Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

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First Session

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Unesco

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In this Series

Reports of Governing and Major Subsidiary Bodies, which was initiated at the beginning of 1984, the reports of the following meetings have already been issued:

- Eleventh Session of the Working Committee on International Oceanographic Data Exchange
- Seventeenth Session of the Executive Council
- Fourth Session of the Working Committee for Training, Education and Mutual Assistance
- Fifth Session of the Working Committee for the Global Investigation of Pollution in the Marine Environment

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A brief Final Session of the IOC Association for the Caribbean and Adjacent Regions took place immediately prior to the First Session of the Sub-Commission (of the same name). This Final Session is reported under Section 2 of the present Report.

1. OPENING

1 The Chairman of the Association, Professor Manuel Murillo, called the meeting to order at 10.10 hrs, 20 August 1984. He expressed the regrets of the Prime Minister of the Netherlands Antilles who had hoped to attend the Opening but was not able to be present. The host government was represented by His Excellency the Minister of Education, Mr. Jacques Veeris, who was accompanied by His Excellency the Minister of Health, Mr. Eddy Werleman. The Chairman called on the Minister of Education to address the meeting.

2 The Minister welcomed the participants to the Netherlands Antilles and to Curaçao in the vernacular Papiamento: "Bon Bini na Korsou". He stressed the need for great wisdom, patience and, above all, perseverance in dealing with the many political, cultural and developmental obstacles, among others, facing international co-operative marine science, and the vital importance of the sea to Curaçao as the source of over 95 % of the drinking water, and the fine natural harbours of Curaçao that have played a significant role in the historical and economic development of the Netherlands Antilles. The Minister's speech is given in full in Annex III.

3 The Chairman of the Association responded to the Minister of Education, thanking the Government of the Netherlands Antilles for its generosity in hosting this important session.

4 The IOC Assistant Secretary, Mr. Ray. C. Griffiths, speaking on behalf of the Secretary of the IOC, Dr. Mario Ruivo, expressed the Secretary's regret at not being able to be present. He stressed the increasing workload of the Secretariat which itself had not grown at the same rate, thus leading to increasing difficulty in, for example, the timely delivery of meeting documents to Member States. With the goodwill and hardwork of the Member States and of the Secretariat, he believed that the Sub-Commission could, nonetheless, become one of the most important regional bodies in the Caribbean. He noted the fine example given by the host country in the preparations for the present meeting, recalling that the Netherlands Antilles, and Curaçao in particular, had been the birthplace of the Association's predecessor, CICAR, and was now the birthplace of the Association's successor, the Sub-Commission.

5 The Assistant Secretary thanked the Government of the Netherlands Antilles, through the Minister of Health and on behalf of the Secretary of the IOC, for its generous invitation.

6 The List of Participants is given in Annex VI.

2. FORMAL TERMINATION OF THE ASSOCIATION

7 The Chairman of the Association, before formally terminating the Association as an IOC regional subsidiary body, reviewed the main achievements of, and the main obstacles to, marine science co-operation in the Caribbean and Adjacent Regions.

8 Professor Murillo noted that several programmes of the Association had been successful, particularly the Marine Pollution Monitoring Programme (CARIPOL), and that this had been due to the special effort of a group of qualified scientists, particularly Dr. D.K. Atwood in the case of CARIPOL.

The TEMA aspects of some of the programmes had also proven of great value in developing marine science in the region. On the other hand, it was also clear that the Association had been too ambitious or over-optimistic in the choice of some of its programmes; the ends had been ill matched with the means in terms of appropriately qualified scientists, adequate facilities, infrastructure and funding.

9 Even so, the number of marine scientists and marine scientific institutions in the region had increased substantially during the life of the Association and, although this was not due to the Association alone, he felt that the Association had played an important role in this development. Although it remains a fact that the human and material resources of the region, in the marine sciences, are still limited, increased co-operation - a genuine effort of synergetic action by the Member States - in which as many countries, institutions, scientists and technicians as possible took a real part, however modest it might be, could, he believed, achieve a great deal more. International co-operative marine science in the region was not simply a matter of adopting a programme and then seeking funds for its implementation from the IOC, which is not itself a funding organization. Although the IOC could, and does, provide a mechanism for regional co-operation, and can promote the development of national infrastructure through TEMA, it cannot assume a Member State's own responsibility for the development of its national marine scientific programmes and infrastructure, and this fact had not always been fully understood among the Member States of the Association. Nor had it considered enough the usefulness of subregional programmes to deal with certain more localized problems and therefore to stimulate the development of national programmes.

10 Professor Murillo hoped that the experience acquired during the life of the Association would be put to work in the development of the Sub-Commission. He expressed his special thanks to the Vice-Chairman, Dr. Harris B. Stewart, and to the former IOC Assistant Secretary for IOCARIBE, Dr. Robert R. Lankford, for the considerable help they had given him as Chairman.

3. FORMAL INITIATION OF THE SUB-COMMISSION

11 The IOC Assistant Secretary, Mr. Ray. C. Griffiths,introduced this item. He recalled the fact that the Association had recommended to the IOC that it be replaced by a Sub-Commission, by Recommendation IOCARIBE-II.7. In response to this Recommendation, the Assembly, at its Twelfth Session, decided to create Sub-Commissions as a new category of IOC subsidiary body, and to create such a Sub-Commission for the Caribbean and Adjacent Regions, with the same acronym, IOCARIBE. At the same time, it adopted the Guidelines for the Structure and Responsibilities of IOC Sub-Commissions (they are in Annex V of the Summary Report of the Twelfth Session of the Assembly - Document SC/MD/73). These General Guidelines had been adapted to the case of IOCARIBE and would be discussed under Agenda Item 5. The Assistant Secretary explained briefly the importance of this decision to create Sub-Commissions.

12 First, it provides a formal basis for long-term support by Unesco in terms of regular budget, staff and services; a new post of IOC Assistant Secretary for IOCARIBE was approved by the General Conference of Unesco at its Twenty-second Session. He expected this post to be advertised soon.

13 Second, it formalizes the structure of IOC, by being identified as a Sub-Commission, the relationship between the parent body, the IOC, and the subsidiary body, IOCARIBE, is made clearer to the many other organizations collaborating with the IOC, and indeed facilitates such collaboration, particularly between the Sub-Commission and a regional subsidiary body of another global organization. The other type of IOC regional subsidiary body, the Programme Group, has a more provisional or tentative status suggesting an evolutionary stage in the Commission's development.

14 Third, a Sub-Commission also offers the Member States a basis for formal action in regional co-operation in marine science, amongst themselves and vis-à-vis other organizations. It also provides a basis, if the Member States felt it was desirable, to avoid purely geopolitical groupings and to move to geo-oceanic groupings (i.e., act as a Sub-Commission) in international fora for dealing with matters of marine science policy.

15 The Assistant Secretary, on behalf of the Secretary of the IOC, thanked the Chairman of the Association for IOCARIBE, Prof. Manuel Murillo, of Costa Rica, and the Vice-Chairman, Dr. Harris B. Stewart, of the U.S.A. for their great personal efforts to advance the work of the Association and thus to lay the basis for the Sub-Commission, which, having been conceived in Cancún, at the Third Session of the Association for IOCARIBE, could now be born in Curaçao.

16 The Chairman invited comments from the floor and, there being none, he declared the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE) formally in being.

4. ADMINISTRATIVE ARRANGEMENTS

17 The IOC Assistant Secretary, Mr. Ray C. Griffiths, informed the participants that informal discussions between some of the delegates prior to the Session had revealed a general feeling that it would not be desirable to hold an election for the Chairman and Vice-Chairman first for the Session and a subsequent election for the Chairman and Vice-Chairman for the forthcoming intersessional period and the Second Session of the Sub-Commission and that, therefore, the Chairman and Vice-Chairman of the former Association should be asked to conduct the First Session of the Sub-Commission. He therefore suggested that, if the Member States shared this view, it might be more appropriate to adopt the Agenda after calling on the Chairman and the Vice-Chairman to conduct the present Session.

18 Several Delegates supported this view and the Sub-Commission called on Professor Murillo and Dr. Stewart to assume this responsibility, which they did.

19 The Sub-Commission also decided to invert the items 4.1 and 4.2 of the Provisional Agenda.

4.1 ELECTION OF OFFICERS FOR THE SESSION

20 The Sub-Commission elected the former Chairman of the Association, Professor Manual Murillo, and the former Vice-Chairman of the Association, Dr. Harris B. Stewart, as the Officers for the First Session of the Sub-Commission.

4.2 ADOPTION OF THE AGENDA

21 The Sub-Commission adopted the Provisional Agenda as amended above, in Section 4 of the present Summary Report, as the Agenda for the present Session.

22 The Agenda is given in Annex I.

4.3 DESIGNATION OF RAPPORTEURS FOR THE SESSION

23 The Chairman invited the Delegates to consider the designation of a Spanish-language Rapporteur and of an English-language Rapporteur, to reflect better the major roles played by these two languages in the affairs of this region.

24 This was found desirable and acceptable by several Delegates, and the Sub-Commission called on Dr. Armando Hernández, of Colombia, to be the Spanish-language Rapporteur, and on Dr. Gerard van Buurt, of the Netherlands Antilles, as the English-language Rapporteur.

4.4 CONDUCT OF THE SESSION

25 The IOC Assistant Secretary, and Technical Secretary for the Session, Dr. Fernando Robles, provided some basic information on the conduct of the Session. He suggested that working hours normally be 09.00 - 13.00 and 15.00 - 17.00. He explained the main reasons for the documentation problems that had arisen and expressed the Secretariat's regrets for any difficulties that late receipt or lack of specific language versions might have caused. He gave details of actual document availability for the first day's sessions and for subsequent days. He then outlined the proposed timetable.

26 While appreciating the heavy demands on the Secretariat, the Sub-commission considered that its work was hampered by the late arrival of some of the Working Documents or the lack of appropriate language versions, and called on the Secretary to make, if necessary in future, special or non-conventional arrangements for the preparation and despatch of key Working Documents.

5. FUNCTIONING OF THE SUB-COMMISSION

27 The IOC Assistant Secretary, Mr. Ray C. Griffiths, introduced this item. He reviewed Document SC-IOCARIBE-I/8 Annex 1 (Terms of Reference and General Guidelines for the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)).

28 Each of the sections of this Document was debated, different Delegates emphasizing one point or another.

29 Regarding the Basic Terms of Reference, the Sub-Commission, bearing in mind the discussion on this subject at the Twelfth Session of the IOC Assembly, noted that it was free to recommend changes to the IOC. Although there were no recommendations for specific changes in wording, several pertinent observations were made.

30 The Sub-Commission agreed that national programmes should provide the main basis for its own programmes, and called on the Member States to adapt their marine science programmes as much as possible to meet regional scientific and related needs, and thus to contribute as effectively as possible to the attainment of the Sub-Commission's objectives.

31 The Sub-Commission thought it would be desirable in certain circumstances to accept sub-regional projects between two or three Member States as part of the Sub-Commission's programmes, if such sub-regional projects addressed an important regional problem. Nevertheless, it considered it important not to make the earlier attempt of localized pilot projects of no general interest to the other Member States not involved.

32 The Sub-Commission stressed the importance of concerned Member States submitting such sub-regional projects to the Sub-Commission for its consideration and approval as components of its own programme.

33 The Sub-Commission also stressed the need for greater co-operation between its Member States, as well as with those of the IOC in general, in dealing with problems common to more than one region, and for an increased effort of mutual assistance, not only between developed and developing countries, but also between developing countries themselves. Arrangements to share certain facilities, as research vessels, for example, should be given much more thought than had hitherto been the case, and to inform other Member States of proposed national programmes of regional significance.

34 The Sub-Commission decided to seek to co-operate as fully as possible with other relevant UN bodies or programmes, particularly with those organizations that are members of the Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography (ICSPRO), and particularly the relevant FAO regional subsidiary body, the Western Central Atlantic Fisheries Commission, in endeavours of mutual interest. (See also Agenda Item 9.).

35 Noting Basic Term of Reference (xi), the Sub-Commission decided to be as sparing as possible in creating its own subsidiary bodies, and make more use of consultants than had been the practice in the past.

36 Regarding the IOCARIBE Region, the Sub-Commission recommended to the IOC that its boundaries remain the same as those set for the former Association. It understood that the phrase "The region... shall be determined by the Commission, .." means determined by the Assembly itself or by the Executive Council if so authorized by the Assembly.

37 Regarding Membership, the Sub-Commission understood the clause requiring Member States to notify the Secretary of their wish to become Member States of the Sub-Commission applied only to those that had not sent a delegation to the First Session or had notified the Secretary of their intention not to send a Delegation thereto. The Sub-Commission therefore instructed the IOC Secretary to take appropriate steps in this sense, in respect of other Member States formerly belonging to the Association. The Sub-Commission stressed the importance of Member States' informing the Secretary of their respective national representatives to act as focal points for the Sub-Commission if this had not already been done, and instructed the Secretary to distribute a list of such national focal points as widely as possible in the region.

38 Regarding the frequency of its meetings, the Sub-Commission considered it desirable to meet once every two years, as recommended in the Guidelines, at least in the initial stages of its development, after which a lower frequency (e.g., once every three years) could be envisaged.

