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(of UNESCO)

TERMS OF REFERENCE FOR THE PROGRAMME ELEMENTS IN THE STRUCTURE OF IOC OCEAN SCIENCE SECTION

DRAFT

The Executive Council at its 35th session discussed the terms of reference for the programme elements of the IOC's Ocean Science Section as they are described in the working document IOC/EC-XXXV/2 Annex 10.

After examination, the Executive Council instructed the Executive Secretary to prepare a revised version of the document (this document) to be circulated to the Member States for further comments.

The final version of the document will become the guiding instrument for the implementation of the Ocean Science Programme. This document will be made available for the 22nd session of the IOC Assembly (June 2003) with the reference IOC/INF-1180.

IOC OCEAN SCIENCE SECTION

Introduction – As of July 2001, the programmes of the Ocean Science Section of IOC consisted of the following three interactive lines of work:

- Oceans and Climate
- Science for Ocean Ecosystems and Marine Environmental Protection
- Marine Science for Integrated Coastal Area Management

This new structure of the Ocean Science Section was adopted at the Twenty-first session of the IOC Assembly (Resolution XXI-6) and the rationale for it is given in IOC/INF-1155, *IOC Ocean Science Section: A Basis for Restructuring*. As described in this document, the new structure is based on external reviews of the current programmes, and is consistent with the IOC statutes, the needs of the Member States, international policy perspectives, and the emerging priorities in ocean science.

Strategy - The IOC was established under the auspices of UNESCO to provide the Member States of the United Nations with an essential mechanism for global co-operation in the study of the ocean. Its mandate contained also the added responsibility of providing a focus for other UN specialised organisations working together on ocean-related, science-based responsibilities. Within this framework, the mission of the Ocean Science Section is:

- **to *catalyse* and *coordinate* oceanographic research addressing critical uncertainties for the management of the marine environment and climate change; and**

- **to *communicate* the results of these investigations to the Member States of the IOC, the United Nations, and the general public.**

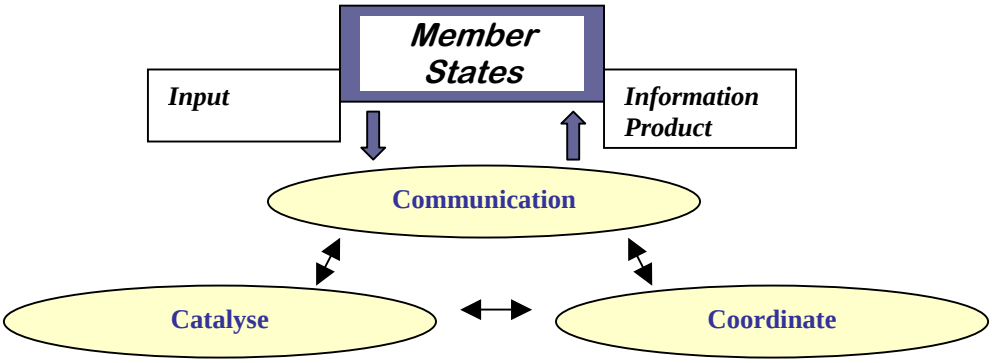
Accordingly, the Terms of Reference for the Ocean Science Section are:

1. Integrate into the agendas of international and regional research programmes the needs and concerns expressed by the Member States of IOC through interactions with international research programmes and partner organizations by participating in scientific steering committees and conferences (catalysis);

2. Assist regional and international coordination of research programmes, especially focusing on the participation of developing nations and training programmes by providing: financial assistance to scientists from developing nations to participate in international and regional research programmes; financial assistance to research programmes; and support for expert groups to provide scientific guidance on specific topics (coordination); and

3. As the UN focal point for Ocean Science, provide information on ocean science and programmes within the UN System, as well as information on international, regional, and national research programmes supported by the UN and other international organizations by: facilitating and aiding the development of publications from programmes, especially for IOC Member States, policy-makers, and the general public; and by developing and maintaining a web-based clearing house of information on ocean science and ocean-related programmes in the UN System (communication).

