biodiversity and Climate Change and the recommendations of the Subsidiary Body on Scientific, Technical and Technological Advice at its ninth meeting and decision VII/15 of the Conference of the Parties at its seventh meeting on biodiversity and climate change, *agrees* that the programme of work on marine and coastal biodiversity should address issues related to biodiversity and climate change, and *further encourages* Parties to make use of it as relevant source of useful information and take measures to

manage coastal and marine ecosystems, including mangroves, seagrass beds and coral reefs so as to maintain their resilience to extreme climatic events;

9. Recognizing the particular significance of this programme of work to small island developing States, *invites* funding institutions, and development agencies to provide financial support for the implementation of the elaborated programme of work on marine and coastal biodiversity, and its annexes and appendices;

Marine and coastal protected areas

10. *Welcomes* the report of the Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas (UNEP/CBD/SBSTTA/8/INF/7), [11]/ *expresses its gratitude* to the Governments of New Zealand and the United States of America, and the World Conservation Union (IUCN), for their financial, organizational and technical support for this work, and *expresses its gratitude* to the Chair and members of the Ad Hoc Technical Expert Group for their work;

11. *Notes* that marine and coastal biodiversity is under rapidly increasing and locally acute human pressure, such that globally, regionally and nationally marine and coastal biodiversity is declining or being lost. One of the reasons for this level of threat is the very low level of development of marine and coastal protected areas;

12. *Notes* that marine and coastal protected areas have been proven to contribute to:

(a) Protecting biodiversity;

(b) Sustainable use of components of biodiversity; and

(c) Managing conflict, enhancing economic well-being and improving the quality of life;

13. *Notes* that there are increasing numbers of marine and coastal protected areas, but in many cases they have not been effective because of problems related to their management (including as a result of lack of resources), size and habitat coverage;

14. *Notes also* that according to available data, marine and coastal ecosystems are severely underrepresented as protected areas, and these protected areas probably protect a very small proportion of marine and coastal environments globally and consequently make a relatively small contribution to sustainable management of marine and coastal biodiversity;

15. *Takes note with appreciation* of the joint note of the International Coral Reef Initiative and the Convention on Biological Diversity (UNEP/CBD/COP/7/INF/26) prepared pursuant to decision VI/3 of the Conference of the Parties on the International Coral Reef Initiative resolutions on small island developing States (annex I to the note) and on cold water coral reefs (see annex II to the note);

Goals of marine and coastal protected areas

16. *Agrees* that marine and coastal protected areas are one of the essential tools and approaches in the conservation and sustainable use of marine and coastal biodiversity;

17. *Notes* that there is an international body of evidence demonstrating that those marine and coastal protected areas where extractive uses are excluded have benefits for fisheries in surrounding areas, and in many cases for communities, and for sustainable tourism and other economic activities within and outside the marine and coastal protected area;

18. *Agrees* that the goal for work under the Convention relating to marine and coastal protected areas should be:

The establishment and maintenance of marine and coastal protected areas that are effectively managed, ecologically based and contribute to a global network [12]/ of marine and coastal protected areas, building upon national and regional systems, including a range of levels of protection, where human activities are managed, particularly through national legislation, regional programmes and policies, traditional and cultural practices and international agreements, to maintain the structure and functioning of the full range of marine and coastal ecosystems, in order to provide benefits to both present and future generations.

19. *Notes* that the Plan of Implementation of the World Summit on Sustainable Development promotes the conservation and management of the oceans, and agreed 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; and *agrees* to adopt this approach for the work of the Convention on marine and coastal protected areas, and to develop a strategy to meet this goal, including indicators of progress;

National framework of marine and coastal protected areas

20. *Aware* that marine and coastal protected areas should be part of a wider marine and coastal management framework, *urges* Parties and other Governments, as appropriate, to make efforts to adopt, as a matter of high priority (while taking into account the resource limitations of small island developing States), such a framework, taking into account appendix 3 to annex I to the present decision;

21. *Agrees* that an effective marine and coastal biodiversity management framework as set out in appendix 3 to annex I to the present decision would comprise sustainable management practices and actions to protect biodiversity over the wider marine and coastal environment, including integrated networks of marine and coastal protected areas consisting of:

(a) Marine and coastal protected areas, where threats are managed for the purpose of biodiversity conservation and/or sustainable use and where extractive uses may be allowed; and

(b) Representative marine and coastal protected areas where extractive uses are excluded, and other significant human pressures are removed or minimized, to enable the integrity, structure and functioning of ecosystems to be maintained or recovered;

22. *Agrees* that the balance between categories (a) and (b) marine and coastal protected areas, in paragraph 21 above would be selected by the country concerned;

23. *Notes* that the Ad Hoc Technical Expert Group on marine and coastal protected areas advised that certain objectives of marine and coastal protected areas, such as scientific reference areas can only be accomplished through the establishment of category (b) marine and coastal protected areas, and *encourages* Parties to take this advice into account when determining an appropriate balance between categories (a) and (b);

24. *Notes* that there are some benefits of the framework that can be provided with any degree of certainty only by including highly protected areas, and that to achieve the full benefits a network needs to include representative and distinctive areas and contain a sufficient area of the coastal and marine environment to be effective and ecologically viable;

25. *Agrees* that key factors for achieving effective management of marine and coastal protected areas include effective governance, clear national legal or customary frameworks to prevent damaging activities, effective compliance and enforcement, ability to control external activities that affect the marine and coastal protected area, strategic planning, capacity-building and having a sustainable financing for management;

26. *Urges* Parties to urgently address, through appropriate integrated marine and coastal management approaches, all threats, including those arising from the land (e.g. water quality, sedimentation) and shipping/transport, in order to maximize the effectiveness of marine and coastal protected areas and networks in achieving their marine and coastal biodiversity objectives taking into account possible effects of climate change such as rising sea levels;

27. *Agrees* that the full participation of indigenous and local communities and relevant stakeholders is important for achieving the global goal, and for the establishment and maintenance of individual marine and coastal protected areas and national and regional networks in line with decision VII/28 on protected areas;

28. *Notes* the technical advice provided by the Ad Hoc Technical Expert Group, contained in annex II to the present decision and in its report, relating to marine and coastal protected areas within national jurisdiction, and *urges* Parties and Governments to utilize that advice in their work to establish marine and coastal protected areas networks;

Marine protected areas in areas beyond national jurisdiction

29. *Notes* that there are increasing risks to biodiversity in marine areas beyond national jurisdiction and that marine and coastal protected areas are extremely deficient in purpose, numbers and coverage in these areas;

30. *Agrees* that there is an urgent need for international cooperation and action to improve conservation and sustainable use of biodiversity in marine areas beyond the limits of national jurisdiction, including the establishment of further marine protected areas consistent with international law, and based on scientific information, including areas such as seamounts, hydrothermal vents, cold-water corals and other vulnerable ecosystems;

31. *Recognizes* that the law of the sea provides a legal framework for regulating activities in marine areas beyond national jurisdiction and *requests* the Executive Secretary to urgently collaborate with the Secretary-General of the United Nations and relevant international and regional bodies in accordance with their mandates and their rules of procedure on the report called for in General

Assembly resolution 58/240, paragraph 52, and to support any work of the General Assembly in identifying appropriate mechanisms for the future establishment and effective management of marine protected areas beyond national jurisdiction;

Assessment, monitoring and research priorities

32. *Notes* that the research priorities and pilot projects set out in appendix 4 to annex I to the present decision would provide important assistance to national and, where appropriate, regional efforts to establish and maintain marine and coastal protected areas and national and regional networks, and that research programmes on the conservation of marine and coastal biodiversity resources are needed while setting up national biodiversity research priorities;

33. *Agrees* to incorporate the research priorities and pilot projects contained in appendix 4 to annex I to the present decision into the programme of work on marine and coastal biodiversity, and *requests* the Executive Secretary to identify partners to adopt the research priorities and undertake these projects as a matter of urgency;

34. *Notes* that it is necessary to develop research programmes on the conservation of marine biological diversity resources beyond marine and coastal protected areas, with a view to establishing protected-area networks;

International support for the creation of networks of marine and coastal protected areas

35. *Urges* Parties, other Governments and relevant organizations to provide active financial, technical and other support for the establishment of a global system of marine and coastal protected area networks and the implementation within it of relevant provisions contained in this decision, including identification and removal of barriers to the creation of marine and coastal protected areas, and removal of perverse incentives for unsustainable activities in the marine and coastal environment, pursuant to decision VI/15, on incentive measures, within the framework of relevant marine-related international law;

36. *Decides* to examine the need for support through the financial mechanism to developing country Parties, in particular the least developed and small island developing States among them, for country-driven activities aimed at enhancing capabilities for activities relating to the establishment and maintenance of marine and coastal protected areas and networks of marine and coastal protected areas and in particular to assist Parties to develop systems to make their marine and coastal protected area networks self-sustaining in the medium to long term;

37. *Notes* that further technical advice related to network design and in particular ecological coherence of networks may be needed to assist Parties in implementation work, and requests the Executive Secretary, in consultation with the Bureau of Subsidiary Body on Scientific, Technical and Technological Advice, to identify appropriate mechanisms for developing this advice;

Monitoring progress toward the global goal

38. *Invites* the World Conservation Monitoring Centre of the United Nations Environment Programme, in collaboration with relevant organizations and authorities, to provide and maintain up-to-date information on marine and coastal protected areas, in line with the proposed categories

for inventory and contextual information set out in annex III below, to provide a basis for the assessment work under the Convention;

39. *Requests* the Executive Secretary to provide an assessment of progress toward the global goal, as part of reporting on the programme of work on marine and coastal biological diversity;

Mariculture

40. *Welcomes* the summary report of the Ad Hoc Technical Expert Group on Mariculture (UNEP/CBD/SBSTTA/8/9/Add.2) and the full report of the Group as presented as an information document for the eighth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (UNEP/CBD/SBSTTA/8/INF/6);

41. *Expresses its appreciation* to the Food and Agriculture Organization of the United Nations (FAO) for the technical support and meeting facilities provided for the meeting of the Ad Hoc Technical Expert Group on Mariculture;

42. *Takes note* of the negative biodiversity effects of mariculture, as described in section II of the summary report of the Ad Hoc Technical Expert Group on Mariculture, and of the methods and techniques available for their mitigation, as described in section III of that summary report;

43. *Notes also* that, in section IV of the summary report, the Ad Hoc Technical Expert Group identified some positive effects for biodiversity of some forms of mariculture with native species;

44. *Urges* Parties and other Governments to adopt the use of relevant methods and techniques for avoiding the adverse effects of mariculture on marine and coastal biological diversity, and incorporate them into their national biodiversity strategies and action plans;

45. *Recognizes* the complexity of mariculture activities, the highly variable circumstances of different geographical areas, mariculture practices and cultured species, as well as social, cultural and economic conditions, which will influence mitigation options, and, accordingly, taking into account the special needs of and the difficulties faced by stakeholders in developing countries, *recommends* that Parties and other Governments adopt the use of the following specific methods, techniques or practices for avoiding the adverse biodiversity related effects of mariculture:

(a) The application of environmental impact assessments, or similar assessment and monitoring procedures, for mariculture developments, with due consideration paid to the scale and nature of the operation, as well as carrying capacities of the environment, taking into account the guidelines on the integration of biodiversity considerations in environmental impact assessment legislation and/or processes and in strategic impact assessment, endorsed by the Conference of the Parties in its decision VI/7 A, as well as the recommendations endorsed in decision VI/10, annex II, on the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities. There is a need to address the likely immediate, intermediate and long-term impacts on all levels of biodiversity;

(b) Development of effective site-selection methods, in the framework of integrated marine and coastal area management, taking into account the special needs and difficulties encountered by stakeholders in developing countries;

(c) Development of effective methods for effluent and waste control;

(d) Development of appropriate genetic resource management plans at the hatchery level and in the breeding areas, including cryopreservation techniques, aimed at biodiversity conservation;

(e) Development of controlled low-cost hatchery and genetically sound reproduction methods, made available for widespread use, in order to avoid seed collection from nature, where appropriate. In cases where seed collection from nature cannot be avoided, environmentally sound practices for spat collecting operations should be employed;

(f) Use of selective fishing gear in order to avoid or minimize by-catch in cases where seed are collected from nature;

(g) Use of native species and subspecies in mariculture;

(h) Implementation of effective measures to prevent the inadvertent release of mariculture species and fertile polyploids, including, in the framework of the Cartagena Protocol on Biosafety, living modified organisms (LMOs);

(i) Use of proper methods of breeding and proper places of releasing in order to protect genetic diversity;

(j) Minimizing the use of antibiotics through better husbandry techniques;

(k) Ensuring that fish stocks used for fish meal and fish oil are managed in such a way as to be sustainable and to maintain the trophic web;

(l) Use of selective methods in industrial fisheries to avoid or minimize by-catch;

