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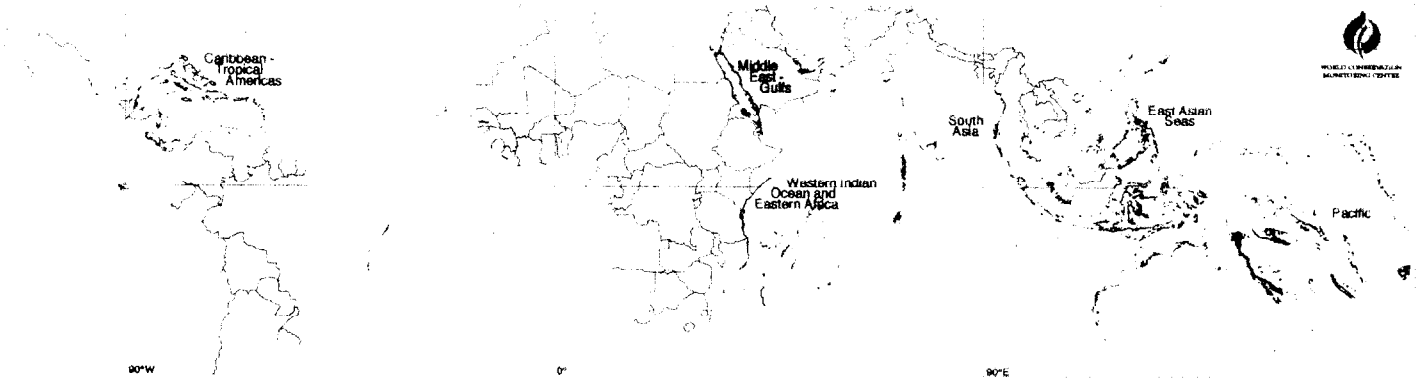
IOC/UNEP/IUCN

Global Coral Reef Monitoring Network

(GCRMN)



Strategic Plan

UNESCO

IOC/INF-1062

IUCN
The World Conservation Union

IOC
Intergovernmental
Oceanographic
Commission
of UNESCO

UNEP
United Nations Environment
Programme

IOC/UNEP/IUCN
Global Coral Reef Monitoring Network
(GCRMN)

Strategic Plan

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PREFACE

The health of the world's coral reefs, one of the most dramatic, diverse and productive living systems on earth, is in serious decline. Globally, best estimates suggest that about 10% of coral reefs are already degraded, many beyond recovery, and another 30% are likely to decline further within the next 20 years. At least two-thirds of the world's coral reefs may collapse ecologically within the lifetime of our grandchildren, unless we implement effective management of these ecosystems as an urgent priority.

Coral reefs are distributed throughout the tropical and sub-tropical waters of the world, mostly in developing countries. They support some of the highest levels of biological diversity in the marine environment and form an important basis for sustainable development. Millions of people around the world depend on coral reefs for their food and livelihood, particularly subsistence communities.

Coral reef degradation results principally from human activities. These include destructive fishing practices, inappropriate coastal development, overfishing, poor land use practices, and the discharge of human and industrial wastes into nearshore waters. Global climate change may impose new stresses on reefs, such as changes in the frequency and severity of storms and floods, and increased water temperature. Global climate change may also interact synergistically with direct human impacts to accelerate reef degradation.

Information on the health of coral reefs and their social, cultural and economic values is critical to their conservation and sustainable use. Unfortunately, in most cases this knowledge is absent. There is thus an urgent need to increase our efforts to assess and monitor coral reefs at national, regional and global levels on a sound scientific basis. This need has also been identified as a priority in the International Coral Reef Initiative (ICRI) Framework for Action and through ICRI regional workshops. Responding to this need will require a framework and mechanism to link resources managers, stakeholders and scientists into networks for the collection, dissemination and use of assessment and monitoring information.

The Intergovernmental Oceanographic Commission (IOC), United Nations Environment Programme (UNEP), and the World Conservation Union (IUCN) have formed a partnership to develop a Global Coral Reef Monitoring Network (GCRMN) in response to the evident need for data and information to support coral reef conservation and sustainable use. The GCRMN will contribute to implementation of Chapter 17, Agenda 21 and other international conventions and programmes, particularly the Convention on Biological Diversity, the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, and the IOC-WMO-UNEP-ICSU Global Ocean Observing System (GOOS).