The functions of IOC's Ocean Science Section and their interactions are illustrated in the following schematic.



It can be inferred from the above schematic that the communication function of the Ocean Science Programmes has grown in time and is expected to play a central role in the future. Communication of the results of the programmes has traditionally been done through meetings and workshop reports. This is today clearly insufficient. Plans are underway to include further outreach that involves improved information about IOC activities, particularly to ocean scientists, as well as governmental and industrial representatives and the general public and also to publicize by all means possible important oceanographic findings and their implications for society. This will require the Ocean Science Section to produce information products such as policy-maker summaries, newsletters, watching briefs, brochures, magazine or web-articles for policy-makers and the general public. The Member States of the IOC serve not only as stakeholders who provide input on concerns and priorities for marine science research, but also are the principle user group, for whom information products must be developed to educate, inform, and provide sound, unbiased scientific guidance for the wise stewardship of the marine environment.

TERMS OF REFERENCE FOR THE PROGRAMME ELEMENTS

The terms of reference for each of the three lines of work of the Ocean Science Section, together with their summary descriptions and the results expected from them at end of the biennium 2002-2003 are given below. Table 1, at the end of the document, is intended as a guide on the programme areas and activities of the Section.

I. OCEANS AND CLIMATE

Winds, currents, cloud formation, and the distribution of heat and gases in the atmosphere and the ocean are all processes driven by the coupled ocean-atmosphere system. The coupled ocean-atmosphere processes are important drivers of ocean circulation and heat transport, greenhouse gas regulation, and climate phenomena such as the monsoons, El Niño-La Niña events, and the North Atlantic Oscillation. These issues are related to the as yet unpredictable variability of the marine environment and ecosystem, fisheries, and flood and draught patterns that act over space scales ranging from local to global and time scales ranging from annual to decadal and to centennial. The principle goals of research in the field of ocean-atmosphere coupling are to understand, model and predict these various climate processes with sufficient skill to avoid loss of property and life, and to understand how human activities such as global warming and increasing CO_2 may be altering ocean processes and the marine environment.

The overall task of the Oceans and Climate Programme is to carry out the strategy of the Ocean Science Section in relation to the coupled ocean-atmosphere processes in the context of climate change and variability. This task is accomplished through activities that presently include: 1) co-sponsorship of the World Climate Research Programme and its research components, the World Ocean Circulation Experiment, and the Climate Variability and Predictability Study; 2) co-sponsorship, technical and implementation assistance for the Ocean Observation Panel for Climate and its observational programme components including the Global Ocean Data Assimilation Experiment, the Argo Float programme, the Surface Flux Analysis Project, the Tropical Moored Buoy Array programme, and the Ship-of-Opportunity programme; and 3) co-sponsorship, technical and implementation assistance for the SCOR/IOC Advisory Panel on Ocean CO_2 and its programme components including observational programme coordination, standards and reference materials for ocean carbon research, and facilitating the exchange of information on the ocean sequestration of atmospheric carbon dioxide.

Oceans and Climate - Terms of Reference

On matters related to Climate Variability:

- Organize, coordinate and sponsor global ocean climate science programmes aimed at improved understanding of the global climate system and its impact regionally; (WMO, ICSU, SCOR);
- Assist in the oversight of programme planning of partner organizations, by participating in and acting as a liaison to related scientific steering groups, advisory panels, etc., emphasizing ocean research interests and intergovernmental perspectives (WCRP, CLIVAR, SCOR IPCC, GCOS);
- Foster national participation in international planning and implementation through focused workshops to enhance capabilities to participate in and benefit from international research programmes;
- Host and sponsor international science conferences and symposia periodically to entrain young scientists, identify benefits to enlist Member State support, mark achievements and disseminate new knowledge;
- Continually review and optimize the design of the climate observing system to gain advantages from developing technologies and new knowledge, and to reflect the evolving priorities for monitoring the physical and biogeochemical processes that determine ocean circulation and effects on the carbon cycle and climate variability (OOPC, SCOR/IOC CO_2 Panel);
- Promote and sponsor the development of and participation in pilot activities to test and demonstrate methodologies needed for long-term, high-quality ocean observations (OOPC, GODAE, Argo, SCOR-IOC CO_2 Panel); and,