(m) Considering traditional knowledge, where applicable as a source to develop sustainable mariculture techniques;

46. *Urges* Parties and other Governments to adopt relevant best management practices and legal and institutional arrangements for sustainable mariculture, taking into account the special needs and difficulties encountered by stakeholders in developing countries, in particular through implementing Article 9 of Code of Conduct on Responsible Fisheries, as well as other provisions in the Code dealing with aquaculture, recognizing that it provides necessary guidance to develop legislative and policy frameworks at the national, regional and international levels;

47. *Requests* the Executive Secretary to undertake a comprehensive review of relevant documents on best practices relevant to mariculture, and to disseminate the results, as well as relevant case studies, through the clearing-house mechanism prior to the tenth meeting of the Subsidiary Body on Scientific, Technical and technological Advice;

48. *Agrees* to incorporate the research and monitoring priorities identified by the Ad Hoc Technical Expert Group on Mariculture as outlined in appendix 5 to annex I to the present decision into the programme of work on marine and coastal biological diversity;

49. *Recommends* that the Executive Secretary, in collaboration with the Food and Agriculture Organization of the United Nations and other relevant organizations, explore ways and means for implementing these research and monitoring priorities, including an evaluation of means through which mariculture can be used to restore or maintain biodiversity;

50. *Recommends* that the Executive Secretary, in collaboration with the Food and Agriculture Organization of the United Nations and other relevant organizations, harmonize the use of terms in regard to mariculture by further developing and adopting the glossary of the Food and Agriculture Organization of the United Nations;

51. *Expresses its support* for regional and international collaboration to address transboundary impacts of mariculture on biodiversity, such as spread of disease and invasive alien species;

52. *Decides* to promote technical exchange and training programmes, and transfer of tools and technology;

53. *Decides* to examine the need for support through the financial mechanism to developing country Parties for country-driven activities aimed at enhancing capabilities to mitigate the adverse effects of mariculture on biological diversity;

Conservation and sustainable use of deep seabed genetic resources beyond national jurisdiction: issues arising from the study of the relationship between the Convention on Biological Diversity and the United Nations Convention on the Law of the Sea

54. *Requests* the Executive Secretary, in consultation with Parties and other Governments and the International Seabed Authority, and in collaboration with international organizations, such as the United Nations Division for Ocean Affairs and the Law of the Sea, the United Nations Environment Programme, and the InterGovernmental Oceanographic Commission of the United Nations Educational, Cultural and Scientific Organization, if appropriate, to compile information on the methods for the identification, assessment and monitoring of genetic resources of the seabed and ocean floor and subsoil thereof, in areas beyond the limits of national jurisdiction; compile and synthesize information on their status and trends including identification of threats to such genetic resources and the technical options for their protection; and report on the progress made to the Subsidiary Body on Scientific, Technical and Technological Advice;

55. *Welcomes* United Nations General Assembly resolution 58/240 of December 2003 and *invites* the Parties to raise their concerns regarding the issue of conservation and sustainable use of genetic resources of the deep seabed beyond limits of national jurisdiction at the next meeting of the General Assembly and *further invites* the General Assembly to further coordinate work relating to conservation and sustainable use of genetic resources of the deep seabed beyond the limits of national jurisdiction;

56. *Invites* Parties and other States to identify activities and processes under their jurisdiction or control which may have significant adverse impact on deep seabed ecosystems and species beyond the limits of national jurisdiction, in order to address Article 3 of the Convention;

Conservation and sustainable use of biological diversity in marine areas beyond the limits of national jurisdiction

57. *Recalling* paragraph 32 (a) and (c) of the Plan of Implementation from the World Summit on Sustainable Development, that calls on the international community to "maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction";

58. *Notes* that United Nations General Assembly in paragraph 51 of its resolution 58/240 has reiterated "its call for urgent consideration of ways to integrate and improve, on a scientific basis, the management of risks to the marine biodiversity of seamounts, cold water coral reefs and certain other underwater features";

59. *Recalls* paragraph 52 of General Assembly resolution 58/240, in which the Assembly "invites the relevant global and regional bodies, in accordance with their mandate, to investigate urgently how to better address, on a scientific basis, including the application of precaution, the threats and risks to vulnerable and threatened marine ecosystems and biodiversity beyond national jurisdiction; how existing treaties and other relevant instruments can be used in this process consistent with international law, in particular with the Convention, and with the principles of an integrated ecosystem-based approach to management, including the identification of marine ecosystem types that warrant priority attention and to explore a range of potential approaches and tools for the protection and management";

60. *Concerned about* the serious threats to the biological diversity, *stresses* the need for rapid action to address these threats on the basis of the precautionary approach and the ecosystem approach, in marine areas beyond the limits of national jurisdiction, in particular areas with seamounts, hydrothermal vents, and cold-water corals, other vulnerable ecosystems and certain other underwater features, resulting from processes and activities in such areas;

61. *Calls upon* the General Assembly and other relevant international and regional organizations, within their mandate, according to their rules of procedure, to urgently take the necessary short-term, medium-term and long-term measures to eliminate/avoid destructive practices, consistent with international law, on scientific basis, including the application of precaution, for example, consideration on a case by case basis, of interim prohibition of destructive practices adversely impacting the marine biological diversity associated with the areas identified in paragraph 60 above;

62. *Recommends* Parties to also urgently take the necessary short-term, medium-term and long-term measures to respond to the loss or reduction of marine biological diversity associated with the areas identified in paragraph 60 above.

Annex I

ELABORATED PROGRAMME OF WORK ON MARINE AND COSTAL BIOLOGICAL DIVERSITY

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

A. Overall vision

1. The overall vision that the effective implementation of the elaborated programme of work on marine and coastal biological diversity strives to attain is to halt the loss of marine and coastal biological diversity nationally, regionally and globally and secure its capacity to provide goods and services.

B. Mission

2. The overall goal of the programme of work on marine and coastal biodiversity, consistent with the Strategic Plan of the Convention, is to promote the implementation of the three objectives of the Convention and achieve significant reduction of the current rate of marine and coastal biological diversity loss by the year 2010.

C. Goals and targets

3. Requests SBSTTA at its or meeting to further refine the proposal for the integration of outcome-oriented targets into the programme of work on marine and coastal biodiversity taking into account, as appropriate, the framework in annex II of decision VII/30 on the future evaluation of progress on the Strategic Plan, and taking into account that these goals and targets should be viewed as flexible framework within which national and/or regional targets may be developed, according to national priorities and capacities, and decides that outcome-oriented targets are a key priority at SBSTTA.

II. Basic principles

4. In accordance with paragraphs 2-14 of the annex to decision IV/5, the ecosystem approach and the precautionary approach have a central role in guiding all activities undertaken as part of the programme of work, and thus provide the foundation for its implementation. The success of the programme of work also relies on scientific research aimed at providing understanding of the functioning of the broader ecosystem in terms of its component parts and their connectivity. Research efforts oriented towards the information needs of management ensure that management decisions are based on best available science in the context of the precautionary approach. The roster of experts continues to provide the Executive Secretary with a valuable source of expertise in marine and coastal biological diversity, and its continued use, expansion and updating is encouraged. The programme of work will also use and draw upon scientific, technical and technological knowledge of local and indigenous communities in keeping with the contents of Article 8(j) of the Convention, as well as community and user-based approaches.

5. The programme of work may be implemented on the following levels:

(a) **National and local**, which provide the primary level of implementation of the activities in the programme of work;

(b) **Regional**, where appropriate, through regional organizations, arrangements and bodies;

(c) **Global**, where appropriate, through international organizations and appropriate bodies.

6. The involvement of all relevant stakeholders in implementation of the programme of work should be promoted. The role of the Secretariat is to promote and facilitate the implementation of the programme of work.

7. The implementation of the programme of work should be carried out with the full and effective participation of indigenous and local communities as appropriate and respect of their rights under domestic and applicable international law. In this context, Article 6.18 of the FAO Code of Conduct for Responsible Fisheries, which highlights the need to protect the preferential access rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to traditional fishing grounds and resources, should be noted.

8. In accordance with the Millennium Development Goals, the implementation of the programme of work aims to make a direct contribution to poverty alleviation. Its successful implementation will require national and regional capacity-building and financial resources for developing country Parties, in particular the least developed and small island developing States among them.

III. PROGRAMME ELEMENTS

Programme element 1: Implementation of integrated marine and coastal area management (IMCAM)

Goal: To promote and improve the implementation of IMCAM at the local, national and regional level.

Operational objective 1.1:To apply appropriate policy instruments and strategies, including building of capacity, for the effective implementation of IMCAM

Suggested activities:

(a) To promote, within the framework of IMCAM, the integration of biological diversity concerns in all socio-economic sectors adversely impacting the marine and coastal environment.

(b) To promote the application of ecosystem-based management, including through integration of coastal management activities and watershed management.

(c) To identify obstacles to the implementation of IMCAM nationally and regionally, and develop and implement strategies, such as partnerships, tools and other means, to overcome those obstacles, including provision of guidance on the application of such tools.

(d) To encourage the application of the ecosystem approach, promote integrated multidisciplinary and multisectoral coastal and ocean management at the national level, and encourage States in developing ocean policies and mechanisms on integrated coastal management.

(e) To promote the identification or establishment of national and, where appropriate, regional processes for developing advice on the application of IMCAM and issues identified under the operational objective.

(f) To assist the development of national and regional capacity-building.

(g) To provide information on relevant legal and institutional issues, having regard to the United Nations Convention on the Law of the Sea (UNCLOS) and other related international and regional agreements.

(h) To assist the development of appropriate education and public awareness programmes at all levels.

(i) To provide guidance on maintenance and wider application of local and traditional knowledge.

(j) To cooperate with and build upon the Large Marine Ecosystem (LME) concept, as well as specific LME projects that are ongoing or planned.

Ways and means

The activities should be carried out by Parties acting individually or under regional agreements, assisted by regional and international organizations, and the Executive Secretary. An ad hoc technical expert group on implementation of integrated marine and coastal area management (SBSTTA recommendation VIII/3 A, annex) will provide guidance on implementation of activity (c).

Operational objective 1.2: To undertake direct action to protect the marine environment from negative impacts

Suggested activities

(a) To promote adequate protection of areas important for reproduction such as spawning and nursery areas and restoration of such areas and other important habitats for marine living resources.

(b) To promote action to reduce and control sea-based sources of pollution.

(c) To achieve substantial progress in protecting the marine environment from land-based activities through effective application of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and other appropriate instruments, including proper coastal land use, watershed planning, and integration of integrated marine and coastal area management into key sectors.

(d) To promote urgent and special attention and measures in respect to closed and semi-closed seas.

(e) To take measures to reduce by-catch.

Ways and means

The activities should be carried out by Parties acting individually or under regional agreements where appropriate and assisted by regional and international organizations, including the Global

Programme of Action for the Protection of the Marine Environment from Land-based Activities. The Executive Secretary should assist Parties in implementation.

Operational objective 1.3: To develop guidelines for ecosystem evaluation and assessment, paying attention to the need to identify and select indicators, including social and abiotic indicators that distinguish between natural and human-induced effects.

Suggested activities

(a) To promote the development of sets of national indicators on which to base decision-making; and convene regional workshops to help select key indicators.

(b) To identify existing organizations and initiatives.

(c) To promote the identification of key habitats for marine living resources on a regional basis, with a view to further develop policies for action to prevent physical alteration and destruction of these habitats, and pursue restoration of degraded habitats, including, *inter alia*, coral reef systems.

(d) To promote the establishment or strengthening of mechanisms for research, monitoring and assessment of marine and coastal ecosystems and their living resources.

(e) To promote exchange of information and experience using the clearing-house mechanism and other appropriate mechanisms.

(f) To collaborate with relevant organizations in the preparation of guidelines.

(g) To facilitate the establishment of 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.

Ways and means

The Executive Secretary should support the implementation of activities (a) at the global level, (b), (e), (f), and (g). Parties should implement (a), (b), (c), (d), and (e) at the national level and under regional agreements where appropriate, with regional organizations, such as regional seas conventions and action plans, taking a lead role on relevant activities at the regional level.

Programme element 2: Marine and coastal living resources

Goal: To ensure the conservation and sustainable use of marine and coastal living resources

Operational objective 2.1: To promote ecosystem approaches to the conservation and sustainable use of marine and coastal living resources, including the identification of key variables or interactions, for the purpose of assessing and monitoring, first, components of biological diversity; second, the sustainable use of such components; and, third, ecosystem effects.

Suggested activities

(a) To develop collaborative links with relevant organizations and institutions, including in regards to cooperative activities aimed at protecting biodiversity in marine areas beyond national jurisdiction.

(b) To promote the exchange of information and experience using appropriate mechanisms.

(c) To promote the identification and development of ecosystem approaches compatible with the sustainable use of marine and coastal living resources.