39 Regarding secretariat support, the Sub-Commission expressed its satisfaction with the creation by Unesco, of the post of IOC Assistant Secretary for IOCARIBE. Having been informed that the post was expected to be advertised in the near future, the Sub-Commission stressed the importance it attaches to as early an appointment to the post as possible.

40 In response to a question from the floor as to whether there was any particular significance in the fact that the location of the outposted staff in an office of a UN-system organization in the region was given apparent precedence over its location in a Member State, the Assistant Secretary explained that there was no preference in principle, all things being equal, but that an office of a UN-system organization had the advantage of a host-country agreement that had already been negotiated, whereas, for an independent office in a Member State, a separate and new agreement would have to be negotiated which could take many months and could conceivably be of a more restricted duration. Stressing the importance of establishing, as soon as possible, an office in the region for the Assistant Secretary for IOCARIBE, the Sub-Commission agreed that the office for outposted IOC staff should, as far as possible, remain in one place to ensure continuity in its operations.

41 Regarding financial arrangements and support in kind, the Sub-Commission recognized that the regular budget available for its work would not allow the full range of activities envisaged. It therefore stressed the importance of the Member States' contributions to the IOC Trust Fund for IOCARIBE activities, and their support in kind to specific activities of the Sub-Commission in which they wish to participate. Certain of such contributions are identified under the Agenda Items to which they are relevant.

6. OCEAN SCIENCE

6.1 MARINE POLLUTION RESEARCH AND MONITORING

42 The IOC Assistant Secretary, Dr. Fernando Robles, introduced the item. He pointed out, in general terms, the importance and state of development of marine pollution research, monitoring and prevention in the region. He also informed the participants of the agreement on co-operation between IOC and UNEP in the conduct of marine pollution research, intercalibration and related training in the IOCARIBE region.

43 Dr. Alfonso Mata, as a member of the CARIPOL Steering Committee, reported on progress in carrying out the IOCARIBE Marine Pollution Programme (CARIPOL) since 1976. He pointed out that, since the First Session of the IOCARIBE Association in the same year, problems of pollution, particularly by hydrocarbons, had been identified, and had lead to the monitoring of floating tar, tarballs on beaches

and dissolved/dispersed hydrocarbons. Thus, the main early effort was the understanding and monitoring of oil pollution, the first results of which were made available at the Third Session of the Association in Cancún in December 1980. Dr. Mata stressed the TEMA activities and the strengthening of some laboratories by the provision of analytical equipment and data-processing facilities by several countries and institutions, notably the Atlantic Oceanographic and Meteorological Laboratory (AOML), in Miami. As a result, the programme had recorded more than seven thousand five hundred basic data for the purposes of pollution monitoring in the region. At meetings of the Steering Committee in Veracruz in 1982 and Mazatlán in 1984, it was recommended that emphasis be placed on the publication of results and their presentation in scientific meetings, such as the proposed CARIPOL Symposium in 1985, planned to be held in Mayagüez at the invitation of the University of Puerto Rico.

44 As part of the effort to co-ordinate the work of the IOC and of UNEP, the IOC, through IOCARIBE, is charged with the task of organizing an intercalibration exercise at the Bermuda Biological Station for Research, and ad hoc training of scientists in centres of excellence in the region, as, for example, at the Universidad Nacional Autónoma de México. Dr. Mata particularly mentioned the progress report on CARIPOL prepared by the Secretariat for the Session on the basis of a report submitted by the Programme Director for CARIPOL, Dr. D.K. Atwood.

45 Several Delegates stressed the success of the programme as well as the effectiveness of the measures foreseen which would gradually overcome the limitations in the infrastructure and human resources, and increase the number of data obtained.

46 Some Delegates provided information on national activities relating to pollution by petroleum, mercury, and heat, and demonstrated their countries' interest in taking part in CARIPOL.

47 The Delegate of France, although referring particularly to marine pollutant analysis, stressed the importance of raising, wherever possible, the quality of data, particularly with a view to making regional marine environmental assessments possible and long-time series valid (he noted that the average lead concentration in various marine media had declined steadily in the last decade as a result of improved sampling and analytical techniques and strategies, notably the avoidance of contamination prior to, and during, the analysis), as well as reducing the cost to Member States that arises from poor quality data. He said his country and, indeed, his own laboratory were ready to assist any IOCARIBE Member State, or institution that so wished, by offering specialized training, technical assistance and specialized manuals on sampling and analytical measurements.

48 The Sub-Commission welcomed this offer of assistance, with respect to improved data quality.

49 The Sub-Commission thanked the Delegate of France for this generous offer and recommended that interested Member States take advantage of it.

50 The Sub-Commission affirmed its support for the programme, and restated the importance of ongoing efforts to strengthen this type of co-operative study; it also decided that CARIPOL should extend its activities to include other pollutants, such as trace metals and insecticides.

51 The Sub-Commission recommended the continuation of intercalibration, of data exchange, and the exchange of experience between research centres in the region, as a way of overcoming difficulties of communication.

52 The Sub-Commission requested the Secretary of IOC to take the necessary steps as soon as possible to convene the proposed CARIPOL Symposium on the Results of the Petroleum Pollution Monitoring Programme and Intercalibration Exercise, utilizing the funds made available to the IOC for this purpose by UNEP.

53 The Sub-Commission also stressed the importance of close co-ordination of the activities of the IOC and UNEP so as to maximize the effectiveness of the use of the available budgetary resources, particularly in the framework of multilateral and interagency co-operation offered by the UNEP Regional Seas Programme.

54 The Sub-Commission emphasized the need to make the fullest possible use of contacts amongst participants and representatives in meetings and activities of IOC and UNEP, with a view to maintaining an adequate exchange of information and close co-ordination of these activities.

55 The Sub-Commission also emphasized the value of IOC regional programmes on living resources, coastal dynamics and others, to the understanding, monitoring and protection of the marine environment against the effects of pollutants.

56 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.1.

6.2 REGIONAL COMPONENT OF OCEAN SCIENCE IN RELATION TO LIVING RESOURCES

57 The Chairman, Dr. Manuel Murillo, when introducing the subject, informed to the Sub-Commission that this topic would be treated in three parts: (i) the advances achieved through the implementation of the IOC-FAO joint programme on Ocean Science in Relation to Living Resources (OSLR); (ii) the relevant aspects of the main inter-regional Unesco project on Research and Training Leading to Integrated Management of Coastal Systems (COMAR); and (iii) the activities developed in the recent past by IOCARIBE on sea-turtles and fish kills.

58 The Assistant Secretary, Dr. F. Robles, gave a detailed exposition on the genesis and development of the OSLR programme up to the present state of implementation, from its approval by the IOC, through Resolution XII-1, and its later co-sponsoring by FAO. An important element in the conception, definition and implementation of OSLR was the decision to concentrate the research effort mainly (but not exclusively) on the problem of the recruitment of marine species of commercial importance and the causes of variability in this recruitment. As a part of the "mandate" established by Resolution XII-1, a Workshop on the IPEP Component of the IOC Programme on Ocean Science in relation to Living Resources, was held in Halifax, Nova Scotia, Canada, in September 1983 (IOC Workshop Report No. 33), at which some ecological problems were defined, such as those related to the recruitment of demersal resources in tropical coastal zones. The IOC Guiding Group of Experts on OSLR, at its First Session in Paris in July 1984, emphasized the existence of new methods which offer the possibility of overcoming previous limitations associated with recruitment studies and variability in high-diversity ecosystems, such as those of the inter-tropical coastal areas.

59 Considering, inter alia, the socio-economic importance of these fisheries, the Guiding Group of Experts proposed (Recommendation 2) to submit to the consideration of the Sub-Commission at the present session, the organization of a workshop on OSLR-IREP elements in demersal communities of the intertropical fringe. Dr. Robles stated that the Terms of Reference suggested for this workshop were included in the Draft Summary Report of the First Session of the Guiding Group of Experts on OSLR (Document IOC-FAO/OSLR-GGE-I/3); the site and tentative dates for the workshop were suggested: the Instituto de Ciencias del Mar y Limnología of UNAM (México) and the second half of 1985, respectively.

60 The Representative of FAO, Dr. Elda Fagetti, presented information on the activities of the Western Central Atlantic Fishery Commission (WECAFC), pointing out the complementary aspects of the IOCARIBE activities, in particular the problem to be addressed by the above-mentioned workshop.

61 Several Delegates welcomed the evolution of the OSLR programme and pointed out the importance for ongoing research in many of the Member States of IOCARIBE.

62 The Sub-Commission endorsed the Recommendation of the Guiding Group of Experts on OSLR relevant to IOCARIBE.

63 The Delegate of Mexico confirmed his country's offer to host the OSLR-IREP Workshop on Recruitment in Tropical Demersal Communities, at the Marine Biological Station of UNAM in Ciudad del Carmen, Campeche, and to make available the R/V JUSTO SERRA, if necessary and if it were available.

64 The Representative of Unesco, Dr. Robert Lankford, informed to the Sub-Commission of the state of implementation of COMAR, in particular of its regional component under the coastal systems of Latin America and the Caribbean, and its relations with the continental shelf project (COSALC). He stressed the different elements of the programme relevant to coastal ecosystem management and the socio-economic implications, and explained that the COSALC component originated from a meeting of 21 specialists in Caracas in November 1982; the proposition is under consideration by UNDP for funding. A concurrent initiative with COSALC is a study of coastal lagoons in Brazil, Colombia, Mexico and Venezuela, which is in the early stages of development. Dr. Lankford also referred to relevant aspects of coastal geology training, notably beach stability and sedimentology, concluding that all the described activities could be of great importance to IOCARIBE.

65 Several Delegates recognized the importance of the rational management of the coastal zone, especially of the coastal lagoons, mangroves, sea-grass beds and coral reefs. Several provided information on national programmes in the coastal zone.

66 The Sub-Commission emphasized the multidisciplinary nature of these studies and the need to keep in mind, in research on these systems, the continuity and integrity of the marine environment, and to give adequate attention to the relationship between processes in the coastal zone and those on the continental shelf and in the open ocean.

67 The Sub-Commission stressed the urgent need to establish an adequate co-ordination between the programmes described and those of a global or regional character, particularly OSLR, promoted by the IOC.

68 The Sub-Commission also stressed the need to avoid unnecessary duplication of effort and called attention to the complementarity of the projects sponsored by IOCARIBE and those under COMAR, especially in the fields of living resources,

marine pollution, coastal and ocean dynamics, and the respective TEMA components, as well as their relationship with similar activities conducted by other governmental and non-governmental international organizations.

69 The Sub-Commission concluded that, given the importance of these studies and problems for the region, they should be set in the framework of the existing regional intergovernmental oceanographic mechanism: IOCARIBE (see also Agenda Item 9.2).

70 The Representative of Unesco, Dr. R. Lankford, gave the results of the IOCARIBE Western Atlantic Turtle Symposium (WATS) held in San José (Costa Rica) in July 1983. This Symposium was considered unanimously as one of the most successful activities of the former Association. The attendance at that symposium was about 300 participants, representing 33 countries. The Proceedings of the meeting have been published in English, and a Spanish version will be printed soon. As a consequence of this initiative, similar activities on spiny lobsters and mollusks were proposed, as well as a second turtle symposium for 1987.

71 The Sub-Commission thanked Dr. Lankford for his role in the success of this initiative; it recognized the importance of the co-operative investigations in the management and protection of high-value species, and called on the Secretary of IOC to develop contacts with FAO through regional subsidiary bodies, especially WECAFC, in the follow-up.

72 The Representative of Unesco explained that, after the widespread regional fish-kill phenomena in August-September 1980, the Association organized, in collaboration with the Gulf and Caribbean Fisheries Institute, a symposium on this subject in Mayagüez, Puerto Rico, in October 1982. All the information presented and compiled in that meeting was presented in a report entitled Unusual Fish Mass Mortality in the Caribbean Area. The Symposium also recommended the publication of a manual on the determination and follow-up of similar future phenomena in the area. The content of such a manual was formulated during an ad hoc workshop held also in Mayagüez.

73 The Sub-Commission stressed the importance and timeliness of these actions, as well as the need to extend them to all types of fish-mortality phenomena.

74 The Sub-Commission recommended that the Secretary of IOC consider the early publication of the aforementioned manual and the organization of appropriate training in the regional application of the techniques described in the manual. The Sub-Commission also recommended the study of possibilities for future co-operation and co-ordination with FAO and its regional subsidiary bodies in this field of activity.

75 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.2.

6.3 REGIONAL COMPONENT OF OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES

76 The Chairman noted, when presenting this point, that the most relevant topics were discussed exhaustively during an ad hoc Expert Consultation on Coastal Area Dynamics prior to the present session (15-17 August), the report of which was before the Sub-Commission as Document SC-IOCARIBE-I/8, Annex 3.