On issues related to global carbon cycle:

- Provide information to SCOR, GOOS, LOICZ, and OOPC on observations, data management and modelling needed for studies of the global carbon cycle, through: identifying gaps and weak links in the present carbon cycle observing system that compromise the ability to understand and predict global change; identifying opportunities that can be used to further develop such an observing system (e.g., collaboration with other global observing systems); advising GOOS and OOPC on the

observational strategies needed to assess, model, and predict global ocean CO_2 fluxes; and providing advice to GOOS and OOPC on technology development needed to improve future capacity for carbon cycle monitoring.

- Aid the synthesis of SCOR and IGBP results with respect to marine CO_2 observations, data management and modelling by: initiating and facilitating the assembly of the necessary data bases; interacting with ocean modellers to encourage appropriate uses of ocean carbon cycle data and to identify weaknesses of such data; encouraging and facilitating the collaborative analysis of CO_2 data together with other carbon cycle and supporting data sets; and
- Maintain a watching brief to provide information to IOC and SCOR on CO_2 sequestration in the ocean.

Primary Results Expected at the End of the Biennium 2002-2003

- Dissemination of information products for improved models of ocean circulation, including integrated, quality-controlled data sets obtained through WOCE;
- Information products for public and policy-makers on developments concerning CLIVAR in general and the Global Ocean Data Assimilation Experiment (GODAE), in particular, on matters related to progress in capacity for climate predictions, emerging data products, and the developments of more specialized systems such as ecosystem models for climate research;
- The development of a recognized, international group for the coordination of ocean carbon research linking existing programmes such as CLIVAR, LOICZ, SOLAS, OCMIP, the IGBP Ocean Component projects and in close cooperation with the IGBP-WCRP-IHDP Global Carbon Project, which brings together carbon research from the ocean, land, and atmosphere;
- Serving as the international coordination and information clearinghouse mechanism for ocean carbon and related data sets, and as an international advocate for the support, development, distribution, and appropriate use of standards and reference materials and intercomparison experiments;
- The development of a strategy and implementation plan for ocean carbon measurements within the framework of GOOS, highlighting the scientific priorities, observing system elements, existing and planned programmes, process studies, and technology development needed to implement such a system;
- The development and publication of a Watching Brief on ocean CO_2 sequestration, designed for policy-makers and the general public;
- The development with SCOR of a synthesis of ocean CO_2 sequestration science based on an international workshop (2003) and published as a special issue of an appropriate scientific journal.

II. SCIENCE FOR OCEAN ECOSYSTEMS AND MARINE ENVIRONMENTAL PROTECTION (SOEMEP)

The SOEMEP Programme is a new line of work in the Ocean Science Section. It is based on the following vision. The management of marine ecosystems requires a knowledge of the dynamics of the ecosystems in relation to their structure, functioning, composition, and stability as well as the effects of biological, chemical and physical factors. This must involve

understanding the status and trends of living marine resources, as well as the factors affecting water quality, including eutrophication, waste dumping and the source and fate of contaminants and their eco-toxicology. These factors are critically relevant to questions concerning the protection of the marine environment against the anthropogenic activities causing, or likely to cause, adverse effects in the marine environment, its resources, amenities, and associated threats to human health. The approach to understanding the oceans needs to be integrated, interdisciplinary and intersectoral. "*Integrated management of human activities based on a knowledge of ecosystem dynamics to achieve sustainable use of ecosystem goods and services to preserve ecosystem integrity"* that is, the ecosystem approach according to ICES's definition, needs to be part of the global context of marine scientific research.