(d) To promote the identification both of components of the ecosystems which are critical to the functioning of the ecosystem and of key threats.

(e) To promote capacity-building at local, national and regional levels, including local and traditional knowledge.

(f) To carry out a study on the effects of fish and invertebrate stock enhancement on marine and coastal biological diversity at the species and genetic levels.

(g) To implement the 1995 Code of Conduct for Responsible Fisheries taking note of the relevant FAO international plans of action and technical guidelines.

(h) To eliminate destructive fishing practices, and restore and maintain fisheries stocks to sustainable levels by the year 2015, including through financial assistance to developing countries, in particular small island developing States, for improved enforcement, surveillance and patrolling and recognizing the importance of use of sustainable fishing practices, including traditional fishing practices.

(i) To maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including areas within and beyond national jurisdiction.

(j) To promote, in collaboration with the Global Taxonomy Initiative, the strengthening of taxonomic expertise at regional and national levels.

Ways and means

The activities should be carried out by Parties acting individually or under regional agreements where appropriate, and regional and international organizations. The Executive Secretary will assist Parties in implementation, and should carry out activity (f).

Operational objective 2.2: To make available to the Parties information on marine genetic resources in marine areas beyond national jurisdiction and, as appropriate, on coastal and marine genetic resources under national jurisdiction from publicly available information sources.

Suggested activities

(a) To compile and synthesize information on the methods for the identification, assessment and monitoring of genetic resources of the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction, and information on their status and

trends including identification of threats to such genetic resources and the technical options for their protection and report on the progress made to SBSTTA.

(b) To identify activities and processes under national jurisdiction or control which may have significant adverse impact on deep seabed ecosystems and species beyond the limits of national jurisdiction, in order to address Article 3 of the Convention on Biological Diversity.

Ways and means

Activity (a) should be carried out by international organizations, such as the United Nations Division for Ocean Affairs and the Law of the Sea, the United Nations Environment Programme, and the InterGovernmental Oceanographic Commission of the United Nations Educational, Cultural and Scientific Organization, as appropriate with the support of the Executive Secretary. Activity (b) should be undertaken by Parties and other States.

Operational objective 2.3: *To gather and assimilate information on, build capacity to mitigate the effects of, and to promote policy development, implementation strategies and actions to address: (i) the biological and socio-economic consequences of physical degradation and destruction of key marine and coastal habitats including mangrove ecosystems, tropical and cold-water coral-reef ecosystems, seamount ecosystems and seagrass ecosystems including identification and promotion of management practices, methodologies and policies to reduce and mitigate impacts upon marine and coastal biological diversity and to restore mangrove forests and rehabilitate damaged coral reef; and in particular (ii) the impacts of mangrove forest destruction, coral bleaching and related mortality on coral-reef ecosystems and the human communities which depend upon coral-reef services, including through financial and technical assistance.*

Suggested activities

(a) Activities on coral bleaching and physical degradation and destruction of coral reefs as adopted in decision VI/3 and as amended in decision VII/5 are contained in appendices 1 and 2 below.

Other activities relevant to non-coral ecosystems will be developed by Parties and, where appropriate, by regional organizations.

Ways and means

The Executive Secretary should facilitate implementation, through active collaboration with International Coral Reef Initiative and its partners, the regional seas programmes of the United Nations Environment Programme, the InterGovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization, and other relevant organizations. The other activities should be carried out by Parties acting individually or under regional agreements and regional and international organizations.

Operational objective 2.4*: To enhance the conservation and sustainable use of biological diversity of marine living resources in areas beyond the limits of national jurisdiction*

Suggested activities

(a) To identify threats to the biological diversity in areas beyond the limits of national jurisdiction, in particular areas with seamounts, hydrothermal vents, and cold-water corals, and certain other underwater features.

(b) To urgently take the necessary short-term, medium-term and long-term measures to eliminate/avoid destructive practices, consistent with international law, on scientific basis, including the application of precaution, for example, consideration, on a case by case basis, of interim prohibition of destructive practices adversely impacting the marine biological diversity associated with marine areas beyond the limits of national jurisdiction, in particular areas with seamounts, hydrothermal vents, and cold-water corals, other vulnerable ecosystems and certain other underwater features.

Ways and means

Activities (a) and (b) should be carried out by Parties, the United Nations General Assembly and other relevant international and regional organizations, within their mandate, and according to their rules of procedure.

Programme element 3: Marine and coastal protected areas

Goal: The establishment and maintenance of marine and coastal protected areas that are effectively managed, ecologically based and contribute to a global network [13]/ of marine and coastal protected areas, building upon national and regional systems, including a range of levels of protection, where human activities are managed, particularly through national legislation, regional programmes and policies, traditional and cultural practices and international agreements, to maintain the structure and functioning of the full range of marine and coastal ecosystems, in order to provide benefits to both present and future generations.

Operational objective 3.1: *To establish and strengthen national and regional systems of marine and coastal protected areasintegrated into a global network and as a contribution to globally agreed goals.*

Suggested activities

(a) To establish effective marine and coastal biodiversity management frameworks as set out in appendix 3 below, which would comprise sustainable management practices and actions to protect biodiversity over the wider marine and coastal environment, including integrated networks of marine and coastal protected areas consisting of:

(i) Marine and coastal protected areas, where threats are managed for the purpose of biodiversity conservation and/or sustainable use and where extractive uses may be allowed; and

(ii) Representative marine and coastal protected areas where extractive uses are excluded, and other significant human pressures are removed or minimized, to enable the integrity, structure and functioning of ecosystems to be maintained or recovered.

In establishing these frameworks, the appropriate balance between categories (i) and (ii) above would be selected by the country concerned.

Ways and means:

Activity (a) should be carried out by Parties acting individually or under regional agreements and regional and international organizations. Funding agencies should support implementation of these activities.

Operational objective 3.2*: To enhance the conservation and sustainable use of biological diversity in marine areas beyond the limits of national jurisdiction*

Suggested activities:

(a) To support any work of the United Nations General Assembly in identifying appropriate mechanisms for the future establishment and effective management of marine protected areas beyond national jurisdiction.

Ways and means

Activity (a) should be carried out by the Executive Secretary in support of the Secretary-General of the United Nations.

Operational objective 3.3: *To achieve effective management of existing marine and coastal protected areas*

Suggested activities

(a) To achieve effective management of marine and coastal protected areas through good governance, clear legal or customary frameworks to prevent damaging activities, effective compliance and enforcement, ability to control external activities that affect the marine and coastal protected area, strategic planning, capacity building and sustainable financing.

(b) To address, through appropriate integrated marine and coastal management approaches, all threats, including those arising from the land (e.g. water quality, sedimentation) and shipping/transport, in order to maximize the effectiveness of marine and coastal protected areas and networks in achieving their marine and coastal biodiversity objectives taking into account possible effects of climate change such as rising sea levels.

(c) To facilitate relevant stakeholder and indigenous and local community participation as an essential component of implementing operational objective 3.3.

Ways and means

The activities should be carried out by Parties acting individually or under regional agreements and regional and international organizations. Funding agencies should support implementation of these activities.

Operational objective 3.4: To provide support for and facilitate monitoring of national and regional systems of marine and coastal protected areas

Suggested activities

(a) To provide active financial, technical and other support for the establishment of a global system of marine and coastal protected area networks and the implementation within it of relevant provisions contained in this operational objective, including identification and removal of barriers to the creation of marine and coastal protected areas, and removal of perverse incentives for unsustainable activities in the marine and coastal environment, pursuant to decision VI/15, on incentive measures, within the framework of relevant marine-related international law.

(b) To provide and maintain, in collaboration with the World Conservation Monitoring Centre of the United Nations Environment Programme, in collaboration with relevant organizations and authorities, up-to-date information on marine and coastal protected areas in order to provide a basis for assessment of progress made in implementing the operational objective.

(c) Promote transfer of appropriate technology and closely collaborate with regional initiatives to fund activities, such as monitoring, geared towards conservation and sustainable use of marine and coastal biological diversity.

Ways and means

The activities should be carried out by Parties acting individually or under regional agreements, and regional and international organizations, such as the World Conservation Monitoring Centre of the United Nations Environment Programme. The Executive Secretary should facilitate their implementation. Funding agencies should support implementation of the activities.

Operational objective 3.5: To facilitate research and monitoring activities that reflect identified global knowledge gaps and priority information needs of management of marine and coastal protected areas.

Suggested activities

(a) To collaborate with relevant organizations in the preparation of project proposals to facilitate the implementation of the research and monitoring priorities outlined in appendix 4 below.

(b) To identify and implement an appropriate mechanism for developing advice related to network design and ecological coherence of networks.

(c) Using the clearing-house mechanism, to assist the exchange of information on research, management issues and problems (including incentive measures) between marine protected area managers, to facilitate continuous improvement in management effectiveness across the global network [14]/ of marine protected areas.

Ways and means

Activity (a) should be carried out by Parties acting individually or under regional agreements and regional and international organizations, including research organizations. The Executive Secretary should facilitate its implementation. The Executive Secretary should take the lead role in implementing activities (b) and (c).

Programme element 4: Mariculture

Goal: To prevent or minimize the negative impacts of mariculture on marine and coastal biodiversity and to enhance any positive effects of mariculture using native species.

Operational objective 4.1: To promote use of techniques, which minimize adverse impact of mariculture on marine and coastal biological diversity.

Suggested activities

(a) To adopt the use of relevant methods, techniques and practices for avoiding the adverse effects of mariculture on marine and coastal biological diversity, and to incorporate them into national biodiversity strategies and action plans as appropriate, including:

(i) The application of environmental impact assessments, or similar assessment and monitoring procedures, for mariculture developments, with due consideration paid to the scale and nature of the operation, as well as carrying capacities of the ecosystem, taking into account the guidelines on the integration of biodiversity considerations in environmental impact assessment legislation and/or processes and in strategic impact assessment, endorsed by the Conference of the Parties in its decision VI/7 A, as well as the recommendations endorsed in decision VI/10, annex II, on the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities. There is a need to address the likely immediate, intermediate and long-term impacts on all levels of biodiversity;

(ii) Development of effective site-selection methods, in the framework of integrated marine and coastal area management, taking into account the special needs and difficulties encountered by stakeholders in developing countries;

(iii) Development of effective methods for effluent and waste control;

(iv) Development of appropriate genetic resource management plans at the hatchery level and in the breeding areas, including cryo-preservation techniques, aimed at biodiversity conservation;

(v) Development of controlled low-cost hatchery and genetically sound reproduction methods, made available for widespread use, in order to avoid seed collection from nature, where appropriate. In cases where seed collection from nature cannot be avoided, environmentally sound practices for spat collecting operations should be employed;

(vi) Use of selective fishing gear in order to avoid or minimize by-catch in cases where seed are collected from nature;

(vii) Use of native species and subspecies in mariculture;

(viii)Implementation of effective measures to prevent the inadvertent release of mariculture species and fertile polyploids, including, in the framework of the Cartagena Protocol on Biosafety, living modified organisms (LMOs);

(ix) Use of proper methods of breeding and proper places of releasing in order to protect genetic diversity;

(x) Minimizing the use of antibiotics through better husbandry techniques;

(xi) Ensure that fish stocks used for fish meal and fish oil are managed in such a way as to be sustainable and to maintain the trophic web;

(xii) Use selective methods in industrial fisheries to avoid or minimize by-catch;

(xiii) Considering traditional knowledge, where applicable as a source to develop sustainable mariculture techniques.

(b) To adopt best-management practices and legal and institutional arrangements for sustainable mariculture, taking into account the special needs and difficulties encountered by stakeholders in developing countries, in particular through implementing Article 9 of Code of Conduct on Responsible Fisheries, as well as other provisions in the Code dealing with aquaculture, recognizing that it provides necessary guidance to develop legislative and policy frameworks at the national, regional and international levels.

(c) To undertake a comprehensive review of relevant documents on best practices relevant to mariculture, and to disseminate the results, as well as relevant case-studies, through the clearing-house mechanism prior to the tenth meeting of SBSTTA.

(d) To facilitate the implementation of the research and monitoring priorities outlined in appendix 5 below in collaboration with FAO and other relevant organizations.

(e) To undertake regional and international collaboration to address transboundary impacts of mariculture on biodiversity, such as the spread of disease and invasive alien species.

Ways and means

Activities (a) and (b) should be carried out by Parties acting individually or under regional agreements, with assistance from regional and international organizations, such as FAO, and the Executive Secretary. The Executive Secretary should take a lead role in carrying out activity (c). Activity (d) should be carried out by Parties, regional and international organizations, including research organizations. The Executive Secretary should facilitate its undertaking. Funding agencies should support implementation of activities (a) and (b).

Programme element 5: Invasive alien species

Goal: To prevent the introduction of invasive alien species into the marine and coastal environment, and to eradicate to the extent possible those invasive alien species that have already been introduced.