77 Dr. H. Stewart, Co-ordinator and Chairman of the ad hoc Consultation presented the Report and the Recommendations thereof as the basis for the discussion of this Agenda Item, covering also the point initially proposed as 6.5.1 (Coastal Area Dynamics). He emphasized that the wide range of subjects covered and the proposed recommendations arose from the integrating and unifying nature of the concept of coastal area dynamics, which should be kept in mind during discussion of the problems, because of the wide range of implications. He synthesized the four main subjects covered during the ad hoc Consultation: a) Physical oceanography of the coastal zones; b) Shoreline stability, coastal erosion and sedimentation; c) Coastal pollution, environmental protection and coastal resource management; and d) General Recommendations. He briefly outlined the conclusions of the Consultation and its 18 Recommendations:

a) Physical oceanography of the coastal zones.

Recommendation 1 - The organization of a training workshop on coastal current measurement techniques.

Recommendation 2 - The preparation of a manual of coastal measurement and sampling techniques.

Recommendation 3 - Tidal-current measurement and prediction.

Recommendation 4 - The monitoring of waves, sea-level and surface weather.

Recommendation 5 - The development of regional circulation models of the Caribbean Sea and the Gulf of Mexico.

Recommendation 6 - The use of ships-of-opportunity.

Recommendation 7 - Vessel assistance to coastal programmes.

b) Shoreline stability, coastal erosion and sedimentation.

Recommendation 8 - The organization of a workshop on techniques for monitoring beach changes.

Recommendation 9 - The preparation of geomorphological maps.

c) Coastal pollution, environmental protection and coastal resource management.

Recommendation 10 - Coastal area pollution studies.

Recommendation 11 - The preservation of seagrass beds.

Recommendation 12 - The establishment of pilot study areas.

d) General recommendations

Recommendation 13 - Availability of satellite data and imagery.

Recommendation 14 - The identification and use of local coastal marine scientific capability.

Recommendation 15 - The preparation of an IOCARIBE directory of marine scientists.

Recommentation 16 - Dissemination of information on training courses in coastal processes.

Recommendation 17 - Facilitating the international movement of scientific equipment.

Recommendation 18 - The preparation of project plans.

78 With regard to shoreline stability, the Representative of WMO, Mr. C. Reudink, informed the Sub-Commission about ongoing activities within his Organization. He mentioned particularly the status of a project under the WMO Tropical Cyclone Programme dealing with the regional aspects of storm-surge production (Caribbean, Central America and Eastern Pacific), the main objectives of which are:

(i) to develop storm-surge atlases for all the larger countries;

(ii) to study the impact of the surge on small islands;

(iii) to develop the capabilities of updating the storm-surge models; and

(iv) to provide relevant training of personnel involved.

79 Mr. Reudink cautioned against duplication of efforts and, on the other hand, expressed his Organization's interest in the outcome of any exercise on research in this respect. He further informed the Sub-Commission on the role of Port Meteorological Officers with respect to recruitment of, and liaison with, ships-of-opportunity for the making and transmission of observations, and offered the co-operation and assistance of his Organization in the relevant activities of the Sub-Commission.

80 Many Delegates thanked Dr. Stewart and the Experts for their detailed review of the topics presented in the report of the above mentioned ad hoc Consultation, and pointed out that it confirmed the importance, for IOCARIBE, of including the coastal zone among its activities. Based on the report provided, some Delegates stressed the artificial nature of the separation of the coastal and open-ocean, restating what had been said by several Member States in the General Conference of Unesco, and in the Assembly and Executive Council of the IOC.

81 The Sub-Commission endorsed the complete text of the "Report and Recommendations of the ad hoc Expert Consultation on Coastal Dynamics in the Caribbean and Adjacent Regions" (see Annex IV).

82 Nevertheless, the Sub-Commission indicated the practical necessity of setting priorities for, and of choosing, some of the proposed actions to be incorporated in a summary recommendation, in order to ensure viability of execution.

83 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.3.

6.4 OCEAN MAPPING

84 The IOC Assistant Secretary, Dr. F. Robles, introduced the subject, emphasizing the different bathymetric and cartographic activities of the IOC. Some of them, such as the General Bathymetric Chart of the Oceans (GEBCO), are carried out in collaboration with the IHO; all such activities are strongly supported by the Member States of IOC. The Assistant Secretary recalled the offer of Mexico, made during the Twelfth Session of the IOC Assembly and again in the Seventeenth Session of the IOC Executive Council, to provide facilities for the editing and publishing of International Bathymetric Charts for the Caribbean and Pacific coast of Central America.

85 The Delegate of Mexico restated his offer and outlined the many applications for such charts in various fields of marine science. He stressed the need for close collaboration among participating Member States, in such an undertaking, and that the GEBCO experience and the advice of the Guiding Committee for GEBCO would be of a great help in elaborating the charts.

86 Many Delegates expressed their appreciation of the offer of Mexico, and gave details of bathymetric projects in their respective countries. They stressed the regional importance of such a project, including the possibility of incorporating overlay sheets for various oceanographic parameters.

87 The Sub-Commission approved the proposed project and requested the Secretary of IOC to take the necessary steps to establish the Editorial Board therefor.

88 The Sub-Commission thanked the Delegate of Mexico for his country's generous offer.

89 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.4.

6.5 OCEAN DYNAMICS

6.5.1 Coastal Dynamics

90 This item was covered by the debate under Agenda Item 6.3.

6.5.2 Ocean Climatology

91 The Assistant Secretary, when presenting the item, suggested that the title of this point could be confusing and that it must be understood as referring to ocean processes. The denomination originated from the designation and objectives of the YUCA-I cruise carried out by UNAM with the R/V JUSTO SIERRA in the Yucatán Channel. Thanks to the kind invitation of Mexico and support from IOC, physical oceanographers from Colombia, Costa Rica, Cuba, the United States, Panamá and Trinidad & Tobago participated in this cruise. The Assistant Secretary stressed the value of this regional experience, which could be a useful precedent for future co-operative exercises, in support of the global and regional experiments that are being planned as part of the oceanographic component of the WMO-ICSU World Climate Research Programme (WCRP). This oceanographic component is being planned by the Joint SCOR-IOC Committee on Climatic Changes and the Ocean (CCCO).

92 Several Delegates expressed their interest in this type of co-operative investigations.

93 The Delegate of Colombia informed the participants of a related programme being developed with some support from the Organization of American States (OAS), with the participation of regional scientists.

94 Several Delegates stressed the importance of such studies in the light of the fundamental role that ocean-atmosphere interaction plays in the region, especially the dynamic processes associated with the Gulf current; these processes are still not well understood. They also emphasized the need to give continuity to all planned co-operative programmes in this field in the future.

95 The Sub-Commission recommended that emphasis be given to monitoring and modelling of parameters related to air-sea interaction.

96 The Sub-Commission recommended, to this end, the early organization of a regional expert consultation on modelling of such parameters for the Caribbean Sea, and requested the Secretary of IOC and the interested Member States to consider the financial support for this initiative.

97 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.5.

7. OCEAN SERVICES

7.1 REGIONAL DATA MANAGEMENT

98 The IOC Assistant Secretary summarized the results of the Eleventh Session of the IOC Working Committee on International Oceanographic Data Exchange (IODE), 9-18 January 1984. He stressed the problems identified in relation to the collection and dissemination of the information by the US National Oceanographic Data Center (NODC) which acts as the Responsible National Oceanographic Data Center for IOCARIBE. He also stressed the fact that the RNODC does not receive a sufficient amount of information to allow it to meet IOCARIBE's stated needs. There is no firm tendency to establish or strengthen the oceanographic data services of the countries of the region, and this restricts information exchange; The Assistant Secretary nevertheless recalled the CARIPOL programme efforts in this regard.

99 Various Delegates recognized the vital importance of having a permanent and timely data and information flow. They stated, nevertheless, the indispensable need for personnel training and technical assistance to enable them to build up efficient National Oceanographic Data Centres.

100 The Delegate of the USA stressed the subject's importance and offered his country's co-operation by providing training activities in this field.

101 The Delegate of France called the attention of the participants to the need for harmonizing and correlating the basic data and offered his country's co-operation by assisting the attendance of local specialists at seminars on the subject that are periodically organized in Brest (France).

102 The Sub-Commission recalled the importance of consolidating a regional system of oceanographic data exchange, and gratefully acknowledged the training offers in this field made by the USA and France.

7.2 INFORMATION SERVICE NEEDS

103 The IOC Assistant Secretary stressed the need, repeatedly manifested by IOCARIBE Member States, to develop information services, and for an Information Services Manual in the fields of marine science and fisheries, which is being prepared by IOC with the support of the International Development Research Council (IDRC) of Canada. This manual could be experimentally tested in the IOCARIBE region.

104 The Representative of FAO informed the Sub-Commission about the Aquatic Sciences and Fishery Information System (ASFIS) and its products (ASFA - Aquatic Sciences and Fisheries Abstracts; MSCT, Marine Science Contents Tables; FACT,

Freshwater and Aquaculture Content Tables; List of Schedules Meetings, and Directories) and gave details of the opportunities that these services offer.

105 The Sub-Commission expressed the importance, for the countries of the region, of being provided with these kinds of services and recalled the need to stimulate the exchange of information and documentation between the research institutions and teaching centres of the Member States. It recommended that this subject receive special attention by the missions to the countries of the region mentioned under Agenda Item 8.1.

7.3 IMPLEMENTATION OF REGIONAL COMPONENTS OF IGOSS

106 The Assistant Secretary, when introducing this topic, recalled that the Integrated Global Ocean Services System (IGOSS) is a joint IOC-WMO programme. He pointed out the need of setting up systems for real-time data management to meet future demands of the oceanographic component of the World Climate Research Programmes (WCRP).

107 He recalled that a mission had already been organized in the region from 15 March to 12 April 1981 and that the IGOSS Operations Co-ordinator visited Mexico, Dominican Republic, Venezuela, Colombia and Costa Rica. From that mission, a proposal for the implementation of IGOSS in the Caribbean Region was prepared (doc. IOC-XII/8 Annex 6) and submitted to the Assembly at its Twelfth Session (Paris, 3-19 November 1982) and to the Joint IOC/WMO Working Committee (JWC) for IGOSS at its Third Session (Paris, 21 February - 2 March 1983). The Assembly "considered the present policy for regional implementation of IGOSS to be a suitable one and recommended that it be pursued". In turn, the Joint Working Committee on IGOSS "considered that, as compared to the Pacific, the Caribbean countries have not as yet shown a significant interest in implementing IGOSS in the region". But it was noted that this situation was likely to evolve, in particular in relation with sea level measurements (see Agenda Item 7.4).

108 The Delegates discussed the objectives, structure and functioning of the System, recalling that, in the developing countries of the region, there is still not a clear idea of its objectives and benefits and the means of participation.

109 The Sub-Commission requested the Secretary of IOC to consider the organization of IGOSS experts visits to the region to update and explain the advantages and requirements of the System and to evaluate present modes of implementation and/or strengthening of the IGOSS and IODE systems in the region. These visits could be organized jointly with WMO in view of this Organization's willingness to co-operate with IOC in developing IGOSS in the region.

7.4 REGIONAL TIDE-GAUGE NETWORK

110 The Assistant Secretary provided the background to this item. The 1983 report of the Permanent Service for Mean Sea Level shows the geographic distribution of presently operating tide gauges in the IOCARIBE region (excluding the United States); it also shows that the western and southern Caribbean Sea have the least coverage. The Gulf of Mexico has adequate coastal coverage. The major passages of the basin do not have cross-straits station pairs which are needed for geostrophic interpretation of the sea-level signal.

Many islands are without operating gauges. Details of tide-gauge location, availability of co-located meteorological and sea-surface temperature observations, periodic leveling reports, and data-archiving procedures are unknown.

111 The Representative of WMO, Mr. C. Reudink, drew the attention of the Sub-Commission to the Integrated Global Ocean Services System (IGOSS) General Plan and Implementation Programme 1982-1985 (WMO Publication No. 582). He noted that real-time monitoring and exchange of sea-level data are of paramount importance in the provision of efficient and effective ocean services (for example, to compute surface currents). Also, tide-gauge stations (coastal stations and fixed platforms) constitute one of the important observing systems in the Global Observing System (GOS) component of the World Weather Watch (WWW) Programme of WMO; and telecommunication facilities of the Global Telecommunication System (GTS) component of the World Weather Watch are a part of the IGOSS Telecommunications Arrangement (ITA).

112 The Sub-Commission recognized that long-term series of sea-level measurements are also becoming increasingly immortant for geophysical monitoring. At sites where long time-series are available, the sea-level is observed to have fluctuations with periods from tidal to interannual. Coastal tide-gauges provide sea-level records that are dominated mostly by gravitational, climatic, steric, meteorological, and geostrophic signals. All these signals carry scientific information that may bear on the safety and economic development of the Caribbean countries. To use sea-level records for regional-scale economic and scientific purposes, the gauges must be located where the signal is oceanic rather than estuarine; many existing gauges do not meet this criterium. Also, there must be adequate geographic coverage.

113 The Sub-Commission also recognized that the value of a regional tide-gauge network is enhanced if the data are combined with those of the meteorological reporting network. This will provide up-to-the-minute sea-level information to marine interests. This real-time information is better suited for archiving, and for application to immediate problems such as fish kills, transportation accidents, surveying, and determining coastal circulation patterns. Moreover, the data would also be archived in a uniform format, with the necessary quality control, for use in an IOC training programme, and could be made available to all interested entities. A modern regional tide-gauge network will significantly contribute to other efforts in the IOC, such as the Global Tide-Gauge Network and to the WMO-ICSU World Climate Research Programme.