In transitioning to the new structure, the activities previously carried out under the Global Investigations of Pollution In the Marine Environment (GIPME), Ocean Sciences in Relation to Living Resources (OSLR) and Ocean Sciences in Relation to Non-Living Resources (OSLNR) Programmes are therefore placed under one grouping called 'Science for Ocean Ecosystems and Marine Environmental Protection' (SOEMEP) Programme.

SOEMEP - Terms of Reference:

1. Promote, participate in and co-sponsor global oceanographic research programmes[1] and their regional components that address a wide spectrum of issues that can contribute to the scientific knowledge needed for the ecosystem approach to the management of marine and coastal environments and resources;

2. Promote and coordinate investigations of specific scientific issues, such as harmful algal blooms and indicators of the health of ocean ecosystems, and the factors affecting water quality, including eutrophication, waste dumping and the source and fate of contaminants and their eco-toxicology, which require in-depth studies by convening study groups, panels and small ad hoc groups that are sponsored either jointly with the existing or emerging global programmes or by IOC alone;

3. Ensure that the activities of SOEMEP are pertinent to regional concerns and that IOC regional subsidiary bodies take an active role in them;

4. Provide information to IOC Member States, policy-makers, and the general public on SOEMEP Programme as well as information on related international, regional, and national research programmes supported by international organizations, including those within the UN System; and

5. Respond to the SOEMEP related requirements of global and regional conventions, agreements and programmes, as appropriate.[2]

The present activities of SOEMEP are carried out within three programme foci. These are described below.

[1] These presently include: GLOBEC (IGBP/SCOR/IOC), JGOFS (IGBP/SCOR), GEOHAB (SCOR/IOC), LOICZ (IGBP), SOLAS (SCOR/IGBP/WCRP/CACGP); OCEANS (IGBP/SCOR), LMEs (IUCN, IOC, UNEP, UNDP, UNIDO, FAO, WMO, NOAA).

[2] These presently include: UNCLOS, UNCED / *Agenda 21* and the global Conventions on Climate Change and Biodiversity as well as objectives of the Global Plan of Action for the Protection of the Marine Environment from Land Based Activities (GPA/LBA), ICES, PICES, major science programmes of UNESCO, the Regional Seas Programme and related Conventions, the system of regional fisheries organizations of FAO.

Focus 1. Harmful Algal Blooms Programme. The overall objective of the Programme is to foster the effective management of, and scientific research on, harmful algal blooms in order to understand their causes, predict their occurrences, and mitigate their effects. **Working groups** are established to address regional issues. **Training and capacity building** is a main component of the Programme and is composed of modules on taxonomy, toxin chemistry/toxicology, ecology, management and mitigation. **IOC Science and Communication Centres** on harmful algae have been established at national research institutions to help implement the HAB Programme. **Manuals, guides, and other publications** are developed to facilitate HAB research, monitoring and teaching. **HAB related data bases** on HAB events, monitoring systems, HAB experts, and a HAB bibliography (within ASFA) is established and maintained. **International research initiatives** are taken by the IOC-SCOR research initiative on the Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) and the ICES-IOC Working Group on the Dynamics of Harmful Algal Blooms. The scientific goal of GEOHAB is to determine ecological and oceanographic mechanisms underlying the population dynamics of harmful algae through the integration of biological and ecological studies with chemical and physical oceanography, supported by improved observation systems. Targeted cooperative research is conducted with Member States through the IOC Science and Communication Centres.

Focus 2. Environmental variability and ecosystem change. The main concerns of this programme focus are measures for assessing the state of and trends in the marine environment and diagnosing the causes of ecosystem change as well as the development of early warning signals of change in ocean ecosystems. The primary objective of the programme area is fostering the development of indicators of the health of the ocean ecosystems that are reliable in their ability to detect driving forces, powerful in their ability to discriminate between anthropogenic *versus* natural sources of stress, and easy to use and broadly applicable in different parts of the world for management actions. The issues related to sources and fate of contaminants and their eco-toxicology is an integral part of this objective.