The IOC, UNEP and IUCN, as co-sponsors of the GCRMN, urge governments, organizations, resource managers, scientists, and community groups to take an active role in the development and implementation of the Global Coral Reef Monitoring Network.

Intergovernmental Oceanographic Commission	United Nations Environment Programme	IUCN - The World Conservation Union
Gunnar Kullenberg Executive Secretary	Elizabeth Dowdeswell Executive Director	David McDowell Director General

1. INTRODUCTION

The Global Coral Reef Monitoring Network (GCRMN) provides a framework and process to integrate efforts in assessing and monitoring the current status and future trends in coral reefs and their human use and values. The GCRMN proposes to link governments, scientists, resource managers and coral reef user communities into national and regional networks that collect, assemble and synthesize information on coral reef health. This information will enhance awareness and efforts to conserve and manage coral reefs for their sustainable use.

The GCRMN is co-sponsored by IOC, UNEP and IUCN and incorporates and builds on prior initiatives by these organizations. The co-sponsors, along with the International Coral Reef Initiative (ICRI) Secretariat and GCRMN co-hosts, AIMS and ICLARM, form the GCRMN Management Group[1]. The GCRMN was recommended by ICRI to provide information on coral reefs and related ecosystems for more efficient conservation, management and sustainable use. A Scientific and Technical Advisory Committee (STAC) provides advice to the Management Group on the development and implementation of the GCRMN. A small central office has been established by the co-sponsors to facilitate global coordination and GCRMN development.

The GCRMN will be established incrementally, region by region. The initial focus will be on catalytic efforts to establish networks, e.g. developing proposals for seed funding, training and pilot monitoring. This Strategic Plan outlines the objectives, structure and activities of the GCRMN, with the emphasis on the establishment phase of about 5 years.

A major focus during the establishment phase will be to facilitate interaction among the institutions and the agencies which form the core of the network in each country and region, and on capacity building. Efforts are required to build capacity for coral reef assessment and monitoring in participating countries and regions, especially to provide training in assessment, monitoring, database operations and communication. Establishment of the GCRMN will proceed depending on existing capacity or as resources are provided. Full responsibility for GCRMN support will shift to regions, countries and local organizations after the establishment phase.

2. BACKGROUND

In response to growing global evidence of degradation of coastal ecosystems, UNEP, IOC, WMO and IUCN assembled a group of experts to discuss coral reef and mangrove monitoring in 1991, building on existing coral reef monitoring initiatives (UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change, Pilot Projects on Mangroves and Coral Reefs, Monaco). This led to establishment of the UNEP-IOC-IUCN-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs in 1992, which reported that the imminent threats to coral reefs were anthropogenic, with climate change as a long-term threat to reefs and a short-term threat to coral island communities (Wilkinson, C.R. and Buddemeier, R.W. Eds. Global Climate Change and Coral Reefs: Implications for People and Reefs. IUCN).

At the 7th International Coral Reef Symposium (Guam, 1992) approximately 60 coral reef scientists and resource managers reported their willingness to participate in global coral reef monitoring as proposed by the IOC. However, funding was not available to initiate the monitoring programme at that time. The International Coral Reef Initiative (ICRI) was launched at the United Nations Global Conference on the Sustainable Development of Small Island Developing States (Barbados, 1994). The ICRI global workshop (Dumaguete City, Philippines, May 1995) developed a Framework for Action which calls for the establishment of the GCRMN.

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[1] IOC - Intergovernmental Oceanographic Commission; UNEP - United Nations Environment Programme; IUCN - World Conservation Union; AIMS - Australian Institute of Marine Science; ICLARM - International Center for Living Aquatic Resources Management.

IOC, UNEP and IUCN renewed their efforts to establish the GCRMN in 1995. A Coordinator's post was established through a contribution from the United States to the IOC Trust Fund and a Coordinator was appointed in March 1996. The Coordinator is co-hosted by AIMS and ICLARM. The GCRMN is a major contribution to the Coastal Zone Module of the IOC-WMO-UNEP-ICSU Global Ocean Observing System (GOOS) and the FAO-ICSU-UNEP-UNESCO-WMO Global Terrestrial Observing System (GTOS).

3. OBJECTIVES AND PRINCIPLES

3.1 GOAL

The overall Goal of the GCRMN is to:

a) Improve the conservation, management and sustainable use of coral reefs and related coastal ecosystems by providing data and information on the trends in biophysical status and social, cultural and economic values of these ecosystems; and

b) Provide individuals, organizations and governments with the capacity to assess the resources of coral reefs and related ecosystems and collaborate within a global network to document and disseminate data and information on their status and trends.