114 The Sub-Commission decided to undertake a systematic study of the variability of the oceanic dynamic topography of the IOCARIBE region, using all available hydrographic, CTD, and XBT data.

115 The Sub-Commission also recommended that the IOC convene a workshop of interested IOCARIBE Member States to discuss: (i) the present state of sea-level monitoring in the region; and how to upgrade and expand the existing network as a regional component of the IOC global network; (ii) assess current knowledge of the ocean dynamic topography of the IOCARIBE region; and (iii) taking into account present knowledge of the bathymetry of this region, make recommendations to the IOC and to IOCARIBE, on the upgrading, expansion and rational design of a regional sea-level monitoring network. A comprehensive analysis of the present state of development as regards the main topics recommended, should be prepared in advance as basic material for the workshop.

116 The Delegate of the USA informed the Sub-Commission that the University of Puerto Rico was willing to host such a workshop, and that the NOAA Atlantic Oceanographic and Meteorological Laboratory in Miami, Florida, was willing to conduct the necessary preparatory research to facilitate the work of the proposed workshop.

117 The Sub-Commission thanked the Delegate of the USA for these generous offers.

118 The Sub-Commission called on the IOC to facilitate implementation of the regional tide-gauge network by organizing training courses, encouraging periodic scientific research sessions, and supporting joint publication of work in referred international journals.

119 It also requested WMO (through the Joint IOC-WMO Working Committee for IGOSS) to include sea-level data in the Report of Surface Observations from a Sea Station (WMO code form FM 13-VII SHIP); for example, by including in Section 2 of the Report an additional code group (7 $H_sH_sH_sH_s$) in which $H_sH_sH_sH_s$ show the stage, in centimetres above zero, of the gauge for the station (in case of negative stages, 5000 should be added to the absolute value measured in centimetres).

8. TEMA ACTIVITIES IN SUPPORT OF THE SUB-COMMISSION'S PROGRAMMES

8.1 THE IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME TO ENHANCE THE MARINE SCIENCE CAPABILITIES OF DEVELOPING COUNTRIES IN THE IOCARIBE REGION

120 The IOC Assistant Secretary, Mr. Ray C. Griffiths, introduced the Plan. He explained that, hitherto, the IOC, through TEMA, had succeeded to an appreciable degree, in enhancing the quality of Member State participation in IOC programmes. Nevertheless, the Third UN Conference on the Law of the Sea, and the emergence of a New Ocean Regime, particularly the creation of Exclusive Economic Zones (EEZ), had increased not only the possibility of economic development through the exploration of new national resources but also the responsibilities for the rational management of such zones. This implied the need for a new order of magnitude in the development and application of marine science, which TEMA, as presently conceived and conducted, was not able to ensure. Hence the Comprehensive Plan had been developed and approved by the IOC and endorsed by Unesco. The major elements of this Plan are: (i) the assessment of existing marine science infrastructure and of the need for its development in the developing countries; (ii) the improvement of internal co-ordination of the marine scientific activities in the Member States and of the interface with relevant international organizations, in order to attain national objectives in marine affairs; and (iii) the preparation of regional/subregional projects as vehicles for achieving the enhanced capabilities required. The mechanism proposed for (i) is a Marine Science Country Profile; that proposed for (ii) is a National Oceanographic Committee or a similar body; and that proposed for (iii) is self-evident.

121 The Assistant Secretary briefly outlined the steps being taken to implement the Comprehensive Plan, particularly the preparation of an expert mission to nine small island and mainland States (Jamaica, Antigua and Barbuda,

Barbados, Curaçao, Dominica, Guayana, Saint Lucia, Saint Vincent, and Trinidad and Tobago) in the eastern Caribbean to: (i) assess their immediate and long-term needs in terms of manpower and facilities; (ii) advise on the co-ordination of national activities in the marine sciences, ocean services and related aspects; (iii) propose measures to strengthen or establish an adequate marine science infrastructure; (iv) advise on joint marine research and common facilities and services; and (v) prepare a proposal for a subregional technical assistance project.

122 The Representative of FAO, Dr. Elda Fagetti, informed the Sub-Commission of her Organization's experience in the preparation of Fishery Country Profiles. Although these were less complex than those proposed by the Commission, they had presented appreciable difficulties in obtaining and compiling the relevant information. She offered her Organization's collaboration in IOC's MSCP endeavour by making the relevant Fishery Country Profiles available.

123 The discussion was mainly on the question of the Country Profiles and the proposed National Oceanographic Committees, the regional/subregional projects being considered generally acceptable in principle.

124 Several Delegates stressed, however, that the mission should not concentrate only on MSCP and NOC, but also develop a basis for subject-oriented research projects.

125 Some Delegates believed that the requirements for the preparation of MSCPs were generally too complicated and too detailed, and could not be universally applied. Each Member State had to be taken case by case, and the requirements for the Profile adjusted to the circumstances; a more easy approach was needed. Not all the details called for were necessarily required.

126 The Delegate of the USA informed the Sub-Commission that, at the Fourth Session of the IOC Working Committee for TEMA, the Australian Delegate had offered to assist in the preparation of MSCPs for those Member States of the IOC Programme Group for the Western Pacific (WESTPAC) that desired such assistance, and that his Government was likewise willing to help in the IOCARIBE region. He informed the Sub-Commission that the US Agency for International Development (AID) was collecting relevant data (among many others) which, he believed, could be made available to the IOC.

127 The Sub-Commission noted other on-going efforts, particularly in Jamaica and Mexico, to assemble relevant information on marine science infrastructure, and stressed the importance of making MSCPs precise and directed towards clearly defined objectives, it being very important to know what exactly exists and what can be done.

128 It also expressed its concern that the preparation of MSCPs, as a basis for the formulation of regional/subregional research projects, would take a considerable time, during which TEMA activities should continue to be carried out and, as far as possible, expanded.

129 Regarding the formation of National Oceanographic Committees or similar bodies, some Delegates warned against stressing one or another type of mechanism for internal co-ordination.

130 Responsibility for marine affairs is usually spread amongst a wide range of institutions within any one country, and the IOC proposal that Member States create an all-embracing National Oceanographic Commission (or similar body) in certain Member States, might, at the present time, cause more problems than it solved.

131 The Sub-Commission called on its Member States to study internal requirements for co-ordination of marine scientific and related affairs, with a view to improving national participation in IOC global and regional programmes and, if thought desirable, facilitating the focus of national resources on national problems to meet national goals in marine affairs.

132 The Sub-Commission expressed its interest in the outcome of the proposed expert mission, regarding it as a useful approach to the preparation of a subregional project under the Comprehensive Plan.

133 While commending the IOC and Unesco on the adoption of the Comprehensive Plan, the Sub-Commission stressed the importance of expanding TEMA in the region, recognizing that TEMA served to meet the needs of Member States directly in the field of marine science and ocean services.

134 The Delegates of the USA informed the Sub-Commission that his country conducts a Hydrographic Survey Assistance Programme in the Caribbean region for the purpose of stimulating data collection in support of nautical charting. He stated that the USA offers hydrographic surveying and charting courses, conducted in the Spanish language, in Panama and will soon resume a programme of hydrographic instruction in the USA that will be available to all IOCARIBE Member States. He also informed the participants that IHO issues a publication (Sp-47) outlining hydrographic courses available throughout the world and that IMO recognizes this IHO document as valid for training programme financial support.

8.2 SCHEME FOR CO-OPERATION AMONG EDUCATION AND RESEARCH INSTITUTIONS IN THE REGION

135 The Chairman, Dr. Manuel Murillo, introduced the subject by referring to Document SC-IOCARIBE-I/8, Annex 4. He mentioned the efforts made by the IOCARIBE Association and its predecessor, CICAR, in the consolidation of the scientific capacity of the Member States. The Chairman reviewed the possibilities of establishing a co-operative programme between higher education and research institutions of the region and presented a scheme with the objective of strengthening the marine science capacity of Member States, based on the formation of human resources at post-graduate level and high-quality research projects. He stated that most of the research institutions in the IOCARIBE region depend on, or are related to, universities; they constitute an extraordinary human and infrastructure resource; he also stated that, in view of this reality, it is hard to justify the need to create a special regional centre for oceanographic studies for the Caribbean, as had been suggested in the past. The Chairman proposed to establish a mechanism for organizing and co-ordinating a network of institutions in marine science teaching and research in the region.

136 The Delegates of Venezuela, Cuba and Colombia informed the participants of their countries' possibilities for co-operation in the establishment of such a network.

137 The Delegate of the USA offered its (marine science) capabilities in the region, especially those available at the University of Puerto Rico.

138 The Delegate of Mexico offered the participation of UNAM in such a network.

139 The IOC Consultant, Dr. P.E. Penchaszadeh, proposed to incorporate in such a system the concept of short-term co-operation in specific training for scientists in the region, for which a periodic inventory of offers should be produced.

140 The Delegate of Cuba stressed the need to develop mechanisms for the exchange of scientific documentation between institutions in the region.

141 The Delegate of the Netherlands Antilles mentioned the existence of the Caribbean Association of Island Marine Laboratories which could assist in the development of an institutional network.

142 The Sub-Commission approved Guidelines for a Regional Network of Higher Education and Research Institutions (attached as Annex V to this Report), and recommended that IOCARIBE Member States follow them in the development of the Network.

143 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.6.

8.3 REGIONAL RESEARCH PROGRAMMES

144 The IOC Assistant Secretary, Mr. Ray C. Griffiths, introduced this item. He described, in general terms, the approach of IOC to TEMA and that of the Unesco Division of Marine Sciences; the former had historically concentrated on specific training and assistance to enhance Member State participation in IOC programmes, which are co-operative and international, whereas the Division had historically concentrated on developing the marine scientific infrastructure of individual Member States. He stressed the respective roles of IOC's major technical subsidiary bodies (e.g., Working Committees for GIPME, IGOSS, IODE) and the major regional subsidiary bodies (e.g., IOCARIBE, WESTPAC, etc.) in defining the TEMA components of the relevant IOC programmes. The former are expected to define the broad technical requirements of the TEMA components, the latter should identify these components in more specific terms related directly to the bodies' respective programmes, and include quantitative needs and required follow-up.

145 The Representative of Unesco, Dr. Robert R. Lankford, described IOC role in respect of TEMA in IOCARIBE. He recalled among other actions the provision of Nansen Bottles and repair kits by the USA to several countries of the region, and of spectrofluorimeters by France and the United Kingdom. He observed that the Sub-Commission's discussions of COMAR/COSALC (see Agenda Items 6.2 and 9.2) mentioned several activities relative to TEMA. In particular:

(i) Pilot Project on Coast and Beach Erosion, which is a pilot effort in the small island states (eastern Caribbean) to be developed in two stages: 1st stage - a series of "awareness" seminars given in each island; 2nd stage - training courses for participants from the region (UNDP funds being sought).

(ii) Pilot Projects on Coastal Lagoons in Latin America; a workshop in Puerto Alegre selected pilot projects on coastal lagoons in Brazil, Venezuela, Colombia and Mexico; the projects include development and standardization of methods, and contain TEMA components. There are two sub-projects: a Workshop on Coastal Lagoon Physical Processes and a Workshop on Coastal Lagoon Biological Processes.

(iii) Coastal Geology Training Course; planned for March 1985 in Puerto Alegre, Rio Grande do Sul, Brazil, of 2-weeks duration for 10 participants.

(iv) Round Table for Decision Makers in Coastal Zone Management; in collaboration with the UN (OETB).

146 The Delegate of France called the attention on the forthcoming IOC International Course on Coastal Oceanography to be held at the University of Bordeaux (18 September - 4 October 1984)to be attended by students coming from IOCARIBE and Central Eastern Atlantic Member States. He emphasized that this and other similar courses to be organized in the future, are very relevant to the activities listed by the Representative of Unesco and therefore an appropriate overall co-ordination should be maintained in planning and executing these research and training initiatives.

147 The Chairman reminded the participants that several recommendations on research and TEMA aspects had been made during the discussions of various Agenda Items, and during the Expert Consultation held immediately prior to the present Session.

148 The Assistant Secretary invited the Delegates to identify their research and TEMA requirements, or their possibilities for providing related support (courses, technical assistance, etc.), in the context of Recommendation SC-IOCARIBE-I.6 and following the Terms of Reference given in Annex V. He said this would be pursued in the intersessional period with each Member State, with a view to obtaining the corresponding details.

149 Taking into account these new approaches and the Recommendations of the Fourth Session of the IOC Working Committee for Training, Education and Mutual Assistance (TEMA) (4-9 June 1984, Lisbon, Portugal) the Sub-Commission decided to abolish the TEMA co-ordinators for the IOCARIBE region.

9. RELATIONSHIPS WITH OTHER ORGANIZATIONS

9.1 UNEP REGIONAL SEAS ACTION PLAN FOR THE CARIBBEAN ENVIRONMENT PROGRAMME

150 The IOC Assistant Secretary, Mr. Ray C. Griffiths, briefly recalled the history of IOC-UNEP co-operation, particularly that part of it referring to the UNEP Regional Seas Programme Activity Centre (UNEP(RSPAC) and to the Caribbean region. He informed the participants of an Aide-memoire on co-operation drawn up in January 1984 in which UNEP agreed to co-sponsor the GIPME Group of Experts on Methods, Standards and Intercalibration (GEMSI) and co-operate in the development of the Marine Pollution Monitoring System (MARPOLMON).