Under this programme area IOC provides support for expert groups to provide scientific guidance on a series of specific issues which include: **Coral Bleaching Related Indicators for Coral Reef Health, Indicators for Health of Benthic Communities; Ecosystem Indicators for Fisheries Management; and Use of Environmental Indices for Climate Change effects on Small Pelagic Fish Populations.** The last two issues are addressed jointly with SCOR and GLOBEC.

Focus 3. Global Changes in the Ocean and Large Ecosystems. The objective of this programme focus is to promote, facilitate and coordinate research and assessment activities involving biogeochemical-physical aspects of Global Change in the oceans with the objective of protecting the marine environment against the anthropogenic activities that cause, or are likely to cause adverse effects in the marine environment, its ecosystems, amenities, and associated threats to human health. Specific issues of concern include fluxes through ocean boundaries and interfaces, chemical-biological-physical interactions in relation to nutrient transformations, oxygen demand and transport by physical processes. These issues are related to eutrophication, harmful algal blooms, hypoxia, changes in species composition and community structure as well as changes in ocean chemistry. The development of interdisciplinary models is of primary interest.

One of the important issues considered within the programme area is the Land-Atmosphere-Ocean biogeochemistry of nutrient enrichment of coastal ecosystems. An IOC/UNEP working group has been established to address this issue through models to

predict nutrient transport to coastal ecosystems as function of natural processes and human activities. The Large Marine Ecosystems Programme co-sponsored in with FAO, IMO, IUCN, NOAA (USA), UNEP, UNIDO, and WMO constitutes another area of responsibility. Further, IOC participates in the development of the future SCOR and IGBP phase II research framework in biological and chemical aspects of Global Change in the Ocean in the context of Earth System Science. A programme concerned with geosphere-biosphere coupling processes in relation to the protection of the marine environment of the high seas is under development. Mechanisms for facilitating GCRMN activities (co-sponsored by IOC, IUCN, UNEP, and the World Bank) also function under the Programme.

Primary Results expected at the end of the biennium 2002-2003

- A better understanding of the factors that regulate the dynamics of harmful algal blooms (HABs) in the context of physical and chemical forcing, ecosystem dynamics, and human influences for improvement of strategies for monitoring and prediction of HABs;
- A series of molecular, cellular, physiological, and community indicators of coral bleaching that are reliable in their ability to detect early stress signals and an analysis of a suite of mechanisms by which coral reefs adapt and acclimatize to global environmental change;
- A series of indicators of the health of benthic communities that are robust in their ability to detect driving forces, capable of discriminating between anthropogenic versus natural sources of stress, inexpensive and easy to use and broadly applicable in different parts of the world for management actions;
- Production of a comprehensive review and scientific framework for the use of environmental indices to help hindcast/nowcast and forecast changes in the abundance and distribution of pelagic fish in selected areas resulting from climate change;
- A review of the current state of knowledge in different marine and terrestrial disciplines relevant to the development of indicators for marine ecosystems that characterize ecosystem changes induced by fisheries;
- Development of the next generation of spatially explicit global models to forecast the effects of human activities on nutrient inputs to coastal marine ecosystems and a monograph in the peer-reviewed literature, describing major issues in the field of nutrient inputs to, and effects on, coastal ecosystems globally; and
- An active programme concerned with geosphere-biosphere coupling processes in relation to the protection of the marine environment of the high seas.