3.2 OBJECTIVES

The Strategic Objectives of the GCRMN are to:

a) Develop and implement a mechanism to link governments, organizations, institutions and individuals for the long-term monitoring of biophysical and social, cultural and economic aspects of coral reefs throughout the world within 5 years;

b) Initiate, foster and facilitate the functioning of the GCRMN through interacting regional networks that coordinate activities in participating countries and organize training and database operations within 3 years;

c) Strengthen, or when necessary, build the capacity of governments, organizations, institutions and individuals to monitor and research coral reefs through the provision of training, documents and equipment within 3 years;

d) Develop a consistent monitoring program that incorporates biological, physical, social, cultural and economic studies, identifies trends in the health of coral reefs and discriminates between natural, anthropogenic, climatic and other aspects of global change within 5 years;

e) Assemble, synthesize and disseminate the results of coral reef monitoring at local, national, regional and global scales in regular reports on coral reef status and trends;

f) Collaborate with the global observing systems, particularly GOOS and GTOS, to provide high-quality data on the health and trends in coral reefs for the preparation of predictive global change models; and

g) Provide and disseminate the results of GCRMN assessments and monitoring through cooperative interactions with environmental management agencies to facilitate more effective sustainable use and conservation of coral reef resources.

3.3 OPERATING PRINCIPLES

The GCRMN will be based, wherever possible and feasible, on the following basic principles for the monitoring of coral reefs and associated ecosystems and their uses and values:

a) Emphasize the involvement of local communities of reef users;

b) Place equal emphasis on gathering biophysical and social, cultural and economic data;

c) Function through existing inter-governmental or coordinating organizations and networks as much as possible, thereby avoiding the need to create new bodies and enhancing sustainability;

d) Integrate all relevant monitoring programmes interested in participating in the GCRMN, and maintain flexibility to incorporate different methods, levels of monitoring and forms of data;

e) Offer a standard methodology to participants commencing monitoring, and ensure that this methodology is adaptable to regional and local variations in cultures, capacities and environments;

f) Incorporate novel approaches and be responsive and flexible to the attitudes and wishes of participants;

g) Focus on current or planned Marine Protected Areas and adjacent unprotected areas, where appropriate, to provide data for the Global Representative System of Marine Protected Areas; and

h) Ensure that the data and information gathered are relevant to economic and environmental policy development, and are accessible to all participants in a comprehensible format.

4. OUTPUTS AND RESULTS

The GCRMN will produce the outputs and results outlined below.

Data and information on coral reef status and trends:

The collection of data and information on reef status and trends from communities, governments and research institutes will commence early 1997. These data and information will be widely disseminated and summaries will be stored in ReefBase.

Reports and manuals:

Reports on coral reef status will come from all levels of the Network, especially annual reports at the national, regional and global scales, with the first report due approximately 12 months after the initiation of regional/sub-regional networks. Reports will go to major international fora, including the 9th International Coral Reef Symposium in 2000. Two manuals will be prepared and distributed: Survey Manual for Tropical Marine Resources (Eds. English, Wilkinson and Baker) which will be published by AIMS in 1997; and a manual on social, cultural and economic assessment and monitoring, for which the process to develop the manual will commence in 1997. More specific monitoring protocols adapted for each region will be produced, starting in 1997.

International network:

There will be an interactive network of people from countries in 6 coral reef regions co-operating to monitor coral reefs.

Trained people:

Individuals will be trained in approximately 60 countries to assess and monitor coral reef status and trends to the best of their abilities.

Greater awareness of reef conservation issues:

Greater awareness of the need for coral reef conservation will occur in users groups, governments and international agencies. This will lead to better coral reef conservation, management and sustainable use.

Improved health and conservation of coral reefs:

There will be improved conservation, management and sustainable use of the world's coral reefs as a result of increased awareness, information and understanding of coral reef status, trends and the causes of degradation.

5. FRAMEWORK FOR CORAL REEF MONITORING

5.1 NATIONAL NETWORKS

The basis for the GCRMN will be national level coral reef assessment and monitoring programmes. In most cases, national programmes will consist of assessment and monitoring activities undertaken by government agencies, universities and NGOs based in the country, as well as monitoring conducted by visiting scientists and by international programmes. It will be necessary to determine the capacities and requirements of relevant institutions and organizations in order to structure national monitoring programmes, especially with regard to capacity building.