151 It had not been possible for UNEP to be represented at the Session, but it was agreed that the following telex message from the Director of the UNEP Regional Seas Programme Activity Centre could be (after some minor editorial changes) inserted in the Summary Report.

152 "UNEP welcomes this opportunity to express our best wishes for a successful First Session of the IOC Sub-Commission. We regret that due to unavoidable commitments of our small staff we cannot physically participate in your meeting, but rest assured that, in spirit, we are with you. UNEP attaches great importance to your meeting and we trust that it will be an important step to improve further the co-operation between IOC and UNEP. We see IOCARIBE as a particularly important regional body which could play a significant role in the implementation of the marine pollution control aspect of the Caribbean Action Plan for which UNEP acts as the secretariat.

153 The Action Plan, adopted on 8 April 1981 in Montego Bay, Jamaica, and which is now supported by the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, signed two years later in Cartagena de Indias by the majority of the Caribbean States, is UNEP's framework for assistance to your region. The Action Plan, the Convention and the Protocols associated with it provide an ample opportunity for co-operation with IOCARIBE and we should like to invite you to consider the ways and means to achieve this common goal of our Organizations".

154 The Delegate of the USA asked the Assistant Secretary to clarify for the participants the way co-ordination is presently effected between IOC and UNEP, and, in particular, whether this was only at the Secretariat level.

155 The Assistant Secretary explained that while, obviously, day-to-day co-ordination was mainly at the Secretariat level, the other ways were: inter-agency meetings (i.e., between agencies involved in the UNEP Action Plans); mutual representation at each other's (IOC and UNEP) relevant Sessions; co-operation, at national level, between those national entities dealing with UNEP and those dealing with IOC. He noted that, so far, no joint meetings of IOC and UNEP Governing bodies had ever been convened, but the Assembly of IOC had charged the Chairman of IOC with presenting a report on relevant IOC activities to each session of the Governing Council of UNEP. Another form of co-ordination could also be envisaged, with wider scope, if UNEP joined ICSPRO, but such a decision had not yet been taken.

156 The Sub-Commission expressed its satisfaction with improved co-operation between IOC and UNEP, particularly as it refers to the objectives of CARIPOL. It welcomed the constructive message received from the Director of the UNEP Regional Seas Programme Activity Centre, and noted with satisfaction not only the approval, by the UNEP Monitoring Committee for the Caribbean Environment Programme, of the sum of $ 53,000 for activities highly relevant to CARIPOL, but also the invitation to propose ways and means to achieve the goals of both Organizations in the region.

157 The Sub-Commission strongly supported the view that it should be represented at all relevant UNEP meetings in or regarding the Wider Caribbean, and vice-versa, to provide ample opportunity for development and for co-ordination of joint activities or activities of mutual interest.

9.2 UNESCO MAJOR INTERREGIONAL PROJECT ON RESEARCH AND TRAINING LEADING TO THE INTEGRATED MANAGEMENT OF COASTAL SYSTEMS (COMAR)

158 The Representative of the Unesco Division of Marine Sciences, Dr. Robert R. Lankford, briefly outlined the objectives and progress of COMAR (also given in Document MARINF/52). He also stressed the role played by ROSTLAC in promoting COMAR. Nevertheless, he informed the Sub-Commission that, while Unesco had catalytic funds for the promotion of COMAR, the Member States themselves were expected to put national resources in the proposed research and training required for improved management of their coastal zones.

159 The IOC Assistant Secretary, Mr. Ray C. Griffiths, stressed the importance of identifying those activities within the Sub-Commission's adopted programme that were directly relevant to COMAR and could be carried out collaboratively with the Division of Marine Sciences. He noted that the proposed study of the role of sea-grass beds in trapping coastal sediments was an example. Also, the coastal geomorphological maps proposed under Agenda Item 6.5 might be combined, appropriately, with coastal ecological maps of overlay sheets.

160 The Sub-Commission stressed the importance of the coastal zone to the Member States, especially the developing ones and recognized that this had lead to an increasing IOC interest in this oceanic boundary.

161 The Sub-Commission took the position that, owing to the important interaction between the coastal zone and the offshore seas, it was essential to ensure the unity of Unesco's marine science programmes. It therefore called on the Secretary of the IOC and the Director of the Unesco Division of Marine Sciences to increase their efforts to ensure a co-ordinated and integrated approach to the Unesco marine science programmes, in general, and to COMAR in particular.

162 The Delegate of Mexico expressed his concern on learning that some Member States had created, or were considering the creation of, National COMAR Commissions, since the creation of such Commissions, together with those already created or under consideration by IOC Member States, places a considerable burden on the weak infrastructures of many of the developing Member States. This, and the separation of coastal marine science from open-ocean marine science, could have a harmful effect on the developing countries. He also emphasized the need that Unesco, through IOC or the Division of Marine Sciences, should be at the service of the Member States and not the opposite.

163 The Sub-Commission adopted Recommendation SC-IOCARIBE-I.7.

9.3 OTHER UN BODIES

164 The IOC Assistant Secretary, Mr. Ray C. Griffiths, introduced the item, reviewing briefly the present areas of collaboration between the IOC and the organizations members of ICSPRO.

165 In order to identify areas of common interest between FAO and IOCARIBE in the region, the Representative of FAO, Dr. Elda Fagetti, informed the participants of the work FAO is carrying out through the FAO Western Central Atlantic Fisheries Commission (WECAFC) and the FAO Regional Office for Latin America and the Caribbean, and the recently ouposted Regional Fishery Officer in Trinidad

and Tobago. Emphasis is being placed by the WECAFC Working Group of Experts on shrimps, pelagic species and artisanal fisheries. The importance of ecological information has been recognized, particularly that on the effects of ocean dynamics on fisheries, on the role of coastal ecosystems as nursery grounds of commercial species, on the early life history of spiny lobsters, and on coral-reef fishery resources. The IOC-FAO Programme of Ocean Science in Relation to Living Resources (OSLR) would provide a means for increasing the ecological knowledge of some fish stocks. She also informed the participants of the availability of FAO technical documents such as the FAO Species Identification Sheets for the Western Central Atlantic, the world catalogues of shrimps, squids and sharks, all of which had been widely distributed to the WECAFC member countries.

166 The Representative of WMO, Mr. C. Reudink, recalled his earlier statements on the World Climate Research Programme, Tropical Oceans and Global Atmosphere, and IGOSS. He said his Organization would welcome increased participation in IGOSS by the Sub-Commission.

167 The Delegate of Jamaica stated that regional assistance by the Pan-American Health Organization (PAHO) in the field of environmental monitoring should have positive implications for CARIPOL. This is especially true in light of the expanded activities under CARIPOL. Jamaica is a good example of this, since equipment placed in Jamaica by PAHO has enhanced considerably the ability to monitor heavy metals. Moreover, the study of the transfer of pollutants through the food chain, undertaken in the framework of CARIPOL, has implications ultimately for environmental health.

168 The Delegate of the USA informed the participants of the interest of IMO in the field of coastal hydrographic mapping in relation to safety of life at sea and suggested that this could be an area, among others, of collaboration with IOC.

169 The Sub-Commission decided to develop collaboration with the relevant bodies of the UN system, and particularly the appropriate regional subsidiary bodies. It also stressed the importance of active IOC participation in the relevant aspects of the work of the Preparatory Commission for the International Sea-bed Authority, and of WHO (World Health Organization).

9.4 ORGANIZATION OF AMERICAN STATES

170 The IOC Assistant Secretary, Mr. Ray C. Griffiths, informed the participants that IOC collaboration with OAS had remained limited an still largely accidental. Nevertheless, it was understood that some OAS programmes were of interest to the IOC and, even more so, to the Sub-Commission, and he sought the guidance of the Delegates on possible improvements.

171 Several Delegates stressed their countries good experience with OAS, including that gained in the field of ocean affairs. They also thought that it was in the interest of the Member State that OAS and IOC (and therefore IOCARIBE) harmonize their methods, and avoid overlap, so as to make the best possible use of the limited resources available.

172 The Sub-Commission instructed the Secretary of IOC to establish contact with OAS with a view to exchanging information on their respective programmes, particularly those relating to the coastal zone, and to determine the current

status of the OAS-Unesco Co-ordination Committee. With this information in hand, the Secretary, in consultation with the Officers of the Sub-Commission and, in due course, the IOC Assistant Secretary for IOCARIBE, should identify areas of mutual interest and seek much closer co-operation with OAS.

10. FUNDING AND OTHER FORMS OF SUPPORT

173 The IOC Assistant Secretary, Mr. Ray C. Griffiths, briefly explained the background to the preparation of the Unesco Programme of Work and Budget for 1984-85 (Document 22 C/5) and the preparations for the following biennium 1986-87. He pointed out that, in terms of regular budget assigned specifically to the region, the available resources were very small, but could be augmented in various ways: for example undefined sums assigned to IOC global programmes would be eventually disbursed on relevant activities in the region; contributions of Member States to the IOC Trust Fund earmarked for IOCARIBE activities; analogous contribution in kind; funds made available through the UNEP Action Plan for the Caribbean Environment Programme; and so on. He suggested that the Sub-Commission, at this stage, list the activities it wished to carry out (e.g., workshops, training courses, preparation of manuals, other meetings) in 1985, 1986 and 1987.

174 Some Delegates wished to know, with reasonable precision, what funds are disbursed on IOCARIBE activities from all sources, together with a quantification of national contributions in kind.

175 The Representative of the Unesco Division of Marine Sciences pointed out that the current figure was approximately $ 100.000 above the level given in Document IOC/INF-495 (An Evaluation of IOCARIBE).

176 In this regard, the Delegate of Colombia suggested that any attempt to quantify national contributions should only be undertaken if very carefully chosen criteria were adopted, otherwise unrealistic figures might be generated, even in good faith.

177 The Delegate of Mexico stressed the importance of the appreciable budgetary increase accorded to the IOC by the Unesco General Conference, and the need to present firm grounds to the Conference, at its next Session or future Sessions, for further increases to meet the growing needs of the developing Member States. He also suggested that increased co-operation with other UN-bodies, particularly the organizations members of ICSPRO, could lead to increased support for the work of the Sub-Commission. The contributions derived from such IOC programmes as GIPME, IGOSS, IODE and TEMA, should be quantified even if only indicatively. He suggested that Member State contributions in kind could be limited to those made directly to the IOC, in terms of facilities, equipment, research vessels, assumption of local costs, fellowships, visiting researches, etc..

178 In response to questions from the Delegate of the USA, the IOC Assistant Secretary explained, that even if the budgetary position was not strong, it was worthwhile identifying important possible actions, since this provides a basis for seeking adequate funding; also, the authorization to disburse funds made available by UNEP to the IOC for IOCARIBE workshops and exercises in the field of marine pollution monitoring relative to the Caribbean Action Plan, had been obtained by UNEP and plans for the agreed expenditures

(see Agenda Item 6.1) were proceeding; and, thirdly, funds as yet unspecified, would be made available to provide support for the Assistant Secretary for IOCARIBE when appointed and in post.

179 The Delegate of France expressed his concern over the difficulty facing the Sub-Commission of setting priorities in its work against available resources, or of identifying Member State participation, as manifested in the deployment of national resources in each IOCARIBE programme. He suggested that priorities could be defined as those generally recognized, and those expressed by individual Member States. But he also believed that the identification of real capabilities and the need for assistance would help provide solutions to funding problems.

180 The Sub-Commission requested the Secretary of IOC to provide funding estimates for the proposed activities agreed at the present Session and, where appropriate, to identify the available or potential sources of such funds.

181 It also urged Member States to indicate to the Secretary of IOC their interest in particular activities and to inform him of the resources (funds, facilities, etc.) they intended to put into such activities.

182 The Sub-Commission requested the Chairman, in collaboration with the IOC Assistant Secretary for IOCARIBE, to present to each of its Sessions an analysis of its budgetary and other related resources available to the Sub-Commission and to identify the intersessional activities to which these resources had been applied.

11. OTHER MATTERS

183 The Chairman invited Delegates to announce any other matters they wished to put to the Session.

184 The Delegate of Venezuela expressed his concern that many Member States, and notably small island States, were not represented at this Session. He suggested that the new Chairman and Vice-Chairman of the Sub-Commission be called upon to make a special effort to promote membership and participation in the work of the Sub-Commission. He thought a special letter should be addressed by the Secretary to El Salvador to encourage its membership of the Sub-Commission, in view of its interest in the proposed international bathymetric chart of the Pacific coast of Central America (see Agenda Item 6.4).