Operational objective 5.1: *To achieve better understanding of the pathways and the causes of the introduction of alien species and the impact of such introductions on biological diversity.*

Suggested activities

(a) To analyse and disseminate information, data and case-studies on the subject.

(b) To develop collaboration with relevant organizations.

(c) To ensure exchange of information and experience, using appropriate mechanisms.

Ways and means

The Executive Secretary should take a lead role in carrying out these activities, with assistance from international organizations (such as the International Maritime Organization (IMO) and the Global Invasive Species Programme (GISP)), regional organizations and Parties.

Operational objective 5.2: *To put in place mechanisms to control all pathways, including shipping, trade and mariculture, for potential invasive alien species in the marine and coastal environment.*

Suggested activities

(a) To invite relevant organizations such the International Maritime Organization (IMO), the Global Invasive Species Programme (GISP), the Food and Agriculture Organization of the United Nations (FAO), and the Ramsar Convention on Wetlands to work together to develop an international cooperative initiative to address impediments to the management of marine alien species, particularly to address technical problems related to the identification and control of marine invasions.

(b) To implement measures to address invasive alien species in ballast water, including through the International Convention for the Control and Management of Ships' Ballast Water and Sediments

(c) To exchange information and facilitate technical cooperation on effective techniques for prevention, early detection, eradication and control of invasive alien species in the marine and coastal environments.

(d) To develop close collaboration between national agencies responsible for development of controls on pathways for entry of alien species and national input into the work of the International Plant Protection Convention (IPPC), the Organization internationale des epizooties (OIE), IMO and other relevant international agreements.

(e) To identify means to support capacity-building in developing countries to strengthen their ability to conduct work related to alien species.

(f) To promote international cooperation by inviting relevant organizations and donor agencies to collaborate in the assessment of the effects of invasive alien species, and in the elaboration of strategies for their control.

Ways and means

Activities (b), (c) and (d) should be carried out by Parties. The other activities should be carried out by the Executive Secretary and the organizations identified in activity (a) as well as by, and in collaboration with, Parties.

***Operational objective 5.3*:** To maintain an incident list on introductions of alien species

Suggested activities:

To continue making updated information on introductions of alien species available through the clearing-house mechanism or other appropriate mechanisms.

Ways and means

The Executive Secretary should take a lead role in facilitating the implementation of this activity in collaboration with relevant international and regional organizations and the Parties.

Programme element 6. General

Operational objective 6.1: To assemble a database of initiatives on programme elements through a cooperative approach with relevant organizations and bodies, with special emphasis on integrated marine and coastal areas management.

Suggested activities

(a) To identify sources of relevant information and to make this readily available.

(b) To request inputs from Parties, countries and relevant organizations and bodies.

(c) To carry out desk evaluations with the assistance of the roster of experts of available information and to disseminate the findings through the clearing-house mechanism.

Ways and means

The Executive Secretary should take a lead role in implementing these activities.

Operational objective 6.2: To undertake effective collaboration, cooperation and harmonization of initiatives with relevant conventions, organizations and agencies while recognising their independent mandates.

Suggested activities

(a) To identify and implement meaningful joint activities and initiatives with relevant conventions, organizations and agencies aimed at the implementation of this work programme.

(b) To collaborate with regional seas conventions and action plans, including identification of joint programmes of work on topics of mutual relevance, including through regionally

elaborated criteria for the establishment and management of marine and coastal protected areas under regional seas conventions and action plans.

Ways and means

The Executive Secretary should take a lead role in implementing these activities, together with relevant conventions, organizations and agencies, coordinating units of regional seas conventions and action plans.

IV. ENABLING ACTIVITIES

(a) Provision of assistance to coastal in particular small island developing States in developing ocean policies and mechanisms for integrated management.

(b) Strengthening capacity of small island developing States, through training and other appropriate means, to enable their effective participation in all elements of the Convention's research priorities on marine and coastal biodiversity, including conducting new research and compiling information from past research on marine and coastal biodiversity within and beyond national jurisdiction.

(c) Updating and strengthening existing legislation as well as institutions dealing with marine and coastal issues, including the effective implementation of laws and regulations, and the strengthening and rationalization of institutions.

(d) Provision of assistance to coastal in particular small island developing States in coordinating policies and programmes at the regional and subregional level, aimed at the conservation and sustainable management of fishery resources and implementation of integrated coastal area management plans, including through the promotion of sustainable coastal and small-scale fishing activities and, where appropriate, the development of related infrastructure.

(e) Formation of cooperative partnerships between countries or between international and/or regional organizations to enhance capacity for implementation, taking into account the special needs and difficulties experienced by stakeholders in developing countries and by indigenous and local communities.

(f) Increase of scientific, technical and technological collaboration, including integrated assessment at the global and regional levels, including the appropriate transfer of marine science and marine technologies and techniques for the conservation and management of living marine resources and expanding ocean-observing capabilities for timely prediction and assessment of the state of the marine environment.

(g) Build capacity in marine science, information and management, through, *inter alia*, promoting the use of environmental impact assessments and environmental evaluation and reporting techniques for projects or activities that are potential harmful to the coastal and marine environments and their living and non-living resources.

(h) Undertaking capacity-building, technology transfer, public education and awareness, and training in order to improve the implementation of this programme of work.

(i) Urgent mobilization of financial resources and identification of additional funding mechanisms for implementation of this programme of work, including provision of information about creative arrangements and tools for financing conservation and sustainable use, and through establishment of additional mechanisms, such as small grants funds.

(j) Provision of financial and technical support by the international community including by distant water fishing nations to developing countries in particular small island developing States for sustainable management and use of marine and coastal resources.

(k) Continued review of obstacles to implementation of each programme element leading to development of additional enabling activities, as appropriate, aimed at overcoming such obstacles.

(l) To develop close collaboration between national agencies responsible for implementation of this programme of work and related supporting activities.

Ways and means

The Executive Secretary should collaborate with funding agencies, international and regional organizations and Parties to facilitate the implementation of these activities. Activity (b) will carried out in collaboration with regional fisheries and research organizations as appropriate. Funding agencies should support implementation of activity (b).

V. TIME SCHEDULE

The elaborated programme of work will be effective for a six year time period (2004-2010) at which point its implementation will be reviewed in depth, and the programme of work will be revised as necessary. Additional elaboration of the programme of work prior to 2010 can be undertaken through decisions of the Conference of the Parties in response to emerging global priorities needing urgent action.

Appendix 1

SPECIFIC WORK PLAN ON CORAL BLEACHING

The following activities, adopted by the Conference of the Parties in its decision VI/3 and amended by decision VII/5, would be incorporated under operational objective 2.3 of the elaborated programme of work. These amendments recognize the urgent need to implement action to manage coral reefs for resistance and resilience to, and recovery from, episodes of raised sea temperatures and/or coral bleaching.

1. ***Management actions and strategies to support reef resilience, rehabilitation and recovery***

(a) The identification, investigation and management of areas of demonstrated resilience and/or resistance to raised sea-temperature and coral-bleaching events. [15]/

Highest priority actions for implementation

(i) Identification of coral-reef areas that exhibit resistance and/or resilience to raised sea temperatures.

(ii) Identification, development, testing and refinement of management regimes to enhance reef resilience to and recovery from raised sea temperatures and/or coral bleaching, through the application of, *inter alia,* appropriate protective status, reduction of reef stressors, management of reef communities, etc

Other priority actions

(iii) Investigation of factors that enable such resistance such as, *inter alia* cool currents, cold up-wellings, genetic tolerance in certain species and genotypes of corals to raised sea temperatures, presence and necessary abundance of reef associated biodiversity that imbues reef systems with resilience to raised sea temperatures and/or coral bleaching;

(iv) Investigation of the role(s) of sea currents, local and larger scale, in the resistance and/or resilience of coral reefs to raised sea temperatures and/or coral bleaching.

(b) The recognition of the urgent need to supplement coral reef information gathering and monitoring schemes with focused management activities and the need to assist, support and enable such activities:

Highest priority action for implementation

(i) Establish or expand as appropriate, and begin to implement, international support programmes to developing countries, countries with economies in transition, and in particular, least developed countries and small island developing states, to support such activities;

(c) Identify and develop pilot projects for management interventions that promise to increase reef resilience to bleaching in both the short and long-term and/or strengthen reef recovery post-bleaching .[16]/

Highest priority actions for implementation

(i) Explore utility and feasibility of short-term management interventions to reduce severity of bleaching or to facilitate recovery after bleaching;

(ii) Instigate and support initiatives for marine protected areas managers where resilience principles are being actively applied and tested;

(ii) Encourage the application of resilience principles in coral reef areas outside marine protected areas;

(d) Integrate bleaching resilience principles into marine protected areas network design of networks of marine protected areas, and management approaches, such as improving water quality, preventing overfishing and protecting biodiversity. [17]/

Highest priority action for implementation

(i) Establish programmes that provide information and resources to support understanding and application of resilience principles into the design.

(e) Increase implementation of management actions, including identifying and promoting key demonstration sites that reduce localized stressors on reefs in order to increase reef resilience to mass bleaching: [18]/

Highest priority action for implementation

(i) Assist reef managers to identify, implement and justify actions that can reduce localized stressors on reefs that will increase reef resilience to mass bleaching.

2. Information gathering

(a) Implement and coordinate targeted research programmes, including predictive modelling, that increase understanding of:

(i) The *mechanisms* that cause mass coral bleaching, including:

a. Mechanisms that lead to variation in bleaching symptoms;

b. Bleaching thresholds for varying geographic locations and reef types for acute and chronic increases in sea temperature;

c. Synergistic relationships between global stressors, such as warming, increased exposure to ultraviolet radiation and localized threats that already place reefs at risk, such as pollution and overfishing;

(ii) The *long-term consequences* of mass coral bleaching under different warming scenarios, including:

a. Understanding of acclimation and adaptation potential

b. Prediction of the frequency and extent of mass bleaching

c. Predict the impacts of mass bleaching on ecological, social, and economic systems.

(iii) The *management* of mass coral bleaching, including:

a. Effectiveness of short-term management interventions in promoting reef resilience to bleaching and/or recovery after mass bleaching events.

b. Understanding of strategies to support long-term resilience to bleaching, including connectivity, removal of localized stressors, etc.

While many of the information needs for the work plan will require a longer term commitment, the work plan recognizes the need to act now to minimize the impacts of coral bleaching through effective management initiatives. [19]/

Highest priority actions for implementation

(i) Document instances of mass bleaching, and the impacts of coral-bleaching and coral-mortality events on social and economic systems, and provide relevant information to the Secretariat through the Global Coral Reef Management Network (GCRMN).

(ii) Compile, and disseminate through the clearing-house mechanism, current scientific information on the survival of reef-building corals under global warming to allow some prediction of the adaptation and survival of the biological diversity of coral reefs in coming decades.

(iii) Collaborate with the Global Coral Reef Monitoring Network to compile information on existing networks, databases and websites which can provide up-to-date information of the status of coral reefs and their threats; and assess the quality of the data they contain and methodologies used for data collection and analysis.

Other priority actions

(iv) Strengthen networks for data collection and dissemination of information on coral-reef status and interpretation of long-term trends resulting from global climate change and anthropogenic stresses to assist effective management and conservation.

(v) Support further targeted research programmes that investigate:

a. The mechanisms that cause of mass bleaching specifically, explanations for variation in bleaching patterns, identification of bleaching thresholds, and synergistic relationships between local threats and warming seas.

b. The impacts of coral bleaching and coral mortality events on social and economic systems;

c. Management options to building reef resilience to mass bleaching on both short- and long-time frames;

(b) Implement and coordinate baseline assessments and long-term monitoring to measure the biological and meteorological variables relevant to coral bleaching, mortality and recovery, as well as the socio-economic parameters associated with coral-reef services. [20]/

Highest priority actions for implementation

(i) Implement baseline assessments and long-term monitoring to measure the extent and severity of coral bleaching, mortality and recovery and identify reef areas that exhibit resistance and/or resilience to raised sea temperatures;

(ii) Compile information on the socio-economic impacts of coral bleaching on communities dependent on coral reefs;

(iii) Widen, as necessary, the research on socio-economic impacts of coral bleaching on communities dependent on coral reefs;

(iv) Identify pilot projects that establish training programmes and survey protocols and enhance availability of expert advice at a range of scales, including classification of scale data;

Other priority actions

(v) Support ongoing assessment and monitoring initiatives, such as those of UNESCO, ICRAN, the regional seas conventions and action plans, GCRMN, UNEP and CORDIO;

(vi) Encourage and facilitate large-scale (ecosystem) monitoring programs that can generate an understanding of the large scale (both temporal and spatial) impacts of coral bleaching, with a particular focus on the cumulative ecosystem-level impacts of successive coral bleaching events (The WWF Global Protocol to be released 2004 provides a framework for this);

(c) Develop a rapid response capability to document coral bleaching and mortality, including in developing countries and remote areas, encompassing establishment of training programmes, survey protocols, expert advice, and contingency funds or rapid release of special project funding. [21]/

Highest priority actions for implementation

(i) Support the development of standardized training modules and manuals on detection and documentation of coral-bleaching events, mortality or recovery monitoring.