An important aspect of national programme development is the ability and willingness of in-country institutions and organizations to participate by orienting existing staff and resources (e.g. facilities and boats) towards monitoring activities. The initial emphasis of the GCRMN will primarily be in facilitating the interaction of the institutions, organizations and programmes already engaged in monitoring to form the core of national networks.

5.2 GCRMN REGIONAL NETWORKS

At the regional level, the GCRMN will be coordinated by the existing UNEP Regional Seas Programme Secretariats, which will function as the Regional GCRMN Nodes, as determined by countries of the region during appropriate regional meetings, e.g. ICRI Regional Workshops. The role of the Regional Network Node is to coordinate the country programmes into a regional network. This may require capacity building in participating countries and the Regional/Sub-Regional Network Nodes.

Regional Network Node development will proceed region by region in association with the 6 ICRI regions (fig. 1): Western Indian Ocean and Eastern Africa; South Asia; East Asian Seas; Pacific; Middle East-Gulfs; and Caribbean-Tropical Americas. Some regions have identified the need to develop Sub-Regional Network Nodes to coordinate monitoring amongst a sub-set of the countries in the region.

Each Regional/Sub-Regional Network Node will determine its own structure, process and needs for GCRMN development. In particular, it is anticipated that the Regional/Sub-Regional Network Node will seek to develop and coordinate:

- training in biophysical, social, cultural and economic assessment and monitoring;
- assistance in site selection for monitoring;
- training in data entry and database operations;
- problem resolution;
- regional workshops and meetings;
- central database development, data collation and regional status summaries;
- continuity in method application and quality control;
- proposals for funding, as required;
- transmission of regional summaries to the GCRMN Coordinator and to ReefBase; and

interaction with other relevant regional organizations, with other GCRMN Nodes and with the GCRMN Coordinator.

5.3 NATIONAL AND REGIONAL STACs

Each region may wish to establish a Regional Scientific and Technical Advisory Committee (R-STAC) to assist with the development of the GCRMN. Such committees should include experienced biophysical and social scientists, and resource managers. The Management Group and Global STAC may be requested to nominate people for the Regional STAC, which should contain at least one member who is also on the Global STAC. Similar advisory committees may be desirable at the country level.

6. MECHANISMS FOR CORAL REEF MONITORING

6.1 LOW, MODERATE AND HIGH RESOLUTION MONITORING

Coral reef assessment and monitoring may be undertaken in different ways and at a number of levels, depending on management needs and the capacities of countries and regions. The rate of development and mode of implementation of monitoring programmes will vary from country to country and region to region based on their present situation and capacity. The GCRMN provides a framework to incorporate three broadly defined approaches to monitoring, i.e. low, medium and high resolution. At all levels, there will be simultaneous gathering of biophysical, social, cultural and economic data as much as possible.

Low resolution assessment and monitoring approaches are designed to provide a broad brush evaluation of the status of coral reefs. This approach should ensure broad coverage and should form the basis for describing the overall national and regional situation and trends. Low resolution methods will often be used to survey large areas, to conduct scoping for more detailed levels of assessment and monitoring and to set priorities at a regional/sub-regional scale, e.g. by using rapid assessment techniques to survey undocumented areas.

Low resolution assessment and monitoring may be the most common level of evaluation by groups without specialized coral reef expertise, such as coral reef user groups and volunteer monitoring groups (e.g. fishers, students, dive operators, community-based organizations, environmental NGOs). Participation in monitoring will provide coral reef user groups with direct involvement in coral reef evaluation and enhance appreciation of coral reef status and the causes of degradation. Local communities will select monitoring areas with, as necessary, the assistance of individuals with monitoring expertise. Special attention will be placed on recording uses and values, environmental change, incidents such as bleaching and blast damage, and in identifying probable causes. There will be a lower emphasis on detail and specialized training, and equipment in low resolution methods.

Moderate resolution assessment and monitoring approaches are likely to be the building blocks of national monitoring programmes. This level will also often be targeted at sub-national areas of interest for conservation and sustainable use, e.g. Marine Protected Areas (MPAs), Environmental Impact Assessment (EIA) sites and important fishing grounds, in response to management needs. Much of the initial GCRMN effort will probably be applied at this level as there is a significant amount of existing capacity in many countries.