185 The Sub-Commission supported this proposal.

186 The Delegate of Cuba expressed his concern at the general absence of small island Member States. He recognized that costs of attendance was one of the reasons and that the Secretary was barred by Unesco rules and in any case, by lack of approved budget, for assisting such attendance. He believed that governments should cover the cost of attendance of their own delegates. Nevertheless he believed that some could be encouraged to come if the Secretary provided, well in advance of a particular meeting, information on hotel costs, for example, with a range of prices so as to give potential delegates a chance to choose one of the less expensive solutions available. He also stressed the need for adequate advance notice to enable internal (national) clearances of

approval for delegates' travel. He also supported strongly the idea of scientific sessions similar to the one organized, informally, in the evening of 23 August 1984, and asked that one or more such sessions be organized at the Second Session of the Sub-Commission. The Delegate stressed the importance to IOCARIBE of regular intercalibration exercises wherever appropriate in each major scientific programme of the Commission. He also stressed the importance of receiving a summary, from each Member State, of its on-going relevant activities at each session.

187 The Sub-Commission welcomed these proposals and instructed the Secretary to provide the required background information for each subsequent session at an early date.

188 It also agreed to call on Delegates to the next Session of the Sub-Commission to present a brief written report on relevant national inter-sessional activities, as well as at subsequent sessions.

12. ELECTION OF CHAIRMAN AND VICE-CHAIRMAN

189 The Chairman invited nominations for the Chairmanship and Vice-chairmanship of the Sub-Commission.

190 The Delegate of the Netherlands proposed Capitán de Navío Rafael Steer of Colombia. This proposal was seconded by numerous Delegations and Capitán Steer was elected by acclamation.

191 Capitán Steer, in accepting the nomination, recalled the excellent work of the Chairman of the Association, Prof. Manuel Murillo, and the Vice-chairman, Prof. Harris B. Stewart; both had set an example that would be hard to follow. He called for the strengthening of IOCARIBE programmes and stressed the importance he attached to early nomination of the new IOC Assistant Secretary for IOCARIBE. Capitán Steer also thanked the former IOC Assistant Secretary for IOCARIBE for his significant contribution to the development of IOCARIBE.

192 The Chairman then called for nominations for Vice-chairman.

193 The Delegate of the Netherlands proposed Dr. Barry Wade, of Jamaica, in absentia.

194 The Delegate of Jamaica informed the Sub-Commission that Dr. Wade was willing and pleased to accept nomination.

195 The proposal of the Delegate of the Netherlands was seconded by several other Delegates, and Dr. Barry Wade was elected Vice-chairman of the Sub-Commission by acclamation.

13. DATES AND PLACE OF THE NEXT SESSION

196 The Chairman invited interested Member States to make known their wishes to host the next Session.

197 The Delegate of Cuba offered to host the Second Session of the Sub-Commission in Havana in September 1986.

198 The Sub-Commission welcomed this offer, and accepted it with thanks.

14. ADOPTION OF THE SUMMARY REPORT

199 The Sub-Commission adopted the Summary Report.

15. CLOSURE

200 At the closure of the Session the Chairman, Dr. M. Murillo, expressed his thanks to all participants for their fruitful contribution to the First Session of the Sub-Commission and particularly to the host government of the Netherlands Antilles for the facilities provided. He warmly extended his commendations to the Vice-Chairman, Prof. H. Stewart, and the former IOC Assistant Secretary for IOCARIBE, Dr. R. Lankford, for their important and permanent support given to IOCARIBE during his Chairmanship. He extended similar concepts regarding the support provided to IOCARIBE by the former and present chairmen of IOC, Dr. A. Ayala-Castañares and Prof. I. Ronquillo, respectively.

201 Many delegations shared the concepts expressed by Dr. Murillo at the same time congratulating him for his excellent performance as Chairman of the former Association.

202 The Delegate of the host Government associated himself to these commendations and expressed his wishes for a dynamic and successful initiation of activities in the framework of the new status given to IOCARIBE, which has been started at the Netherlands Antilles.

203 The Session was closed at 20.00 on Saturday 25 August 1984.

ANNEX I

AGENDA

1. OPENING

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8. TEMA ACTIVITIES IN SUPPORT OF THE SUB-COMMISSION'S PROGRAMMES

   8.1 THE IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME TO ENHANCE THE MARINE SCIENCE CAPABILITIES OF DEVELOPING COUNTRIES IN THE IOCARIBE REGION

8.2 SCHEME FOR CO-OPERATION AMONG EDUCATION AND RESEARCH INSTITUTIONS IN THE REGION

8.3 REGIONAL RESEARCH PROGRAMMES

9. RELATIONSHIPS WITH OTHER ORGANIZATIONS

9.1 UNEP REGIONAL SEAS ACTION PLAN FOR THE CARIBBEAN ENVIRONMENT PROGRAMME

9.2 UNESCO MAJOR INTERREGIONAL PROJECT ON RESEARCH AND TRAINING LEADING TO THE INTEGRATED MANAGEMENT OF COASTAL SYSTEMS (COMAR)

9.3 OTHER UN BODIES

9.4 ORGANIZATION OF AMERICAN STATES

10. FUNDING AND OTHER FORMS OF SUPPORT

11. OTHER MATTERS

12. ELECTION OF CHAIRMAN AND VICE-CHAIRMAN

13. DATES AND PLACE OF THE NEXT SESSION

14. ADOPTION OF THE SUMMARY REPORT

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ANNEX II

ADOPTED RECOMMENDATIONS

Recommendation number	Title
SC-IOCARIBE-I.1	Pollution Research and Training
SC-IOCARIBE-I.2	OSLR-IREP Workshop on Recruitment in Tropical Demersal Communities
SC-IOCARIBE-I.3	Activities on Coastal Dynamics and Shoreline Stability
SC-IOCARIBE-I.4	International Bathymetric Charts for the Caribbean and Pacific Coast of Central America
SC-IOCARIBE-I.5	Ocean-Atmosphere Interactions
SC-IOCARIBE-I.6	Regional Network of Educational and Research Institutions
SC-IOCARIBE-I.7	Co-operation between IOCARIBE and Unesco(OCE) in COMAR

Recommendation SC-IOCARIBE-I.1

POLLUTION RESEARCH AND TRAINING

The IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

Considering the success of the CARIPOL programme so far,

Taking into account: (i) the actions planned by IOC for the period 1984-85 in relation to the programme, for which funding through the Regular Programme (of Unesco) is assured; (ii) the Recommendations made by the CARIPOL Steering Committee at its Fourth Session (Mazatlán, April 1984) which clearly indicate the decision to undertake a more detailed monitoring programme, including the analysis of hydrocarbons in organisms and sediments; (iii) the generous offer of the Government of Mexico to host training courses; and (iv) the generous offer of the Government of the USA to host a CARIPOL Workshop at the University of Puerto Rico, in Mayaguëz,

Strongly supports the dedication of funds and effort towards:

(i) training activities and intercalibration exercises designed to expand and improve the present capacities of the CARIPOL programme;

(ii) ensuring sufficient training opportunities for the less developed laboratories in the area, especially in those Member States that still do not participate in CARIPOL, for lack of human resources and equipment;

(iii) consolidating the programme recommended by the CARIPOL Steering Committee for the next phase on the monitoring of pollutants in sediments and organisms;

(iv) holding a CARIPOL Workshop in 1985, in collaboration with UNEP;

(v) providing analytical instrumentation for the future development of the CARIPOL programme, implying an increased level of sophistication in pollutant analysis, especially in the less developed Member States;

(vi) implementing the Recommendations of the ad hoc Expert Consultation on Coastal Dynamics in the Caribbean and Adjacent Regions (Curaçao, 15-17 August 1984), in view of the importance that these studies on coastal circulation would have in advancing knowledge of transport and dispersal of pollutants in the IOCARIBE Region;

Strongly recommends a bigger and more decided support by the Member States;

Thanks the Government of Mexico for its offer to provide training courses in the field of marine pollution research and monitoring,

Also thanks the Government of the USA for its offer to host a CARIPOL Workshop in Puerto Rico in 1985.

Recommendation SC-IOCARIBE-I.2

OSLR-IREP WORKSHOP ON RECRUITMENT IN TROPICAL DEMERSAL COMMUNITIES

The IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

Recognizing the progress in developing a joint IOC-FAO Programme of Ocean Science in Relation to Living Resources (OSLR),

Acknowledging the accomplishments of the First Session of the IOC-FAO Guiding Group of Experts on OSLR in defining regional research projects for the study of biological and environmental marine fisheries recruitment and the resultant fluctuations in these resources,

Supports the conclusion of the First Session of the IOC-FAO Guiding Group of Experts on OSLR that IOCARIBE Member States will benefit from a programme to study recruitment-related ecological processes relevant to tropical coastal demersal resources;

Also supports Recommendation 2 of the IOC-FAO Guiding Group of Experts, concerning the organization of a Workshop on Recruitment in Tropical Demersal Communities;

Expresses its appreciation to the Government of Mexico for its kind offer to host the Workshop,

Endorses the Terms of Reference for the Workshop proposed in the Summary Report of the First Session of the IOC-FAO Guiding Group of Experts on OSLR;

Decides to establish a Steering Committee composed of experts from Member States of the IOCARIBE region knowledgeable in the field of recruitment in tropical demersal communities to supervise and advise the IOC on the scientific content and the organization of this workshop, and the follow-up of any recommendations emanating from the workshop;

Urges IOCARIBE Member States to participate in the Workshop and, in particular to make available lists of national data and information sources relevant to the Workshop's objectives;

Requests the IOC Secretary to make every effort to obtain the funds required to undertake this Workshop and to support the activities of the Steering Committee.

Recommendation SC-IOCARIBE-I.3

ACTIVITIES ON COASTAL DYNAMICS AND SHORELINE STABILITY

The IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

Having considered the Report of the ad hoc Consultation on Coastal Dynamics and Shoreline Stability that met in Curaçao, 15-17 August 1984,

Having considered the eighteen Recommendations made to the Sub-Commission at its present Session, and particularly those Recommendations that could most easily be translated into an action plan,

Noting the particular relevance of these Recommendations to coastal area problems with which the Member States are currently faced,

Endorses the findings of the above-mentioned Consultation;

Requests the IOC Secretary to: (i) convene a training workshop on coastal-current measurement techniques (Rec. 1); (ii) arrange for the compilation and publication of a manual on coastal measurement and sampling techniques (Rec. 2) with appropriate co-ordination with comparable efforts of the UN(OETB) and the Unesco Division of Marine Sciences; (iii) investigate the possibility of utilizing ships-of-opportunity as data-collecting platforms in the Caribbean (Rec. 6), in collaboration with WMO; (iv) find the means to convene a training workshop on techniques for monitoring beach changes (Rec. 8) considering, and co-operating with, a similar project of the Unesco Division of Marine Sciences and the Ocean Economics and Technology Branch (OETB) of the United Nations and taking into consideration the gracious offer of Cuba to host such a workshop; (v) approach IOC Member States that have satellite capabilities to determine the availability of satellite data relevant to the Caribbean and how these data can be obtained (Rec. 13); (vi) monitor the progress of the publication of the FAO-IOC International Directory of Marine Scientists to ensure adequate inclusion of IOCARIBE marine scientists (Rec. 15); (vii) inform IOCARIBE Member States of the availability of training courses in a timely manner (Rec. 16); (viii) investigate possible mechanisms for facilitating the international movement of scientific equipment (Rec. 17); and (ix) report to the next meeting of the Sub-Commission on the progress made on each of these nine items,

Also requests the Secretary of IOC to convey to the Chairman of the CARIPOL Steering Committee those Recommendations relative to coastal marine pollution contained in Recommendation 10 of Annex IV of this Summary Report and to the appropriate officers of the Major Regional Project on Research and Training Leading to the Integrated Management of Coastal Systems (COMAR) and its Latin American/Caribbean component (COSALC) the entire text of the above-mentioned Annex V for their information, in the interest of interagency co-operation with IOCARIBE in their respective areas of responsibility.

Urges Member States to establish, as soon as possible, Coastal Environmental Research Demonstration Areas (CERDA) as part of their national programmes of marine research (Rec. 12). Each Member State CERDA will ideally consist of the following, insofar as possible: (i) routine measurement of tidal and non-tidal coastal currents by the best available means (Recs. 3 and 10-4); (ii) at least monthly profiles of the beach made perpendicular to the shore (Recs. 10-2 and 10-5); (iii) monitoring of waves, sea level, and surface meteorological parameters (Rec. 4), outflow from estuaries and coastal lagoons (Rec. 10-9), and the movement of sediment and pollutants; (iv) within the CARIPOL framework, monitor not only beach tar (Rec. 10-3) but also initiate studies of heavy metals, insecticides, and other land-derived pollutants (Rec. 6); (v) the preparation of geomorphological maps of the coast (Rec. 9), and coastal bathymetric mapping; (vi) Communication to the IOC Assistant Secretary in charge of IOCARIBE and to each IOCARIBE National Associate of the location of national CERDA's and measurements and observations that are being made there; (vii) encourage co-operation with coastal scientists from other Member States with similar coastal environments; and (viii) submission of results for publication in appropriate referred journals.