(ii) Build capacity and facilitate the development and implementation of coral-bleaching response plans, taking into account expert guidance, by organizations responsible for managing and conserving coral reefs;

Other priority actions

(iii) Organize, in conjunction with relevant agencies and organizations, annual meetings in each region on coral-reef assessment and monitoring methods with particular emphasis on documenting coral bleaching, bleaching related mortality and subsequent recovery. These should be integrated into existing programmes, where possible (regional seas conventions and actions plans may have the best capacity to implement these measures).

(d) Encourage and support countries in the development and dissemination of status-of-the-reefs reports and case-studies on the occurrence and impacts of coral bleaching and related mortality.[22]/

Highest priority action for implementation

(i) Strengthen dissemination of existing assessment and monitoring information on status of coral reefs and their threats through existing networks (Under the ICRAN strategic plan, this is a core role of GCRMN and ReefBase);

Other priority actions

(ii) Include coral bleaching in existing national biodiversity strategies and action plans under the Convention on Biological Diversity.

(iii) Support and collaborate with GCRMN the expansion of existing networks and initiatives at the regional and national level conducting coral-reef status assessments and monitoring.

(e) Emphasize that coral bleaching can be monitored as an early warning of the impacts of global warming on marine ecosystems and that the collapse of coral-reef ecosystems could impact ecological processes of the larger marine system of which coral reefs are a part, and expand the use of early-warning systems for coral bleaching. [23]/

Highest priority action for implementation

(i) Recognizing that coral bleaching is a cumulative-stress response (i.e. global warming is the most widespread stressor, but known localized human-induced stresses exacerbate events), develop education programmes addressing an ecosystem approach to coral-reef management and the relation between coral-reef health, resilience and other human-induced stresses.

Other priority actions

(ii) Encourage space agencies and private entities to maintain deployment of relevant sensors and to initiate design and deployment of specialized technology for shallow-oceans monitoring;

(iii) Expand the use of existing early warning systems and support the development of Web-based early warning systems and other means (for example, insitu temperature loggers);

(iv) Encourage mechanisms to make accessible high-resolution multi-spectrum imagery at low cost to coral-reef scientists and managers worldwide with a view to those scientists and managers that are based in developing countries;

(v) Work with the UNEP Division of Environmental Information, Assessment and Early Warning, GCRMN and other relevant organizations to develop local community capacity for remote and local level validation exercises, and training in interpretation of weather patterns related to the onset of bleaching;

(vi) Assist in developing and enhancing national and regional capacities of developing coastal States, and in particular small island developing States, on monitoring, interpretation, and application of climatic and oceanographic data related to the onset of bleaching.

(f) Facilitate initiatives that develop partnerships between scientists and managers to generate management-relevant information and products that support local management actions in response to global change: [24]/

Highest priority action for implementation

(i) Support initiatives to build capacity among reef managers to access and apply scientific information relevant to climate change and coral bleaching;

Other priority actions

(vi) Develop and support initiatives to foster active working relations between scientists and managers that can increase capacity to effectively respond to global change threats to local reefs;

(vii) Encourage investigations into the relationship between coral-bleaching events and long-term meteorological data.

3. Capacity-building:

(a) Support training for reef managers globally on existing tools for responding to mass bleaching events, including early warning prediction, rapid assessment, communication, and management interventions: [25]/

Highest priority action for implementation

(i) Support activities aimed at building awareness and capacity relating to implementation of tools for responding to mass bleaching events.

(b) Support the training of and career opportunities for relevant marine taxonomists, ecologists, and members of other relevant disciplines, particularly at the national and regional level. [26]/

Highest priority actions for implementation

(i) Develop and/or expand training opportunities for protected area managers, fishery managers and related marine resource managers at the national and regional levels, on resource assessment, monitoring, user impact, ecosystem approaches to marine and coastal resource management, surveillance and enforcement, local community integration, and in setting and measuring the achievement of management performance goals and indicators;

(ii) Encourage a network of reef management agencies in developed and developing countries, and encourage relevant exchange programmes between countries and/or regions involved in coral-reef management with particular emphasis on coral bleaching, bleaching related mortality and subsequent recovery;

(iii) Gather, and disseminate through the clearing-house mechanism, information on existing training programmes on integrated coastal area management, best practices and related issues to sustainable management of coral reefs;

Other priority actions

(iv) In recognition of the important implication of climate change for coral reefs, encourage and facilitate greater understanding within agencies responsible for reef management about coral bleaching and related global change issues for coral reefs;

(v) Encourage incorporation or support the issue of coral reefs and bleaching in the capacity building activities of multilateral environmental agreements (e.g. Ramsar Convention, Cartagena Convention) and of their respective contracting parties;

(vi) Collaborate with GCRMN and other relevant organizations to develop standardized training modules and facilitate programs to build capacity in detection and documentation of coral-bleaching events and subsequent recovery, based on international Protocols and Manager's Guides currently under development;

(vii) Organize, in conjunction with relevant agencies and organizations, regular meetings in each region on coral-reef assessment and monitoring methods with particular emphasis on documenting coral bleaching, bleaching related mortality and subsequent recovery. These should be integrated into existing programmes, where possible;

(viii) Create scholarship trust funds in each region of the regional seas programmes to provide scholarships at graduate/postgraduate level for studies on coral-reef conservation and management, giving special consideration to small island developing States;

(ix) Promote the inclusion in national reports under the regional seas conventions, the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change a section for reporting of ecological and socio-economic impacts of coral-bleaching events.

(c) Encourage and support multidisciplinary approaches to coral-reef research, monitoring, socio-economics and management. [27]/

Highest priority action for implementation

(i) Support ICRI and GCRMN activities that encourage and support multidisciplinary approaches to coral-reef research, monitoring, socio-economics and management;

(d) Build stakeholder partnerships, community participation programmes, and public-education campaigns and information products that address the causes and consequences of coral bleaching. [28]/

Other priority actions

(i) Bridge the gap between global and local action through the creation of national and sub-regional coral-reef initiatives. (see ICRI and the International Tropical Marine Ecosystems Management Symposium on Building the Foundation of New ICRI Action).

(ii) Collaborate with relevant organizations to compile and disseminate relevant information from status-of-reefs reports, *Reefs at Risk*, etc., and examples of effective practical materials for general public, the media, private sector and policy makers.

(iii) Collaborate with relevant organizations to develop educational programmes on the relationship between coral reefs and larger marine systems (e.g. impacts of coral-reef loss on fisheries, local communities etc).

4. Policy development / implementation

(a) Use existing policy frameworks to implement the multiple conservation measures outlined in the Renewed Call to Action of the International Coral Reef Initiative, and develop and implement comprehensive local-to-national-scale integrated marine and coastal area management plans that supplement marine protected areas: [29]/

Other priority actions

(i) Integrate in existing policies at the regional and national levels the priority issues identified by ICRI and the International Tropical Marine Ecosystems Management Symposium (ITMEMS);

(ii) Assess relevant actions of existing policy frameworks and how these are directly addressing the integrated marine and coastal areas management, in particular coral-reef issues;

(iii) Make use of the regional seas programmes and other regional agreements (i.e. shipping, fisheries, trade and land-based sources of marine pollution) as vehicles to develop and implement policies related to coral-reef management and protection;

(iv) Identify and institute additional and alternative measures for securing the livelihoods of people who directly depend on coral-reef services: [30]/

Highest priority actions for implementation

(v) Support and expand existing projects that assess the impacts of coral bleaching on communities dependent on coral reefs, such as the CORDIO project in the Indian Ocean.

(vi) Develop pilot projects for transitioning dependent communities to alternative and sustainable livelihoods.

(b) Initiate efforts to develop joint actions, including between national focal points, among the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, and the Convention on Wetlands to:

(i) Develop approaches for assessing the vulnerability of coral-reef species to global warming;

(ii) Build capacity for predicting, monitoring and managing the impacts of coral bleaching and related mortality;

(iii) Identify approaches for developing response measures to coral bleaching;

(iv) Provide guidance to financial institutions, including the Global Environment Facility (GEF), to support such activities.; [31]/

Other priority actions

(v) Promote and implement joint work plans with other relevant agreements, organizations and initiatives, including the Commission on Sustainable Development, FAO, regional seas conventions and action plans, regional trade and economic organizations, the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities, ICRI and the Man and

Biosphere Programme. In particular, assess and coordinate activities that have been agreed within multilateral environmental agreements about coral reefs;

(vi) Gather the outputs of the Caribbean GEF project on climate change adaptation (CPACC project) as a contribution to activities (i)-(iv) above, and disseminate relevant findings through the clearing-house mechanism and other mechanisms;

(vii) Further development of response measures to coral bleaching and potential guidance to financial institutions, including the GEF may be needed;

(viii) Develop, through a transparent consultative process, a list of international research priorities to support reef management information needs and to guide funding institutions.

(c) Encourage FAO and regional fisheries organizations to develop and implement measures to assess and mitigate the impacts of sea-surface temperature rise on fisheries:

Highest priority actions for implementation

(i) Establish no-fishing zones and limitations on fishing gear to protect breeding grounds and provide fish with refuges as well as increase reef resilience;

(ii) Enforce legislation prohibiting destructive fishing practices that further damage coral-reef ecosystems and reduce reef resilience;

Other priority actions

(iii) Encourage investigations of potentially deleterious effects of changes in oceanographic patterns and resulting impacts on target fish stocks resulting from sea-surface temperature rise;

(iv) In collaboration with FAO, investigate strategies for management of coral-reef fisheries that are demonstrably sustainable with respect to fished stocks and the ecosystems that produce them.

5. Financing:

(a) Mobilize international programmes and mechanisms for financial and technical development assistance, as well as national and private sources to support implementation:

Highest priority actions for implementation

(i) Identify financial and technical assistance for the implementation of this work program.

(ii) Identify financial and technical assistance mechanisms of national and private sources to assistance communities impacted by coral bleaching.

Other priority actions

(iii) Promote programmes that identify the relationships among financial and technical development assistance and environmental project funding.

Appendix 2

ELEMENTS OF A WORK PLAN ON PHYSICAL DEGRADATION AND DESTRUCTION OF CORAL REEFS, INCLUDING COLD WATER CORALS

1. *Assessments and indicators*. To provide a comprehensive analysis of the status and trends of global coral-reef ecosystems, including determination of indicators for continued monitoring and determination of ecological and socio-economic impacts of coral-reef degradation and destruction;

2. *Management*. To identify management practices, technologies and policies that promote the conservation and sustainable use of coral-reef ecosystems and their associated marine biological diversity, with a view to addressing recognized threats (i.e., overfishing, coastal development, destructive fishing practices, land-based pollution, marine-based pollution and recreational use) and identifying sustainable management approaches;

3. *Capacity-building*. To strengthen the capacities of Parties, regions, local communities and other stakeholders, to manage sustainably coral-reef ecosystems and their associated marine biological diversity so as to maintain their ecosystem benefits and to promote awareness and responsible action to prevent and mitigate physical degradation and destruction of coral reefs and its effects on marine biological diversity;

4. *Financing*. To recognize and promote existing programmes and mobilize further mechanisms for financial and technical development assistance to support implementation of activities addressing the physical degradation and destruction of coral reefs;

5. *Education and public awareness*. To educate and inform the public, policy makers and other stakeholders of ecological and socio-economic values of coral-reef ecosystems and the importance of an ecosystem approach towards their conservation and sustainable management.

Appendix 3

ELEMENTS OF A MARINE AND COASTAL BIODIVERSITY MANAGEMENT FRAMEWORK

A. Purpose of the framework

1. The overall marine and coastal biodiversity management framework should fulfil the three objectives of the Convention, namely the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits, arising out of the utilization of genetic resources.

2. The framework would play a precautionary approach role to help halt losses in biodiversity and encourage recovery, notwithstanding our imperfect knowledge of the marine environment.

3. The framework should address all elements of biodiversity, as reflected in Annex I to the Convention, including the genetic, species and ecosystem levels.

4. Marine ecosystems include both benthic and pelagic elements. Most species have a mobile stage in their life cycle. As a consequence, marine systems are considered open and dispersing larvae can link distant marine, coastal and inland water habitats. This means that connectivity issues are

significant in designing a marine biodiversity management framework, and one marine and coastal protected area will not be able to protect all the biodiversity within the area. A network approach is therefore essential. The network should be at an appropriate scale, which may in some cases require a regional approach. That regional approach should address proportionality issues on a regional rather than a national scale, for example when one or a handful of countries possess most or all of a particular habitat type or the world population of a particular species.