Moderate resolution monitoring will usually be undertaken by personnel with tertiary level education and training, e.g. from government environment or fisheries departments and from university programmes. These personnel will often supervise the training activities for low resolution methods. Coastal inhabitants may be able to take responsibility for moderate resolution monitoring in their area after receiving training.

High resolution assessment and monitoring approaches will be more tightly focused, often designed to answer specific questions, e.g. to measure the effectiveness of a management intervention or to evaluate the usefulness of a monitoring technique. High resolution monitoring will most commonly be undertaken by tertiary institutions, preferably in conjunction with management agencies. Participants will pool data and have access to the Network database. These institutions will examine limitations in the methods and the collected data, and make comparisons with other methods, e.g.full species identification, permanent quadrats or video

transects. Institutions involved in high resolution monitoring may be asked to assist those undertaking moderate and low resolution monitoring, e.g. through training, data analysis and problem solving.

The GCRMN will encourage high technology assessments to support direct field observations, but these will not be core activities. Remote sensing can provide a true global perspective by simultaneously examining large areas for the major controlling factors of coral reef growth and health, e.g. temperature changes, sediment and nutrient concentrations, major ocean current patterns. Video techniques, aided by computer analysis, allow rapid gathering of data underwater and provide a permanent record. These kinds of techniques may be used to rapidly assess and monitor remote areas, e.g. in response to reported incidents such as bleaching.

6.2 METHODS

The methods presented in the Survey Manual for Tropical Marine Resources (Eds. English, Wilkinson and Baker) were chosen by the UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change, Pilot Projects on Mangroves and Coral Reefs (1991) and the UNEP-IOC-IUCN-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs (1992) as those preferred for the monitoring of biophysical parameters.

These methods include a range of techniques, e.g. manta tow, line intercept transect (percent cover of live and dead corals and other benthos, "lifeform" level identification of organisms), and fish censusing (emphasis on commercial and recreational target species and indicator fish, such as butterfly (chaetodont) fish. The Survey Manual for Tropical Marine Resources has been revised and is being re-published in 1997 to assist with the development of the biophysical component of the GCRMN.

A comparable set of methods to assess and monitor the social, cultural and economic aspects of coral reefs were not available at the initiation of the GCRMN. A major focus of the initial phase of the GCRMN will be to develop and test social, cultural and economic methods. Social, cultural and economic parameters will include the use of reef resources, community knowledge and values, attitudes towards reef resources and management, demographic data, and legal and economic parameters. Several existing sets of methods are being examined, including RAMP (Rapid Assessment of Management Parameters) of ICLARM and the University of Rhode Island, and the methods developed by the IUCN Tanga District Coastal Zone Management Project, Tanzania.

The above methods will be adapted for different regions and additional monitoring protocols will be developed for regions as the need arises.

6.3 SITE SELECTION

National monitoring programmes will select monitoring sites with, as necessary, the assistance of regional and global STACs. Agencies with aerial and satellite images will be encouraged to contribute information for GCRMN site selection.

Sites should cover the complete geomorphologic range of reef types and locations, from fringing reefs close to land to oceanic atolls. This range of sites should permit discrimination between natural causes (e.g. storms, freshwater runoff), including climate change (e.g. sea level rise, and changes in temperature, radiation, rainfall and current patterns), and anthropogenic causes (e.g. pollution, sedimentation and over-exploitation) of change in the health of coral reefs globally. An important category is monitoring degraded coral reefs with a view to assessing the potential for recovery.

The site selection guidelines listed below are based on those developed by the 1991 Monaco meeting for developing long-term coral reef monitoring programmes. They include assessing:

- a range of reefs, from remote reefs far from human populations to reefs subject to a variety of human impacts;

- reef flats and reef slopes, both windward and leeward;

- reefs at geographic extremes, i.e. high and low latitudes, and exposure to high and low salinity concentrations;

- reefs from high to low biodiversity;
- reefs experiencing the range of storm effects, from equatorial reefs to tropical storm belts (Latitude >7°);
- reefs experiencing a range of oceanic turbulence and current influences;
- reefs experiencing a range of land runoff;
- reefs identified by communities and/or management bodies that have special significance for fisheries, communities, cultural activities, etc.;
- sites monitored in the past, especially those with continuous monitoring data;
- reefs within well managed Marine Protected Areas and adjacent unprotected areas;
- reefs that have been extensively degraded (natural or anthropogenic causes) in order to assess recovery.