Recommendation SC-IOCARIBE-I.4

INTERNATIONAL BATHYMETRIC CHARTS FOR THE CARIBBEAN AND THE PACIFIC COAST OF CENTRAL AMERICA

The IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

Following the decisions of the Assembly (Resolution XII-3) and of the Twelfth International Hydrographic Conference to revise the Terms of Reference of the Joint IOC-IHO Guiding Committee for GEBCO;

Being aware of the considerable progress made in the preparation of chart series in the realisation of the IOC International Bathymetric Chart of the Mediterranean;

Being aware of the planned new ocean-mapping activities in the Central Eastern Atlantic (West Africa), the Central Western Indian Ocean (East Africa) and the Red Sea and Gulf of Aden;

Taking note of the offer of Mexico to play an active role in the preparation of International Bathymetric Charts for the Caribbean and the Pacific Coast of Central America, taking into account the interests of the Member States;

Decides to undertake the preparation of International Bathymetric Charts for the Caribbean and Pacific Coast of Central America, on a scale of 1:1,000,000;

Recommends the creation of an Editorial Board for the International Bathymetric Charts of the Caribbean and Pacific Coast of Central America, in accordance with the practice of IOC for similar types of bodies.

Further recommends that, if the establishment of the Editorial Board is approved by the IOC, Mexico be invited to provide the Chairman thereof;

Thanks the Government of Mexico for its kind offer to play an active role in the preparation of these charts.

Recommendation SC-IOCARIBE-I.5

OCEAN-ATMOSPHERE INTERACTIONS

The Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

Noting the fundamental role which the IOCARIBE region plays in studies of ocean-atmosphere interaction, in particular the dynamic processes associated with the Gulf Current,

Recognizing the importance that this knowledge of the climatic changes on different time scales has for the Member States of the region,

Noting with pleasure that the Universidad Nacional Autónoma de México (UNAM) recently completed the YUCA-I Cruise on Ocean Climatology, with the participation of scientists of seven countries of the Caribbean,

Recalling the importance of continuity in these regional co-operative efforts and the possibility for expanding similar actions, with the collaboration of other IOCARIBE Member States,

Recommends to the Member States to emphasize research dealing with the monitoring and modelling of parameters related to ocean-atmosphere interaction;

Decides to convene a consultation of IOCARIBE experts, to develop specific plans with a view to monitoring and modelling these parameters in the Caribbean region;

Requests the Secretary of IOC and the Member States to provide financial support to this initiative.

Recommendation SC-IOCARIBE-I.6

REGIONAL NETWORK OF EDUCATIONAL AND RESEARCH INSTITUTIONS

The IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

Taking into account the mandate of IOCARIBE, which includes the responsibility to promote, to develop and to co-ordinate the programmes of marine scientific research and related activities, as well as to facilitate the exchange of data and scientific information and the transfer of technology, especially to the developing countries in the region;

Recognizing that the execution of the activities and programmes of IOCARIBE depends on support from the countries of the region;

Recalling Recommendation IOCARIBE-II.4 of the IOCARIBE Association;

Noting that the Member States of the region individually develop research projects, post-graduate studies and other related activities in a national framework, with objectives coinciding with those of regional scientific development which could be of benefit to different interested countries;

Considering it necessary to establish a network or system of higher education and research institutions in the IOCARIBE region;

Requests the Secretary of IOC to study the establishment of a regional system of information exchange among higher education and research institutions of IOCARIBE Member States under the Guidelines given in Annex V of this Summary Report.

Urges Member States and, in particular, the IOCARIBE National Contacts, to submit to the IOC Assistant Secretary in charge of IOCARIBE the information requested in the Guidelines, as well as to stimulate participation in the system of higher education institutions with post-graduate programmes, as described in Annex V.

Recommendation SC-IOCARIBE-I.7

CO-OPERATION BETWEEN IOCARIBE AND UNESCO IN COMAR

The IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE),

A

Considering the priority importance of the coastal environment to IOCARIBE Member States;

Considering further the Major Interregional Project on Research and Training Leading to the Integrated Management of Coastal Systems (COMAR), formally established by the Twenty-first Session of the Unesco General Conference;

Recognizing the importance to IOCARIBE Member States of regional COMAR activities in Latin America and the Caribbean, and the valuable scientific contribution that IOCARIBE can make in furthering regional COMAR objectives;

Expresses its readiness to assist the Unesco Division of Marine Sciences (OCE) in the preparation of proposals for future COMAR activities such as workshops on ecosystem productivity gradients and assessment and management methods;

Recommends the establishment of formal co-operative links between relevant IOCARIBE programmes and COMAR.

B

Having reviewed the Summary Report of the COMAR Workshop on Coral Reefs, Seagrass Beds and Mangroves: their Interaction in the Coastal Zones of the Caribbean;

Recognizing the importance of coral reefs, seagrass beds, and mangroves to the IOCARIBE region;

Endorses the Recommendations of this Workshop,

Requests IOCARIBE Member States to take all possible steps to implement the Recommendations of this Workshop, and particularly to prepare national inventories of these three coastal ecosystems utilizing the research and training guidelines outlined in the Workshop Recommendations, including evaluation of the interactions between these ecosystems and the impact of human activities.

ANNEX III

SPEECH BY THE MINISTER OF EDUCATION
OF THE NETHERLANDS ANTILLES,
HIS EXCELLENCY JACQUES VEERIS

Distinguished Delegates and Observers,
Ladies and Gentlemen,

On behalf of the Government of the Netherlands Antilles, I wish to welcome you to the Antilles and in particular to Curaçao, as we say in our local vernacular Papiamento: Bon Bini na Korsou.

It is a privilege for me to address this meeting of distinguished marine scientists. I am well aware of the many problems and obstacles that confront you. While the scientific, technical and financial problems challenge your determination and sharpen your skills, the many obstacles of a political, cultural and developmental nature call for great wisdom, patience and, above all, perseverance.

Allow me to describe our country's interest in your work by briefly touching on the primary marine activities in the Netherlands Antilles.

It must be emphasized that the sea surrounding our islands is of vital importance to us. In the very first place I must mention the sea as the source of supply of potable water to more than 95% of our population. It is known to you that the cost of production of potable water by distillation with use of fossil energy is very high and for certain activities it is even prohibitive. However, there are as yet no viable alternatives available. Alternatives such as OTEC (Ocean Thermal Energy Conversion) have been proposed to our Government, but as of this date neither technically nor financially have they proven to be feasible.

Approaching the subject from a different angle, I must refer to our natural harbours. Navigation has always been of great significance to the Netherlands Antilles, and throughout history our excellent harbours have been appreciated by many maritime nations. Over the centuries they have shaped the course of the history and the economic development of our Islands, and up to the present they have retained their importance for commerce and industry. Then there is to mention the energy of the ever present sun on the different islands, i.e. St. Maarten, Curaçao and Bonaire, which has been useful throughout many decades in the production of salt. Although most of the salt ponds have been abandoned for more lucrative activities, Bonaire today still has a sizeable salt-producing enterprise, functioning in close harmony with a colony of flamingo birds. Our coral reefs and beautiful beaches are important assets of our coastal environment and are of regional (if not global) importance for tourism and for scientific research.

Another area of IOC interest is fisheries. Our fisheries are of the artisanal type and produce small revenues. Here, strong traditions play an important inhibitive part in the assimilation of modern methods. Modernisation of the fishing industry is a long-term project aimed at increasing local production from the deep and, at the same time, avoiding the depletion of the

marine population of the narrow coastal reefs. On the other hand, in Bonaire a scientific maricultural project to hatch conch eggs is producing very good results and if possible the project may be expanded in the future to include other marine species. In Curaçao research is progressing to determine the size of the blue crab population, its breeding grounds and harvesting potential. Similar research on other crustaceans is planned this year. During the past decade, the Governments of Bonaire and Curaçao have established national marine parks in the coastal waters in order to conserve the coral reefs and sustain activities as scuba diving and fishing. In this way, the sea contributes significantly to the well-being and progress of the Netherlands Antilles and its people.

The Netherlands Antilles otherwise do not possess any exploitable mineral deposits. Consequently we are looking to the marine environment for future mineral resources. Seismographic studies have indicated that petroleum deposits may exist in the substructure of the ocean floor. Nevertheless we are very cautious in being too optimistic about the exploitability of these deposits.

With this short overview of marine activities within the Netherlands Antilles I have illustrated the importance of marine scientific programmes for our country. However, the assumption cannot be made that marine research is yet vigorously being pursued in the Netherlands Antilles. This area has to compete with many other developmental projects, and setting priorities is no easy task. Also, marine science is a difficult and intricate subject, taking place far from public view and requiring rather expensive equipment. Skilled scientists in this field are few in the developing countries and the subject itself is only now receiving general recognition.

After going through the several areas where the marine sciences are of great significance to us, it is my conviction that the subjects you have elaborated over the past sessions of IOCARIBE are relevant and vital to the area and, although the development may be slowpaced, there is definitely a sound basis for your endeavours. The international gathering of scientists in Curaçao also serves to focus the attention of our community on the potentials of the oceans and thus generate more interest in IOCARIBE. Much of the aforesaid is valid in varying degrees for all Member States of IOCARIBE in this region.

You will need vast knowledge, wisdom and patience to find a positive implementation of the programmes of IOCARIBE as well as sensitive communication with the people of the countries in the region.

Mr. Chairman, distinguished delegates and observers, ladies and gentlemen, I wish you a very successful conference.

ANNEX IV

REPORT AND RECOMMENDATIONS OF THE AD HOC EXPERT CONSULTATION ON COASTAL DYNAMICS IN THE CARIBBEAN AND ADJACENT REGIONS

(Curaçao, Netherlands Antilles, 15-17 August 1984)

TABLE OF CONTENTS

1. OPENING

The IOC Assistant Secretary, Mr Ray C. Griffiths, opened the meeting and welcomed the participants. He briefly reviewed IOC global and regional activities and other background relevent to the present Consultation. He suggested that the experts prepare project outlines in the field of coastal-area dynamics, bearing in mind that the research topics should: (i) treat subjects of concern to as many Member States as possible; (ii) have a high chance of success (i.e., based on available scientific and technical capacity and genuine Member State interest); (iii) be specific for particular situations (e.g. small islands, large islands, continental countries); and (iv) take into account the geological and the oceanographic aspects of coastal area dynamics. He also suggested that each project proposal should identify, as far as possible: (i) where (geographically) the research would be desirable (in other words, the places that share a common problem that would benefit from a co-operative approach); and (ii) the means (simple or otherwise) required to carry out the project.

The IOC Assistant Secretary then called on Dr Harris B. Stewart, as Convenor of the Consultation, to conduct the discussion. Dr Stewart briefly reviewed the background to the present Consultation. Although, as marine scientists, the members of the group had research interests in coastal dynamics per se, all had considerable experience in the application of the understanding of coastal processes to specific coastal problems. These problems result from, or are otherwise related to, the intervention of man in the coastal system. Coastal erosion, for example, is of little concern along a totally uninhabited coast. However, when a popular swimming beach for tourists loses most of its sand because of upcurrent jetties that deflect the littoral drift seaward, coastal erosion has both an economic and a sociological impact.

Similarly, the sea can be an economically feasible disposal site for municipal sewage in some places, but if this practice makes swimming beaches a health hazard, impacts the coastal fishery in a negative way, or destroys nearshore coral reefs that may have been a tourist attraction, then the economic benefits of offshore sewage disposal are less than the environmental costs. For any coastal activity, the anticipated economic benefits must be weighed in advance against the anticipated environmental costs.

These important coastal decisions must constantly be made by the authorities in those IOCARIBE Member States where coastal area development is planned.

In too many instances, these decisions are made in vacuo with none of the environmental information that should be part of the available data on which such decisions are based. It is to provide guidance to the Member States - guidance on how IOCARIBE can assist in establishing mechanisms to provide this essential information - that the consultation directed its attention.

2. PHYSICAL OCEANOGRAPHY OF THE CARIBBEAN COASTAL AREA

2.1 Coastal currents

Over the years, techniques have been developed for the measurement of coastal currents. These techniques cover a broad range of sophistication from the inexpensive but adequate to the high-precision but very expensive. Each Member State should determine the degree of measurement sophistication appropriate

to its own needs and resources and obtain the technical training necessary to carry out the needed coastal studies. Intercalibration of methods on a regular basis is an important aspect of any regional study of currents and must be incorporated in any programme of this sort.

Coastal-current information is important for decisions relative to: the placement of sewer outfalls and the siting of power plants; the dilution and dispersion of land-derived pollutants and prediction of the route of coastal oil spills; the movement of coastal sediments causing erosion or deposition; the movement of eggs and larvae of commercial and sport-fishery species; and any other coastal activity in any way dependent on or affected by the movement of the coastal waters.

Recommendation 1

TRAINING WORKSHOP ON COASTAL CURRENT MEASUREMENT TECHNIQUES

It is recommended that IOCARIBE request IOC to find the means to convene an IOCARIBE Training Workshop on Coastal Current Measurement Techniques. Such a Training Workshop should include a field demonstration phase in which the participants measure coastal currents. This workshop should be planned by a panel of experts convened by the Secretary of IOC in consultation with the Chairman of the Subcommission and (if appointed at the time) the IOC Assistant Secretary for IOCARIBE.