B. Elements of the framework

5. An effective marine and coastal biodiversity management framework would comprise sustainable management practices and actions to protect biodiversity over the wider marine and coastal environment, including integrated networks of marine and coastal protected areas consisting of:

(a) Marine and coastal protected areas, where threats are managed for the purpose of biodiversity conservation and/or sustainable use and where extractive uses may be allowed; and

(b) Representative marine and coastal protected areas where extractive uses are excluded, and other significant human pressures are removed or minimized, to enable the integrity, structure and functioning of ecosystems to be maintained or recovered.

6. The balance between category (a) and (b) marine and coastal protected areas in paragraph 5 above would be selected by the country concerned.

7. This framework should respect national legislation and also respect the interests of indigenous and local communities, such as spiritual and cultural practices and socio-economic interests and, as appropriate, opportunities for the participation of indigenous and local communities in the establishment and management of marine and coastal protected areas, and in accordance with Article 8(j) and related provisions should respect, preserve and maintain traditional knowledge, innovations and practices.

C. Marine and coastal protected areas where extractive uses are permitted

8. Marine and coastal protected areas where extractive uses are permitted would contain areas that are subject to site-specific controls that have an explicit biodiversity objective or recognized biodiversity effect. Those controls may also have other objectives (e.g., economic or social objectives). In many countries these may comprise the majority of areas within networks of marine and coastal protected areas and deliver most biodiversity benefits. Examples of such controls include controls on fishing methods (e.g., restricting bottom trawling), controls on the removal of certain species (e.g., habitat forming species), rotational closures, and controls on pollution and sedimentation.

9. Amongst the roles for these areas may be to maintain connectivity across the overall network, protect life cycle stages (e.g. as a result of spawning behaviour), and buffer the representative areas where extractive uses have been excluded.

D. Representative areas from which extraction is excluded

10. Such representative areas would be managed to maintain their integrity, structure, functioning, resilience and persistence, or to take restorative or rehabilitative steps for biodiversity. They would encompass a full range of marine and coastal ecosystems (including those that are also unique or special), and be protected from human impacts and the effects of alien species. The key purpose of these areas would be to provide for intrinsic values, to allow us to better understand the marine and coastal environment by acting as scientific reference areas, to contribute towards marine environmental recovery, and to act as insurance against failures in management. But they will also contribute to other objectives, including socio-economic well-being, sustainable use of fisheries in adjacent areas, and public enjoyment.

11. They should be representative of all marine and coastal ecosystems and should attempt to cover centers of endemism. They should contain sufficient area and replicates to ensure that they can fulfil their objectives and be ecologically viable over time. Although the application of criteria for representativeness in the marine environment is a complex issue, experience in terrestrial protected area work, the work on marine and coastal protected areas to date, and the literature all indicate that the 'representative' concept will not be provided by a few small marine and coastal protected areas.

12. Protection from human impacts would mean that extraction of indigenous biota would be prevented except to the extent necessary to allow essential scientific research and education (i.e., these would be no-take reserves applying to the area or to a specified element of the ecosystem), but also that other practices which significantly impact on biodiversity (e.g. substrate alteration, changes in sediment movements, pollution, visitor disturbance of sensitive species) would be prevented or minimized.

13. These marine and coastal protected areas would be permanent, subject to any necessary changes to allow them to better achieve their objectives, taking into account natural dynamics. They would need to be viable, in the face of changing threats and long-term environmental change (e.g. climate change). Viability might depend on matters such as the nature of the legal protection, the presence of replicates, the design of the individual marine and coastal protected areas, and the connectivity between marine and coastal protected areas (directly or using other marine and coastal protected areas as stepping stones).

14. Although public access may be encouraged in order to generate educational and enjoyment benefits, these benefits would be treated as secondary to the primary purposes listed above. Public access may need to be controlled to prevent unacceptable impacts.

15. Areas would need to be geographically dispersed across biogeographic regions and would need to be ecosystem-based, rather than focus on single species.

E. Sustainable management of the wider environment

16. The marine and coastal protected areas network would be sitting within a framework of sustainable-management practices over the wider marine and coastal environment.

17. Sustainable management practices over the wider marine and coastal environment could include general restrictions that would apply to the entire area (e.g., bans on certain destructive fishing methods), and site-specific restrictions imposed for non-biodiversity purposes (e.g., trawling restrictions to protect cables, restricted areas for defence purposes). These practices can contribute to biodiversity protection in a number of ways, including:

(a) The management of more widespread issues that pose a threat to the effectiveness of individual marine and coastal protected areas, and ultimately, the aim of regional networks. These threats usually arise from land-based sources, and include issues such as water quality, sedimentation and shipping/transport;

(b) Providing direct benefits to biodiversity (e.g. restrictions on trawling to prevent cable damage can also protect sensitive biodiversity such as corals and sponges);

(c) Protecting wide-ranging marine and coastal biodiversity species which are difficult to address through site-specific measures (e.g. restrictions on fishing practices that cause a by-catch of species such as albatross, marine mammals and turtles); and

(d) Reducing impacts on the connections between marine and coastal protected areas, e.g., by allowing the movement of larvae and wide ranging species between marine and coastal protected areas.

F. International support for creation and management of networks of marine and coastal protected areas

18. There are a large number of identified impediments to the creation and management of marine and coastal protected areas at the national level. There are a number of ways in which the international community can help to overcome these impediments. In particular, it can:

(a) Provide active financial, technical and other support for marine and coastal protected areas work; and

(b) Help to identify and remove both the barriers to the creation of marine and coastal protected areas, and perverse incentives for unsustainable activities in the marine and coastal environment.

Appendix 4

RESEARCH PRIORITIES, INCLUDING REASEARCH AND MONITORING PROJECTS ASSOCIATED WITH PROGRAMME ELEMENT 3: MARINE AND COSTAL AREAS

The following research priorities and pilot projects are designed to both explore and enhance the linkages between marine and coastal protected areas and the sustainable use of marine and coastal living resources. Achieving the goal of sustainable use of living resources is dependent on the social, economic and cultural context of each marine and coastal protected area, and therefore a number of the research priorities focus on this aspect of marine and coastal protected areas. The effects of marine and coastal protected areas on population size and dynamics are investigated through priority 2.1 (connectivity and proportionality), priority 2.3 (d) (climate change), priority 3.1 (size and location of marine and coastal protected areas vs. species & habitat dynamics), and priority 3.6 (b) (percentage of protection required vs. size and dynamics of local population).

A. Establishing a global network [32]/ of marine and coastal protected areas

Priority 1.1: Developing and implementing national, regional and global strategies towards establishing networks of marine and coastal protected areas.

Pilot project:

(a) Parties, regional bodies and relevant organizations to bring to the attention of the Secretariat of the Convention on Biological Diversity existing and planned initiatives towards the development of networks of marine and coastal protected areas.

(b) Draft action-oriented strategies for establishing marine and coastal protected areas networks, and implement those strategies in line with regional initiatives, for example by holding regional workshops.

B. Inventory and assessment of marine and coastal protected areas and the global system

Priority 2.1: Assessing the representativeness, connectivity and proportionality of the existing marine and coastal protected areas system.

Pilot projects:

(a) Undertake initiatives to map ecosystems and habitats within regions and biogeographic areas, and determine the minimum level of broad habitat categories required for assessing representativeness of marine and coastal protected areas networks. Use this as a basis for assessing representativeness of the existing marine and coastal protected areas network. This work should use a high-level framework that is compatible with the basis for global inventory work. One possible approach to this work is to hold regional workshops.

(b) Assess connectivity to determine bioregions, and apply this information for evaluation of the existing marine and coastal protected areas network, as well as for identifying priority areas for the future.

(c) Assess the effectiveness of the current marine and coastal protected areas network regionally and globally for the conservation and sustainable use of migratory species.

Priority 2.2: Developing appropriate databases at the national level to allow for an assessment of marine and coastal protected areas frameworks on a larger (regional/global) scale. Using these data to identify patterns among marine and coastal protected areas to generate priority needs for future research and approaches for adaptive management.

Pilot projects:

(a)Develop the high-level framework for the global inventory (see annex IV below), and related advice to national managers on national inventories.

(b) Develop national databases for assessment of selected existing national/regional networks, selecting examples from the range of political, economic and biogeographic situations.

(c) Undertake a global review of the current state of knowledge of marine and coastal protected areas by region. Provide output in a format understandable for managers and policy makers.

(d) Compiling information that illustrates the values, benefits and unique contributions of marine and coastal biodiversity, *inter alia*, breeding, migration patterns of marine species, and spawning sites.

Priority 2.3: Identifying the best indicators for assessing management effectiveness at various scales within an overall system.

Pilot projects:

(a) Develop and test a suite of effective assessment measures, including indicators, on a number of existing sites (biological, socio-economic and governance-based indicators). Selected pilot sites must cover the range of cold, temperate and tropical regions.

(b) Develop methods for evaluating the effectiveness of entire networks of marine and coastal protected areas.

(c) Develop methods for adapting marine and coastal protected areas management in response to possible changing species and habitat distribution patterns, which may result from climate change.

C. Implementation of marine and coastal protected areas networks

Priority 3.1: Develop methods to manage conflicts and generate support for adequate protection of biodiversity through area-specific approaches.

Pilot project:

(a) Evaluate the long-term benefits (for example species changes, habitat changes and ecosystem changes) of protecting large-enough/significant-enough critical habitats and ecosystems, by developing case-studies.

Priority 3.2: Establishing criteria for choosing marine and coastal protected areas in countries that lack such criteria.

Pilot project:

(a) Provide a conceptual model and best practice examples of criteria for selecting marine and coastal protected areas, by undertaking linked work in a small number of selected countries.

Priority 3.3: Enhancing social and economic effects of marine and coastal protected areas, particularly in terms of poverty alleviation.

Pilot projects:

(a) Development of culturally sensitive marine and coastal protected areas development/management approaches to achieve effective participation, as appropriate, of indigenous and local communities and relevant stakeholders.

(b) Develop adaptive approaches to marine and coastal protected areas establishment and management. This could be done by collection and dissemination of case studies of both best and worst-case examples of the degree to which an understanding of how target communities operate (socially/culturally) and "do business" can affect the success of the establishment and management of marine and coastal protected areas.

Priority 3.4: Developing effective "learning networks"-networking among marine and coastal protected areas at the national/international level. Develop and test such networks in a representative range of test countries/regions.

Pilot projects:

(a) Develop networks of communities/stakeholders to enable them to share and learn from experiences.

(b) Compile information on existing learning networks, and develop guidance for the operation of such networks based on these experiences.

Priority 3.5: Developing effective methods for integrating traditional knowledge into the establishment and management of marine and coastal protected areas.

Pilot project:

(a) Develop guidelines for integration of traditional knowledge, practices and innovation, with the participation of indigenous and local communities and with their prior informed consent in accordance with national legislation, into marine and coastal protected areas establishment and management, and support these by compiling and disseminating case-studies on a wide range of examples from places where such initiatives have been undertaken (for example, New Zealand, Chile, the Wider Caribbean).

Priority 3.6: Developing strategies for integrating marine and coastal protected areas and network development into long-term national and regional planning.

Pilot projects:

(a) Develop strategies based on past experience and future needs for the range of geographical regions.

(b) Develop methods for estimating the percentage of non-extractive protection required, in conjunction with national monitoring programmes, depending on the size and dynamics of local populations.

(c) Incorporate considerations of sedimentation and water quality into planning and management processes.