6.4 REPORTING

It is proposed that country summaries will be prepared each year and submitted to the Regional Network Node, which will then assemble annual summaries for the region. Regional summaries will be provided to other GCRMN Regional Nodes, and to the GCRMN Coordinator and ReefBase.

Regional data will be compiled into regular summaries of global reef status and trends by ReefBase and the GCRMN Coordinator, i.e. annual or biennial reports within 3 months of the end of the year. Data will also be incorporated into the CD-ROM compilations currently prepared by ReefBase. These summaries will be reviewed by the GCRMN Management Group and STAC, and distributed widely to international agencies, governments and the public.

The GCRMN Coordinator will make 2 monthly summary reports of activities to the Management Group and STAC through e-mail, with summaries on the GCRMN e-mail list and on a GCRMN homepage. A major report will be prepared for the 9th International Coral Reef Symposium in 2000.

7. CAPACITY BUILDING FOR CORAL REEF MONITORING

An early focus will be on identifying capacity building needs within each country and identifying where the capabilities to respond to these needs already exist. This will allow strategic capacity building programmes to be designed and implemented which target the needs of each country and region. Initially, capacity building will largely focus on responding to needs for training in each country and at the Regional/Sub-Regional Nodes. Later stages will focus on transferring training and monitoring to communities. Specific training activities may include establishing teams of trainers in each region which will conduct training in countries, and focus training on transferring monitoring capacity to the community level.

Training courses should be conducted at sites comparable to those in participating countries, through a series of short workshops. The workshops will generally be 2 to 3 weeks with combined laboratory and field exercises, including data entry and database operations. Experience indicates that 2 to 3 training sessions within 12 to 18 months are necessary to ensure consistent application of methods. The second training should be within 6 months to prevent large digressions. Participants from several countries should be trained simultaneously to reduce costs and permit development of networks and shared experiences.

The amount of equipment required for Regional/Sub-Regional Nodes and participating countries will vary. As with training, equipment needs will be assessed for each country and regional node and the results will be incorporated into capacity building strategies. The GCRMN will provide monitoring manuals, model underwater data sheets, and data entry software packages.

Countries will be encouraged to maintain a database that interacts closely with the Regional/Sub-Regional Network Node database. Where facilities are not available, this may require funding for computers and software. National databases will be responsible for transmitting summaries to user groups, communities

and government agencies within 3 months of data collection. During training, emphasis will be put on ensuring data accuracy and consistency. Database operators may require additional training in data entry, verification, analysis and preparing regional summaries. ReefBase, the global coral reef database at ICLARM, is the recipient of GCRMN data, and database operators at the Regional/Sub-Regional Network Nodes may require training to ensure compatibility of systems and operations.

8. GLOBAL COORDINATION

8.1 MANAGEMENT GROUP

The Management Group consists of representatives of the GCRMN co-sponsors (IOC, UNEP and IUCN), as well as representatives of AIMS, ICLARM, and the ICRI Secretariat, and the Chair of Scientific and Technical Advisory Committee (STAC). The Group provides high level advice on policy, strategies, links to governments, funding possibilities, coordination with international and other agencies and programmes, including NGO activities, and acts as the link between the GCRMN and the representative agencies and committees. Membership of the Group may vary to reflect changes in GCRMN funding and/or support. The Group will maintain regular ongoing electronic communication, with the GCRMN Coordinator acting as the Secretary, and meet on an opportunistic basis, coinciding with international fora or ICRI Coordination and Planning Committee meetings.

8.2 COORDINATOR

The role of the global GCRMN Coordinator is to coordinate the planning and implementation of the GCRMN in close consultation with the Management Group, taking into account advice from the Scientific and Technical Advisory Committee(STAC). The GCRMN Coordinator will:

- assist coordination between countries, regions, the Management Group and STAC via an efficient exchange of information;
- maintain regular communication with Regional/Sub-Regional Network Nodes, the Management Group and the global and regional STACs;
- prepare 2 monthly summary reports to the Management Group and annual global progress and status reports for presentation to GCRMN participants and international fora;
- provide an annual workplan for the Coordinator and an annual proposed development plan for the GCRMN to the Management Group;
- provide an annual review and progress report to the Management Group;
- assist the regions and countries to identify existing national and regional monitoring capabilities and activities, and determine capacity for monitoring network development and requirements for training and equipment;
- assist regions and countries to interact with the Management Group, ICRI partners and potential donors to obtain resources for monitoring;
- obtain methods manuals, literature, equipment, database software and other information for country and regional monitoring programmes;
- assist countries and regions to develop STACs; and
- act as Secretary to the global STAC, report to members through 2 monthly summary reports, and respond to requests from STAC members for specific advice.