III. MARINE SCIENCE FOR INTEGRATED COASTAL AREA MANAGEMENT (ICAM)

Integrated Coastal Area Management (ICAM) is a process that links government and society, science and management, private and public interests in preparing and implementing an integrated plan for the protection and development of coastal ecosystems and resources. The ICAM approach has been recognized by UNCED (*Agenda 21*, Chapter 17), as well as several global and regional conventions (CBD, 1995; GPA-LBA, 1995; Regional Seas Conventions) as the appropriate tool to ensure the sustainable development of coastal areas. In 2000, more than 98 coastal States were engaged in ICAM initiatives or programmes. The development of efficient management plan of complex ecosystems subject to significant

human pressure cannot occur in the absence of science. The natural sciences are vital to understanding the functioning of the ecosystem and the social sciences are essential to comprehending why humans behave in ways that cause ecological problems and how they can contribute to their solution.

In response of the growing needs of coastal States, the ICAM Programme aims to assist IOC Member States in their efforts to build marine scientific and technological capabilities in the field of ICAM, and to ensure that scientific requirements are integrated into the development of national and regional ICAM programmes and plans. In particular, ICAM is promoting, through the exchange of experiences, the development of scientifically based methodologies, tools and services to assist the decision-making process and their corresponding institutions for the sustainable development of coastal areas.

The objectives of the Programme are to address coastal zone problems through activities of a more cooperative, coordinated and interdisciplinary nature, and ensure good co-ordination among existing IOC efforts related to the coastal zone. This programme also aims to provide a mechanism to promote interaction between IOC programmes related to ICAM and those of other international organisations, between marine natural scientists and social scientists, as well as between scientists and coastal managers and policy-makers.

The structure of the ICAM programme is based on a proposal, which was developed by an interdisciplinary group of experts and adopted by the IOC Executive Council in 1998. The achievements and activities of the ICAM programme are regularly reviewed through the convening of the ICAM Advisory Group of Experts that meets every two years.

ICAM - Terms of reference

1. Investigation of interdisciplinary coastal processes to improve the scientific basis for the management of coastal seas;

2. Development of scientific methodologies and techniques to suit the needs of coastal managers;

3. Development of an Internet information system on marine sciences and observation in support of ICAM;

4. Study of human communities and ecosystem interactions, in coastal areas, and in particular in coastal urban environment, though the development of environmental and performance indicators;

5. Training on science/policy interface in coastal areas, as well as technical training in the use of scientific techniques; and

6. Implementation of the ICAM programme through IOC regional mechanisms taking into account the unique and special needs of each region.

The present activities of the IOC/ICAM programme includes the support to the IOC / LOICZ / SCOR Study Group on the Assessment and Management Implications of Submarine Groundwater Discharge into the Coastal Zone; IOC/ICAM is a sponsor of the LOICZ Basins Project which is looking at the evaluation of the role of catchment basins in cycling of nutrients, sediments, water, in coastal areas and the development of indicators of

environmental change and sustainability. The programme is serving as secretariat for the Coastal Ocean Advanced Science and Technology Studies (COASTS) which will produce volumes 12 & 13 of *The Sea.* The programme is a co-sponsor of the ICM Global Web Service – a coastal area management information clearinghouse.

Manuals and guidelines are being elaborated in the framework of the Working Group on Methodological Aspects of ICAM. In particular, the programme is focusing on the role of indicators for ICAM, through the support of Canada's Department of Fisheries and Oceans. Assistance to developing countries in sub-Saharan Africa for the sustainable management of coastal and marine environment is provided through the cooperative GEF project implemented together with ACOPS and UNEP.

Primary Results expected at the end of the biennium 2002-2003

- Increased expertise and regional assessment that is relevant to Integrated Coastal Area Management (ICAM) concerns, especially coastline change, groundwater exchange in Coastal Zone, including nutrient transport, and the transport of both bed and suspended sediments. (LOICZ and SGD projects);
- Global Web Service on Integrated Coastal Area Management acting as Clearing House Mechanism for global, regional, national information on ICAM (together with CSMP, NOAA, GPA, World Bank);
- Manuals, procedures, inventories, guidelines, etc., which provide guidance to coastal scientists and managers and enable them to effectively contribute to Integrated Coastal Area Management (ICAM);
- Guidelines on aggregated environmental-socio-economic indicators for ICAM, including evaluation indicators of ICAM programmes/project;
- Publication of a major global synthesis of how coupled physical-biological-chemical-sedimentary-ecosystem dynamical processes work in the coastal oceans, to improve the scientific basis for the management of coastal seas;
- Regional Pilot project studies on interdisciplinary coastal processes (GEF Project – African Process);
- Development of watershed and coastal areas management principles in coordination with the ICARM/UNEP and LOICZ Basins projects (including demonstration sites, and coastal urban pilot projects); and
- Trained experts on science/policy interface in coastal areas, as well as technical training in the use of scientific techniques relevant to ICAM.