Appendix 5

Research and monitoring priorities associated with Programme Element 4: Mariculture

At the present time there is insufficient information available about the effects of mariculture on biodiversity and its mitigation. Therefore, additional efforts, including through the use of the knowledge, innovations and practices of indigenous and local communities as appropriate, should be developed in the following areas:

(a) *General research needs*:

(i) Development of research programmes to support establishment of efficient monitoring programmes to monitor impacts of mariculture on marine and coastal biological diversity;

(ii) Development of criteria for judging the seriousness of biodiversity effects of mariculture;

(iii) Subsequent establishment of monitoring programmes to detect effects of mariculture biodiversity;

(iv) Research on the impact of escaped mariculture species on biodiversity;

(v) Development of criteria for when environmental impact assessments are required, and for the application of environmental impact assessments at all levels of biodiversity (genes, species, ecosystems), in the context of the guidelines endorsed by the Conference of the Parties in decision VI/7 A and the recommendations endorsed in decision VI/10, annex II;

(vi) Noting that the FAO glossary of terms is skewed towards marine capture fisheries, expansion of this glossary with regard to its terminology related to aquaculture;

(vii) Reinforcement of global assessments of marine and coastal biological diversity;

(b) Research related to impacts of mariculture on genetic diversity:

(i) Development of genetic resource management plans for broodstock;

(ii) Research aimed at understanding genetic effects of biotechnology developments in aquaculture;

(iii) Research aimed at understanding genetic structure of both the farmed and wild populations, including:

a. Effects of genetic pollution from farmed populations on wild populations;

b. Maintenance of genetic viability of farmed populations;

c. Studies of (genetics of) wild populations as potential new candidates for mariculture;

(c) *Research related to impacts of mariculture on species diversity*:

(i) Support for basic global-scale taxonomic studies, possibly in conjunction with the Global Taxonomy Initiative (GTI);

(ii) Support for studies aimed at development of responsible aquaculture using native species, including through consideration of traditional knowledge;

(iii) Development of methods and techniques for limiting by-catch of seed collection;

(d) *Research related to impacts of mariculture on ecosystem diversity*:

(i) Research on carrying capacity and carrying capacity models for planning aquaculture, especially stocking rates;

(ii) Comprehensive studies to quantitatively and qualitatively assess effects of mariculture on biodiversity for various aquatic ecosystems, selected by their sensitiveness degree;

(iii) Research on the competitive nature imposed on marine fisheries by capture and culture fisheries;

(iv) Studies aimed at improved understanding of the effects of inputs, such as chemicals, hormones, antibiotics and feeds on biodiversity;

(v) Research on the impact of diseases in cultured and wild species on biodiversity;

(e) *Research related to socio-economics, culture, policy and legislation*:

(i) Comparative studies on legislation, economic and financial mechanisms for regulating mariculture activity;

(ii) Development of quantitative and qualitative criteria to assess mariculture impacts on the environment, including cultural and social impacts, as outlined in the recommendations contained in decision VI/10, annex II;

(f) *Monitoring programmes*:

(i) Support for mariculture-related disease monitoring programmes at the global level;

(ii) Support for the transfer of biotechnological diagnostic tools for wide use;

(iii) Update of taxonomic database including genetic diversity at the intra-specific level.

Annex II

GUIDANCE FOR THE DEVELOPMENT OF A NATIONAL MARINE AND COASTAL BIODIVERSITY MANAGEMENT FRAMEWORK **[33]**/

1. For countries with no marine and coastal protected areas or no highly protected marine and coastal protected areas, the first step should be to develop the first few marine and coastal protected areas, and the necessary mechanisms to allow future marine and coastal protected areas and networks to be developed. The goals and objectives of each marine and coastal protected areas should be clearly established when they are created.

2. A strategic planning approach should be adopted at the national and regional levels when developing an ecologically viable framework for the development of marine and coastal protected areas. This should be based on past experiences in effective management, large-scale factors affecting the viability and long-term goals of marine and coastal protected areas.

3. Management should focus on ensuring that each marine and coastal protected areas, and the network, are fulfilling the identified goals and objectives. This will require evaluation of effectiveness, and adaptive management over time.

4. Key factors for achieving effective management of marine and coastal protected areas include good governance, clear legal or customary frameworks to prevent damaging activities, effective compliance and enforcement, ability to control external activities that affect the marine and coastal protected areas, strategic planning, and sustainable financing.

5. Good governance will depend on having one or more bodies, each with the authority and capacity to undertake their responsibilities. When there is more than one body, including, in the case of transboundary areas, bodies in different countries, mechanisms for coordinating and integrating management will be vital.

6. The legal or customary framework should clearly identify:

(a) Prohibited activities that will be contrary to the objectives of the marine and coastal protected areas;

(b) Those activities which will be allowed with clear restrictions or conditions to ensure that they will not be contrary to the objectives; and

(c) A decision-making process for all other activities.

7. Minimizing the number of discretionary activities is desirable in order to minimize potential harmful impacts in the marine and coastal protected areas.

8. Effective enforcement will depend on:

(a) Adequate enforcement capacity, including clear responsibilities, inter-agency coordination, trained and equipped personnel and the necessary legal or customary powers;

(b) Appropriate penalties and associated legal provisions; and

(c) Integration between enforcement, voluntary compliance and management.

9. Governments should be encouraged to urgently address, through appropriate integrated marine and coastal management approaches, all threats, including those arising from the land (e.g., water quality, sedimentation and marine debris), and shipping/transport in order to maximize the effectiveness of marine and coastal protected areas and the network in achieving their objectives for marine and coastal biodiversity.

10. The Ad Hoc Technical Expert Group identified stakeholder participation as essential for achieving the global goal and for the establishment and maintenance of individual marine and coastal protected areas and regional networks. Stakeholder participation would be particularly important in establishing equitable sharing of benefits accruing from creation of marine and coastal protected areas. In addition, stakeholder participation would:

(a) Allow decisions to be made in an inclusive and transparent way;

(b) Facilitate the involvement in decision-making and management of a wide range of players, increasing the likelihood of success;

(c) Recognize traditional rights and customs, and other interests of indigenous and local communities and other relevant stakeholders in accordance with national law as appropriate; and

(d) Allow decisions and management to be undertaken at the appropriate level (e.g., through decentralization).

11. It was recognized that the type and extent of participation will depend on local circumstances, including issues such as the traditional rights, customs and traditions of indigenous and local communities in accordance with national law, available mechanisms and governance approaches, and the degree of interest of stakeholders.

Annex III

IMPROVEMENT OF AVAILABLE DATA FOR ASSESSMENT OF PROGRESS TOWARDS THE GLOBAL GOAL

1. Since 1981, UNEP-WCMC has developed and maintained a global database on protected areas. The importance of this database, which is managed in collaboration with the IUCN World Commission on Protected Areas, has been broadly recognized. Within the database is a subset of clearly identified marine and coastal protected areas.

2. The Ad Hoc Technical Expert Group examined available information, consulted UNEP-WCMC (and indirectly WWF-International), and concluded that global data on marine and coastal protected areas should be improved and/or gathered in the following critical categories:

(a) **Location** (physical coordinates and country or political unit, including the names of neighbouring country/countries where the marine and coastal protected areas is transboundary);

(b) **Total size** of the protected area, the relative size of the marine and coastal component and, where transboundary, the total area under country jurisdiction;

(c) **Temporal aspects** e.g. permanency or seasonality of protection or management;

(d) **Type of protection and management** proposed or being implemented, using a simple three-tier system:

(i) Representative highly-protected areas where extractive uses are excluded;

(ii) Additional marine and coastal protected areas;

(iii) Sustainable-management practice in the wider coastal and marine environment;

(e) **Effectiveness of protection and management** gauged against the regime being proposed or being implemented, using a simple three-tier system:

(i) Currently fully effective - no significant problems known;

(ii) Currently partially effective - some deficiencies;

(iii) Currently ineffective - significant implementation problems;

(f) **Nationally-designated names** for type of protection and management e.g. marine park, marine and coastal nature reserve, etc.

(g) **Habitats protected and managed** (3D not just benthic);

(h) **Species protected and managed** (3D not just benthic)**;**

(i) **Habitats and species specifically excluded from protection/management within the marine and coastal protected area** (i.e. that have no legal protection);

(j) **Nature of threats to habitats/species -** see table 1**;**

(k) **Name and contact details** of person(s) providing the above information and date on which this was done.

3. These data categories are a core set, which would provide the key information needed to evaluate progress, and success. They consist of sufficiently few categories to make data collection rapid, easy and hopefully achievable. They would not only underpin the actions of the Convention in the marine and coastal environments but are also considered to be of value to the wider conservation community at global, regional and national levels.

4. The collection of information on habitats being protected and managed would need to be structured from a standard list. This would speed up and standardize data collection. This would need to consist of no more than 15 categories and would need to take a very high level approach. Such an approach needs to be developed but could use terms such as "coral, sea grass, mangrove, estuary, seamounts, etc." A similar approach would need to be taken over high-level categories to collect information on threats. Some first thoughts on such categories are provided in table 1 below. In both cases, a decision at the time of data collection would need to be made on which categories were relevant. Whilst this may cause difficulty on occasions, 'fitting' a site into this

proposed management framework, any errors would be insignificant at the network, regional and global scales.

5. Data in other fields currently held within the world database on protected area of proven value to a wider audience, such as the IUCN management categories and GIS boundary data, could also be gathered but are not considered to be as important. IUCN category information will be collected for all sites on the United Nations list and so could be integrated into the above "global" categories.

6. It is also important, in the context of the Convention on Biological Diversity, that additional contextual information be gathered for each signatory country on the nature of their marine and coastal environments. This would provide benchmarks against which data return would be analysed, progress tracked and future Convention policy determined. This information should include:

(a) *Total area of seas under country jurisdiction in km^2* in accordance with the United Nations Convention on the Law of the Sea, and the criteria against which this measurement was made (e.g. high water to seaward limit of jurisdiction, low water to seaward limit); and

(b) *Habitat and species inventories*. In order to assess whether adequate action is being taken, habitat and species inventories to establish global extent and distribution will be required.

7. The former would enable coverage of the marine and coastal protected area network being established under the Convention on Biological Diversity at local, regional and global scales to be tracked, whilst the latter would provide a reference point against which to set future priorities for action under the Convention to address deficiencies. Both are essential for assessing achievement of the proposed global goal.

8. UNEP-WCMC and the IUCN World Commission on Protected Areas (WCPA), working in collaboration with UNEP regional seas offices and other relevant bodies, provide a vehicle by which such a consolidation and updating of global data on marine and coastal protected areas could be achieved. The United States National Oceanographic and Atmospheric Administration currently chairs the marine and coastal protected areas marine programme, and is interested in using its resources and experience of marine and coastal issues to help develop the information base for making decisions on marine and coastal protected areas.

9. The advent of Internet-based tools will greatly ease data-gathering and increase the accessibility of the information and its analysis to advise on local, regional and global progress and trends. Internet-based initiatives, and the predominate use of drop-down menus when gathering data from managers and practitioners, will also reduce data entry time and provide major advantages for the consistency and coherency, and ultimately reliability, of the dataset that needs to be gathered.

Table 1.

Examples of six possible high-level categories that could be used globally to structure collection of information on the nature of the principal threats to habitats/species within marine and coastal protected areas*

High level category	Sub-categories
Physical loss	Removal (e.g. harvesting, draining to create dry land)

High level category	Sub-categories
	Smothering (e.g. by artificial structures, disposal of dredge spoil)
Physical damage	Siltation (e.g. run-off, dredging, outfalls) Abrasion (e.g. boating, anchoring, trampling) Selective extraction (e.g. aggregate dredging, entanglement, turf cutting)
Non-physical disturbance	Noise (e.g. boat activity) Visual (e.g. recreational activity)
Toxic contamination	Introduction of synthetic compounds (e.g. pesticides, antifoulants, PCBs) Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons) Introduction of radio nuclides
Non-toxic contamination	Nutrient enrichment (e.g. agricultural run-off, outfalls) Organic enrichment (e.g. mariculture, outfalls) Changes in thermal regime (e.g. outfalls, power stations) Changes in turbidity (e.g. run-off, dredging) Changes in salinity (e.g. water abstraction, outfalls)
Biological disturbance	Introduction of microbial pathogens Introduction of non-native species and translocations Selective extraction of species (e.g. bait collection, wildfowling, commercial & recreational fishing)

* Note: one marine and coastal protected area could qualify for a number of high-level categories.

[11]/ The Ad Hoc Technical Expert Group adopted the following definition of "marine and coastal protected area", which incorporates all of the IUCN categories of protected areas:

"Marine and coastal protected area' means any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection that is surroundings.

"Areas within the marine environment include permanent shallow marine waters; sea bays; straits; lagoons; estuaries; subtidal aquatic beds (kelp beds, seagrass beds; tropical marine meadows); coral reefs; intertidal muds; sand or salt flats and marshes; deep-water coral reefs; deep-water vents; and open ocean habitats."

[12]/ A global network provides for the connections between Parties, with the collaboration of others, for the exchange of ideas and experiences, scientific and technical cooperation, capacity building and cooperative action that mutually support national and regional systems of protected areas which collectively contribute to the achievement of the programme of work. This network has no authority or mandate over national or regional systems.

[13]/ A global network provides for the connections between Parties, with the collaboration of others, for the exchange of ideas and experiences, scientific and technical cooperation, capacity building and cooperative action that mutually support national and regional systems of protected areas which collectively contribute to the achievement of the programme of work. This network has no authority or mandate over national or regional systems.

[14]/ A global network provides for the connections between Parties, with the collaboration of others, for the exchange of ideas and experiences, scientific and technical cooperation, capacity building and cooperative action that mutually support national and regional systems of protected areas which collectively contribute to the achievement of the programme of work. This network has no authority or mandate over national or regional systems.

[15]/ *Ongoing initiatives*

(i) Areas exhibiting resistance to raised sea temperatures and/or high resilience to coral bleaching have been identified, for example in the Indian Ocean, through coral reef monitoring programmes.

(ii) Management regimes to enhance post-bleaching coral recruitment in key areas have been tested, for example with regard to control of coral-grazing species

(iii) A users manual for building resistance and resilience to climate change in natural systems, entitled "Buying time" was launched at the World Parks Congress, and is being tested in tropical marine ecosystems.