8.3 SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE

The GCRMN Scientific and Technical Advisory Committee (STAC) was constituted at the 8th International Coral Reef Symposium, Panama, June 1996. Members of STAC are nominated and approved by the Management Group, which is also represented on the global STAC. Membership should include persons with experience in biophysical and social sciences, and resource management, and should also include representatives from all GCRMN regions. Membership will change based on Management Group recommendations as the GCRMN develops to meet new needs.

The global STAC will meet opportunistically, coinciding with international fora, using funds from member host organizations. The Chair of STAC will be elected by the Committee for 1 year, with the term renewable for up to 3 years. The Chair of STAC will facilitate discussion among members on issues identified by the Management Group and keep in contact with the STAC members through electronic communication. The global STAC Chair will provide a 6 monthly report to the Management Group and Coordinator.

The Committee will provide scientific and technical advice to the Management Group, the Coordinator and regional STACs on:

a) coral reef and related system monitoring, associated research and database applications;

b) integrating GCRMN activities into GOOS scientific programmes;

c) developing and applying GCRMN monitoring information for coral reef conservation, management and sustainable use;

d) integrating the GCRMN into local programs and communities, especially the collection of social, cultural and economic data;

e) writing, reviewing and distributing documentation, including proposals for funding;

f) international fora to publicize the GCRMN and ICRI, and access to agencies, governments and potential funders;

g) preparing annual progress reports of monitoring activities and reviews; and

h) developing national and regional networks and STACs.

9. EVALUATION OF THE GCRMN

The Management Group will have a review conducted after 2.5 and 5 years of GCRMN operation. The reviews will assess the effectiveness of all operations, suggesting future improvements and sustainable funding mechanisms for the GCRMN. Additional review and evaluation will be undertaken as required by organizations that provide resources to the GCRMN.

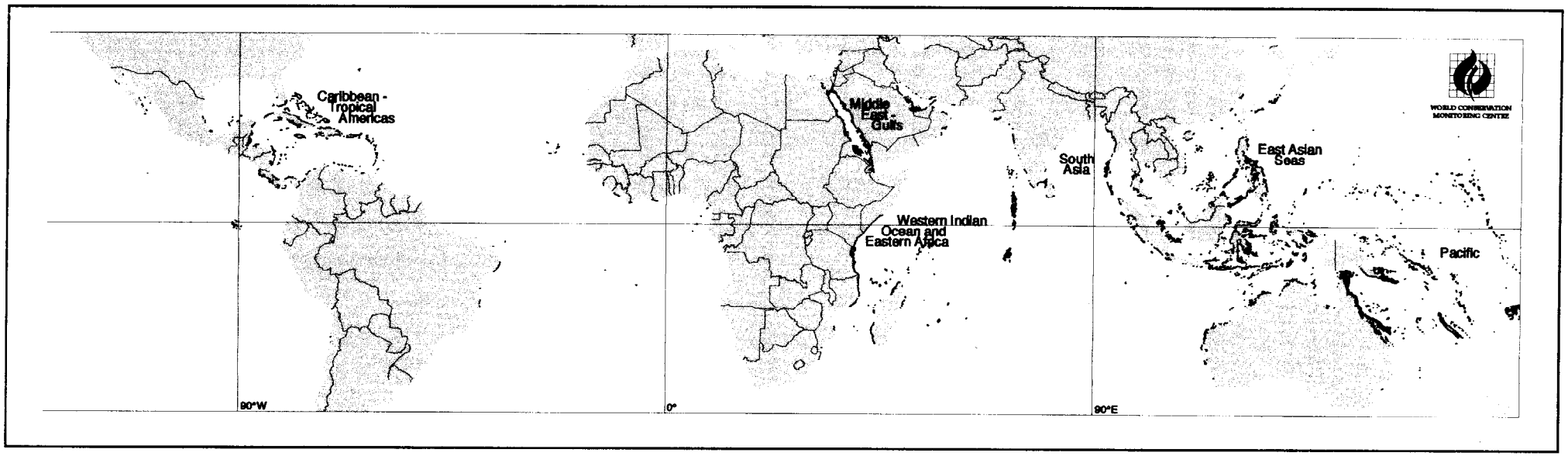
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Figure 1