TABLE 1. OCEAN SCIENCE SECTION PROGRAMME AREAS AND ACTIVITIES SUMMARY

Issues	Activities	Responsibilities
I. Oceans and Climate		
Climate variability	World Climate Research Programme	Co-Sponsor
	GOOS-GCOS-WCRP Ocean Observations Panel for Climate (*joint with GOOS*)	Technical Secretary
	GOOS-GCOS-CLIVAR Tropical Implementation Panel (*joint with GOOS*)	Technical Secretary
Ocean CO_2 – influence on climate, standards and reference materials, measurement technology, observing systems, ocean disposal of CO_2 watching brief	SCOR – IOC Advisory Panel on Ocean CO_2	Technical Secretary
	JGOFS / LOICZ / IOC Continental Margins Task Team and Programme Synthesis; SOLAS	Co-Sponsorship / support
II. Science for Ocean Ecosystems and Marine Environmental Protection		
Focus 1. Harmful Algal Blooms: understanding causes, prediction of occurrences, mitigating effects; interdisciplinary aspects	IOC Intergovernmental Panel on Harmful Algal Blooms; IOC / SCOR Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB); ICES / IOC Working Group on the Dynamics of Harmful Algal Blooms	Technical Secretary and Project Office for HAB
Focus 2 Environmental variability and ecosystem change: Indicators; fate of contaminants; ecotoxicology	IOC Study Groups on Indicators of Coral Bleaching and Subsequent Effects and Benthic Indicators	Technical Secretary
	SCOR / IOC Working Group 119 on Quantitative Ecosystem Indicators for Fisheries Management; IOC / GLOBEC / SPACC Study Group on Use of Environmental Indices in the Management of Pelagic Fish Populations	Co-Sponsor
Focus 3. Global Changes in the Ocean and Large Ecosystems: biogeochemical cycles; environmental protection of large marine ecosystems and ecosystems of the high seas	IOC Working Group on Land-atmosphere-ocean biogeochemistry; Bio Sphere- Geosphere Coupling Processes and Protection of the Environment of the High Seas (under development)	Technical Secretary
	Large Marine Ecosystems Programme; Ocean Biogeochemistry and Ecosystems Analysis (IGBP II); Global Coral Reef Monitoring Network	Co- Sponsorship/ support
III. Integrated Coastal Area Management		
Land-ocean material fluxes: state of the environment and socio-economic impacts	IOC / LOICZ / SCOR Study Group on the Assessment and Management Implications of Submarine Groundwater Discharge into the Coastal Zone; LOICZ Basins Project – evaluation of the role of catchment basins in cycling of nutrients, sediments, water, and development of indicators of environmental change and sustainability	Co-Sponsorship/ support
Data and information for coastal area science and management; Indicators for integrated coastal management	Synthesis of interdisciplinary global coastal ocean science - Coastal Ocean Advanced Science and Technology Studies (COASTS): producing volumes 12 & 13 of *The Sea*	Technical Secretary
	ICM Global Web Service – coastal area management information clearinghouse	Support
	Working Group on Methodological Aspects of ICAM	Technical Secretary
	International Workshop to improve the design and use of indicators in coastal area management	Technical Secretary
Assistance to developing countries in sustainable management of coastal and marine environment and resources	GEF project: Development and Protection of the Coastal and marine environment in Sub-Saharan Africa	Technical Secretary