[16]/ *Ongoing initiatives*

The Nature Conservancy Reef Resilience Program is launching a programme aimed at establishing pilot projects that will test the application of resilience principles in coral reef MPAs.

(ii) The benefits of reducing fishing pressure during post-bleaching recovery of damaged coral reefs are being experimentally evaluated in .

[17]/ *Ongoing initiatives*

The Nature Conservancy Reef Resilience Toolkit provides guidance for MPA managers to integrate bleaching resilience principles into MPA design and management.

(ii) The Great Barrier Reef Marine Park Authority (GBRMPA) has included resilience principles among the major considerations informing the recent rezoning process for the entire Great Barrier Reef Marine Park.

[18]/ *Ongoing initiatives*

(i) The United States Coral Reef Task Force (CRTF) has implemented a program of Local Action Strategies to guide and support local management actions that reduce localise stressors on reefs.

(ii) The GBRMPA is implementing a range of management initiatives within a framework designed to reduce local stressors and therefore improve reef resilience to climate change. Key actions have included a program to reduce land-based sources of pollution (Great Barrier Reef water quality

protection plan) and a full revision of marine park zoning to improve biodiversity protection (representative areas programme).

[19]/ *Ongoing initiatives*

(i) The Ad Hoc Study Group on Indicators of Coral Bleaching and Subsequent Effects was established September 2000 under the auspices of IOC/UNESCO with three major objectives: to develop possible molecular, cellular, physiological, and community indicators of coral bleaching that are reliable in their ability to detect early stress signals; examine potential mechanisms of reef corals for adaptation/acclimatization to global environmental change; investigate long-term response of reef corals to large scale changes in environmental variables. The group will meet annually for three years and distribute findings through annual reports and a final publication.

(ii) The Global Coral Reef Mamnagement Network (GCRMN) is a global network of coral reef scientists, Governments and local communities for monitoring and assessment of coral reefs, in terms of both biophysical and socio-economic parameters needed for management. GCRMN is co-hosted by the Australian Institute of Marine Science and the World Fish Center (ICLARM). The World Fish Center also host ReefBase, the official database of GCRMN, with data of over 8,000 coral reefs over the world. UNEP, together with IOC/UNESCO, is a sponsor of the GCRMN and a member of the GCRMN Management Group and the GCRMN Scientific and Technical Advisory Committee.

(iii) GCRMN has developed a comprehensive Status of Coral Reefs of the World report to be updated every two years, with the most recent edition published in October 2002.

(iv) UNEP, through GCRMN, emphasizes the importance of monitoring socio-economic parameters to achieve sustainable use of coral reef ecosystems. A socio-economic manual has recently been developed (October 2000) for monitoring of these parameters for enhanced management capacity.

(v) Contributing to GCRMN are existing regional projects. Regional coral reef monitoring networks within GCRMN exist for the Indian Ocean and the Wider Caribbean funded by World Bank, with the goal of assisting in the conservation of the rich biodiversity of coral reefs and their socio-economic value, and in the sustainable management of their resources, through a monitoring network. Monitoring programs dedicated to detect impacts from coral bleaching are being implemented within the Asia Pacific region (including the Great Barrier Reef), with a program underway currently to maximise their compatibility for regional summaries.

(vi) Under the International Coral Reef Action Network (ICRAN), the World Conservation Monitoring Centre (WCMC) and the World Fish Center are exploring the integration and availability of map-based products through the WCMC website and through ReefBase.

(vii) Some projects within the CORDIO programme in the Indian Ocean region focus on determining the socio-economic impacts of coral mortality and options for mitigating these through management and development of alternative livelihoods.

[20]/ *Ongoing initiatives*

(i) The objectives of the Ad Hoc Study Group on Indicators of Coral Bleaching and Subsequent Effects under activity (a) above include the identification of biological indicators that would facilitate long-term monitoring.

(ii) GCRMN currently serves as a network for coral reef assessments and monitoring of biological variable relevant to coral bleaching, mortality and recovery, as well as many socio-economic parameters associated with coral-reef services (see activity (a)).

(iii) Data repository and dissemination systems such as ReefBase may offer time-line biological data.

(iv) GCRMN, in coordination with the World Bank, IUCN, the Australian Institute of Marine Science and UNEP regional seas programmes is targeting existing or planned marine protected areas as the focus of some of their monitoring activities. The sites may offer valuable baseline data and serve for long-term monitoring. The Great Barrier Reef Marine Park Authority has implemented a baseline monitoring program to detect long term impacts of coral bleaching on the Great Barrier Reef.

(v) GCRMN is currently developing rapid assessment methodology for socio-economic and biophysical parameters in the Eastern African region, especially for use in developing countries where limited resources do not always allow for regular high-intensive monitoring..

(vi) WWF are leading a collaboration with ReefBase and the Great Barrier Reef Marine Park Authority to release in 2004, a global toolkit containing standardised methods for assessment and monitoring impacts of coral bleaching events.

(vii) The United States CRTF, GBRMPA and IUCN are producing a publication *Responding to Global Change: A Reef Manager's Guide to Coral Bleaching* for release in 2004. The Guide builds on the IUCN/CBD publication *Management of Bleached and Severely Degraded Coral Reefs*. It will assist reef managers to predict, understand and respond to coral bleaching events, and take action to minimise the severity and irreversibility of damage from climate change through supporting the natural resilience of reef ecosystems. The publication evaluates and synthesises current and emerging experience and knowledge to guide efforts to reduce the impact of climate change on coral reefs.

(viii) The UNEP Division of Environmental Information, Assessment and Early Warning coordinates a variety of information available from remote sensing technologies and organizations that facilitates dissemination of such information. They are well suited to coordinate assessment of meteorological variables relevant to coral bleaching, mortality and recovery.

(ix) WCMC and ICLARM are exploring the integration and availability of map-based products through the WCMC website and through ReefBase.

[21]/ *Ongoing initiatives*

(i) The objectives of the Ad Hoc Study Group on Indicators of Coral Bleaching and Subsequent Effects referred to under activity (a) above include the identification of physiological early-stress indicators in corals.

(ii) The Sida-SAREC and World Bank programme on coral-reef degradation in the Indian Ocean, was initiated as a response to the 1998 coral-bleaching event (CORDIO).

(iii) GCRMN is currently developing rapid assessment methodology for socio-economic and biophysical parameters in the Eastern African region, especially for use in developing countries where limited resources do not always allow for regular high-intensive monitoring (ReefCheck).

(iv) Within the ICRAN strategic plan, it is intended that these capabilities will be developed and made widely available.

(v) The UNEP Division of Environmental Information, Assessment and Early Warning coordinates a variety of information available from remote sensing technologies and organizations that facilitates dissemination of such information.

(vi) The Great Barrier Reef Marine Park Authority has developed a comprehensive Coral Bleaching Response Program, which is being used as a model for development of other regional response programs (Program document can be downloaded from www.gbrmpa.gov.au).

(vii) The *Reef Manager's Guide to Coral Bleaching* being released in 2004 by the US Coral Reef Task Force and GBRMPA provides protocols, advice and a framework for planning and implementing rapid responses to coral bleaching events. The plan for dissemination of the guide includes targeted capacity building in partnership with NOAA and The Nature Conservancy.

[22]/ *Ongoing initiatives*

(i) GCRMN has developed a comprehensive Status of Coral Reefs of the World report to be updated every two years, with the most recent edition published in October 2002. This report is largely based of national and regional contributions.

(ii) The Secretariat of the Convention on Biological Diversity, in accordance with decision V/3, paragraph 7 of the Conference of the Parties, invited Parties to submit case-studies for dissemination through the clearing-house mechanism. The national reporting mechanism of the Convention on Biological Diversity facilitates the collection of information on the status of coral reefs and case-studies on the occurrence and impacts of coral bleaching.

(iii) The CORDIO Status Reports offer reporting opportunities on the status of the reefs for Indian Ocean countries. The dissemination of this information through the CORDIO newsletter has facilitated further communication and coordination on local impacts.

[23]/ *Ongoing activities:*

(i) The UNEP Division of Environmental Information, Assessment and Early Warning coordinates a variety of information available from remote sensing technologies and organizations that facilitate dissemination of such information.

(ii) Under the International Coral Reef Action Network, WCMC and ICLARM are exploring the integration and availability of map-based products through the WCMC website and through ReefBase that include satellite and aerial imagery.

(iii) HotSpots satellite temperature monitoring programme.

[24]/ *Ongoing initiatives*

(i) The CORDIO programme links reef managers and scientists in efforts to understand and respond to coral bleaching.

(ii) The GEF/World Bank targeted research programme on coral bleaching has a strong focus on supporting high quality science to generate management-relevant information.

(iii) The *Reef Manager's Guide to Coral Bleaching* released 2004 provides current and emerging information to support local management actions in response to global change.

[25]/ *Ongoing initiatives*

The *Reef Manager's Guide to Coral Bleaching* released in 2004 compiles currently available and emerging tools for responding to mass bleaching events.

[26]/ *Ongoing initiatives*

(i) Various ongoing training activities not necessarily related to coral bleaching but to coral conservation issues, e.g. the Ramsar Wetlands for the future training initiative for Latin America and the Caribbean; the regional seas programme for Caribbean protected areas managers; various activities supported by aid agencies and global and regional development banks.

(ii) Many other training activities are carried out as components of wider projects and programmes. GCRMN is building capacity for coral-reef monitoring and assessments through training workshops, especially in developing countries.

[27]/ *Ongoing initiatives*

Regional seas programmes through the ICRAN strategic plan and existing programmes like CORDIO, and the UNEP Caribbean Environment Programme are increasing regional capacity towards monitoring, socio-economics and management, as related to coral bleaching. The four regions currently active under the ICRAN strategic plans are South-East Asia, Pacific, Caribbean Eastern Africa.

[28]/ *Ongoing initiatives*

(i) ICRI and the International Tropical Marine Ecosystems Management Symposium (ITMEMS) are building the foundation of new ICRI action.

(ii) A number of existing education and capacity-building projects within the regional seas programmes serve to raise awareness regarding coral bleaching.

(iii) IUCN, the Secretariat of the Convention on Biological Diversity, USAID and WWF have produced a publication Management of Bleached and Severely Damaged Coral Reefs, to contribute to effective and immediate management action to aid reef protection and regeneration, and to enhance research to develop the necessary tools and measures for long-term success. In addition, the publication is intended to raise awareness of the urgent need to take all possible actions to reduce the impact of climate change on coral reefs.

(iv) The WWF approach to worldwide coral reef conservation includes training of resource managers, increasing education, raising awareness, and implementing site-based reef management projects to help groups of stakeholders achieve their goals in reef management and sustainable economic development, including through the development of alternatives to destructive practices.

(v) The International Coral Reef Information Network (ICRIN) is the primary public awareness mechanism of the ICRI, and thus serves to disseminate public information products that address the causes and consequences of coral bleaching.

[29]/ *Ongoing initiatives*

As an example, relevant regional activities within the Wider Caribbean are carried out, *inter alia*, in the framework of:

(i) The Cartagena Convention and its protocols on oil spills, land-based sources of marine pollution and specially protected areas and wildlife

(ii) Regional ICRI Framework for Action

(iii) Association of Caribbean States (ACS)

(iv) Central American Commission on Environment and Development (CCAD)

(v) CARICOM.

[30]/ *Ongoing initiatives*

Some projects within the CORDIO programme in the Indian Ocean region focus on determining the socio-economic impacts of coral mortality and options for mitigating these through management and development of alternative livelihoods. Development is needed of further target research projects that investigate the impacts of coral bleaching and mortality events on social and economic systems in other regions.

[31]/ *Ongoing initiatives*

(i) The Executive Secretary has transmitted the view to the United Nations Framework Convention on Climate Change (UNFCCC) that there is significant evidence that climate change is a primary cause of the recent and severe extensive coral bleaching, and that this evidence is sufficient to warrant remedial measures being taken in line with the precautionary approach. In this regard, the Secretariat of the Convention on Biological Diversity, the Secretariat of the UNFCCC, and the InterGovernmental Panel on Climate Change (IPCC) have initiated dialogue to explore the integration of biological diversity concerns into the implementation of the UNFCCC and its Kyoto Protocol.

(ii) GEF Caribbean project on climate change adaptation (CPACC project).

(iii) GEF/World Bank Targeted Research Project on Coral Bleaching.

[32]/ A global network provides for the connections between Parties, with collaboration of others, for the exchange of ideas and experiences, scientific and technical cooperation, capacity-building and cooperative action that mutually support national and regional systems of protected areas which collectively contribute to the achievement of the programme of work. This network has no authority or mandate over national or regional systems.

[33]/ Further elaboration is provided in CBD Technical Document No. 13.