2.2 Measurement technique manual

Although workshops on the sampling and measurement of the coastal area and its physical processes are a desirable activity, the results of such workshops can reach only a relatively small number of people. An important addition to this educational process would be the preparation and publication of a manual on proven techniques for the measurement and sampling required for the adequate understanding of coastal-area processes. The approach could well be similar to that of the 1982 publication 'Technologies for Coastal Erosion Control' of the Ocean Economics and Technology Branch of the Department of International Economic and Social Affairs of the United Nations. (Code ST/ESA/116)

Recommendation 2

MANUAL OF COASTAL MEASUREMENT AND SAMPLING TECHNIQUES

It is recommended that IOCARIBE endorse the idea that a manual of coastal measurement and sampling techniques would be extremely useful to its Member States, as well as to other IOC Member States, that contributions to such a manual be incorporated into the plans of any IOC or IOCARIBE workshop on coastal-area processes, and that the Secretary of IOC be charged with arranging for the compilation and publication of such a manual.

2.3 Tidal currents

Knowledge of the tidal currents along the more populated coasts of Caribbean nations and the ability to predict changes in these currents are important to those concerned with coastal marine transportation, siting of coastal facilities such as sewer outfalls and power plants, and recreational and artisanal fisheries. For most coastal areas in the region, these data are not available.

Recommendation 3

TIDAL-CURRENT MEASUREMENT AND PREDICTION

It is recommended that IOCARIBE urge each Member State to determine which of its coastal areas could benefit most from the availability of tidal-current predictions, and to establish a programme of measurement of tidal-current variations over a sufficiently long period to allow predictions to be made of the tidal-current speed and direction relative to the times of high and low water at the nearest reference tide gauge.

This recommendation should be considered during preparation of any recommendation on the establishment of a Caribbean tide gauge network that might result from the consideration of item 7.4 of the provisional agenda of the Subcommission's First Session.

2.4 Data-base development

For most areas of the Caribbean, there is an inadequate data base relative to the physical factors important to the understanding of the dynamics of the nearshore region. Needed are long time-series of such data as wind-wave and swell height, period, and direction, especially on the windward and leeward sides of the islands of the Antilles, sea-level variations, and surface meteorological conditions. Wherever possible, the oceanographic and meteorological data should be obtained at the same site. In addition to their utility in understanding coastal-area dynamics, these data will also be of importance as regional contributions to such IOC global programmes as the IOC-WMO Integrated Global Ocean Station System (IGOSS), Ocean Processes and Climate, OSLR, etc.

Recommendation 4

MONITORING OF WAVES, SEA LEVEL, AND SURFACE WEATHER

It is recommended that IOCARIBE undertake a regional project to monitor waves, sea level, and surface weather, preferably all at the same locations, to provide a data base of long-term observations for use in coastal-dynamics studies, as well as for relevant IOC global programmes that require such data.

2.5 Offshore circulation

Because variations in the regional circulation pattern can cause drastic variations in the coastal circulation pattern (e.g., variations in the position of the Amazon or Orinoco plumes), it is important that coastal researchers be aware of the larger scale regional circulation which may affect the pattern of coastal water motion.

Recommendation 5

DEVELOPMENT OF REGIONAL CIRCULATION MODELS OF THE CARIBBEAN SEA AND THE GULF OF MEXICO

It is recommended that IOCARIBE urge the governments of those IOC Member States with modelling capabilities to encourage and support efforts to develop physical models of the general circulation of the Caribbean Sea and the Gulf of Mexico, and the ability to determine and to communicate to the IOC Assistant Secretary for IOCARIBE in a timely manner, major changes in the regional circulation pattern that might affect coastal processes. IOCARIBE should also urge its Member States to establish or improve shore stations oriented towards the study of the open ocean, and ship-of-opportunity programmes, to provide the needed data.

2.6 Use of ships-of-opportunity

The group repeatedly expressed its concern for the importance of the regional circulation as one of the driving forces of the coastal circulation. The oceanic circulation and its variations in time and space should be monitored so that its imput to the variations in the coastal circulation can be sorted out and understood. Utilizing satellite data can provide some insight into this problem, but if merchant ships transiting the Caribbean could be equipped with XBT's and perhaps even with the recently developed expendable satellite-tracked Lagrangian buoys, the resulting data would be extremely useful in helping to determine variations in the regional circulation. These data would also be of use in the IOC-WMO Integrated Global Ocean Station System (IGOSS) and the programme on Ocean Processes and Climate.

Recommendation 6

USE OF SHIPS-OF-OPPORTUNITY

It is recommended that IOCARIBE request the IOC Secretary to investigate the possibility of utilizing ships-of-opportunity transiting the Caribbean Sea as potential platforms for the acquisition of open-ocean data. These ships would utilize such expendable instrumentation as might be made available, and the IOC Secretary is requested to investigate possible sources for such equipment as part of the IGOSS and climate programmes, as well as the project's potential contribution to the understanding of the role of regional variations in circulation as forcing functions for the coastal patterns of water motion.

2.7 Vessel assistance to coastal programmes

From time to time, oceanographic research vessels from countries within and outside of the region carry out research projects within the IOCARIBE area. In the planning stages or during the process of requesting clearance to work within the exclusive economic zone (EEZ) of IOCARIBE Member States, the requesting nation should inquire as to what coastal observations or measurements would be of use to the coastal nation and should plan to carry out these observations in co-operation with scientists from that coastal nation.

Recommendation 7

VESSEL ASSISTANCE TO COASTAL PROGRAMMES

It is recommended that any IOC Member State planning oceanographic research in the IOCARIBE area which requires vessel clearance by the coastal State include in its request for work in the waters of the coastal State an indication of its willingness: (i) to obtain such measurements or samples as might be of use to the coastal State in its programme of coastal marine research within the overall IOCARIBE programme of coastal area dynamics; (ii) to involve coastal-State scientists in any such operation; and (iii) to provide opportunities aboard such vessels for the education and training of personnel from the coastal State.

3. SHORELINE STABILITY, COASTAL EROSION AND SEDIMENTATION

3.1 Shoreline stability

Some areas in the Caribbean are experiencing serious coastal erosion, whereas others are receiving enough sediment to cause actual advancement of the shoreline, but such areas need to be mapped and the rates of erosion or accretion determined as an input to coastal-area planning, development and management. However, the existence of the various techniques presently available for studying and monitoring cyclic and non-cyclic changes in beaches is not generally known or the techniques are not utilized in the IOCARIBE region.

The seven-year study of Varadero Beach on Cuba's north coast is a notable exception to this generalization and provides a good example of what can be learned by using these techniques to monitor beach changes.

In addition, the net long-term movement of coastal sediments can, in many places, be determined by such geomorphic indicators as the direction in which coastal spits have developed or river mouths and inlets through barrier islands have migrated. Because the beaches of the Caribbean are presently under the intense pressure of development as attractions for tourists it is important that these beach processes be understood by those concerned with coastal development, recreation and the tourist industry.

Recommendation 8

WORKSHOP ON TECHNIQUES FOR MONITORING BEACH CHANGES

It is recommended that IOCARIBE request IOC to find the means to convene a Training Workshop on Techniques for Monitoring Changes in Beach Characteristics and Configuration.

This workshop should include a field phase in which measuring techniques are applied by the participants. The workshop should be planned by a small group of experts in beach processes, giving due consideration to the selection of the best available instructors and to the selection of participants who will be in a position to apply the prescribed monitoring techniques on their own country's beaches.

3.2 Mapping

For most of the IOCARIBE Member States there exist no detailed geomorphological maps of their coasts. Such maps would show the location and extent of such geomorphic features as barrier islands, coastal marshes, bluffs and headlands (with elevations), spits, straight beaches, pocket beaches, erosion, accretion etc. Such geomorphological coastal maps are useful to those concerned with coastal-area planning, development and management.

Recommendation 9

PREPARATION OF GEOMORPHOLOGICAL MAPS

It is recommended that IOCARIBE strongly endorse the value, to its Member States, of geomorphological maps of the coastal areas of the IOCARIBE region and urge its Member States to undertake the preparation of such maps.

4. COASTAL POLLUTION, ENVIRONMENTAL PROTECTION AND COASTAL RESOURCE MANAGEMENT

4.1 Coastal-area pollution

The pollution monitoring programme of IOCARIBE (CARIPOL) has been the Association's most effective programme to date and it deserves the continued and increased support of those Member States presently involved. It particularly needs the involvement of those few IOCARIBE Member States not yet part of this effort to monitor tar on beaches, floating tar and dissolved/dispersed petroleum hydrocarbons.

If IOCARIBE adopts the recommendation relating to beach surveys, observations of the occurrence of tar on Caribbean beaches should be included in this beach monitoring effort and the results forwarded to the CARIPOL data bank at the Responsible National Oceanographic Data Centre (RNODC) for IOCARIBE. The sea has a great capacity for assimilating selected waste materials generated on land. It is not a question of dump or do not dump, but rather the question to be answered is how much of what material can be disposed of at one place in the sea for how long a period of time without having some deleterious effect that is unacceptable to Man. Thus, the major task is to determine what this limit is; that is, what is the assimilative capacity of the Caribbean Sea for selected wastes generated by Man?

The pollutants that enter the sea from the IOCARIBE Member States can be dispersed by coastal currents, diluted and cause no problem, or they can be carried back to populated coastal areas and swimming beaches depending on the movement of the receiving waters.

This provides additional justification for the need for IOCARIBE to support the concept of a regional programme of coastal-current studies.

Although some pollutants are carried away by coastal currents, others settle to the bottom, are incorporated in the bottom sediments, move with these sediments during longshore drift and in the annual onshore-offshore cycle, and are resuspended into the overlying water during times of increased wave activity related to storms.

This provides an additional rationale for undertaking the studies of coastal sediment transport recommended elsewhere in this report.

Although CARIPOL to date has concentrated on pollution by petroleum hydrocarbons, the CARIPOL Steering Committee at its Fourth Session, in Mazatlán, México, in April 1984, recommended that heavy metals, pesticides and other potentially harmful chemicals be added to the list of monitored pollutants as part of the CARIPOL programme.

Concentration of these land-derived pollutants should be greatest in the nearshore areas where their potential for creating problems for Man through the food web is also the greatest. Thus, those IOCARIBE Member States with adequate sampling and analysis equipment and instrumentation should undertake, in support of CARIPOL and for their own use, the determination of the levels of these pollutants in the nearshore waters, sediments and the tissues of local organisms.

Suspended sediment in coastal waters also creates pollution problems. Following rains, sediment from recently cleared land enters coastal waters as does sediment suspended during dredging operations, storms, or during offshore disposal of dredge spoil. Not only does this suspended sediment carry pollutants along with it, but the sediment itself creates a turbidity that reduces or eliminates the penetration of sunlight essential for coral growth. In addition, the settling out of this suspended material can smother living corals. The damage to coral reefs can have a serious impact on the tourist trade and its economic benefits to the region. The place where domestic sewage, dredge spoil, thermal plumes from power plants, or other potential pollutants enter the sea, can be of critical importance to the present uses and future development of the region's coastal ar areas. The governments of many IOCARIBE Member States do not presently support the study of coastal processes as they relate to pollution, nor have they adopted and enforced regulations to limit or prohibit the discharge of potentially hazardous pollutants into the coastal marine environment.

Although the group decided to exclude estuaries and coastal lagoons from its deliberations, it did feel that the coastal effects of the input from these features constituted an important element of the overall problem of coastal pollution. Thus it was felt that the boundary between estuarine discharge and the coastal waters was an important area for concentrated studies. The effects of discharges from well studied places as, for example, Havana Bay, Cartagena Bay Lake Maracaibo, and Kingston Harbour deserve particular attention, not because of the problems within the bays, but rather because of their probable influence on the coastal pollution problem. As has been done with Havana Bay, these others could well be established as pilot areas for extending existing studies in order to determine the effect of these pollutant inputs to the coastal system.

For the wider Caribbean, the Yucatan Strait between Cuba and the Yucatan Peninsula is the major exit for waters from the Caribbean Sea.

This relatively narrow strait presents an ideal opportunity to monitor the export of dispersed and dissolved pollutants from the Caribbean into the Gulf of Mexico.

It may be that pollutant concentrations in the Yucatan Strait are too small to permit meaningful measurement, but an effort should be made by IOCARIBE to determine the effectiveness of a pollutant monitoring programme in the Yucatan Strait.

Recommendation 10

COASTAL AREA POLLUTION

It has been determined that the present pollutant levels in the IOCARIBE region and their anticipated increase due to the growing pressures for coastal development require the concerted co-operative efforts of the IOCARIBE Member States to

understand the sources, routes, and sinks of primarily land-derived pollutants and to provide the basic relevant scientific data required by those charged with coastal area management.

(i) The present CARIPOL programme should be strongly supported by the IOCARIBE Member States. Those not presently involved in the programme should participate in CARIPOL, and those already involved should continue and even increase their participation.

(ii) Any beach surveys should include observations and description of tar on the beaches in accordance with the procedures described in the CARIPOL manual.

(iii) Competent research groups in the IOCARIBE region should undertake research to assist in determining the assimilative capacity of the Caribbean Sea - especially the coastal areas for the various wastes generated by man on land.

(iv) Studies of the coastal circulation must be carried out in order to provide responsible authorities with advice on the best locations for sewer outfalls, heated water effluent discharge from coastal power plants, offshore disposal of dredge spoil, and any other activity that may put undesirable materials into the marine environment.

(v) Sediment transport studies in the coastal area should be undertaken in order to determine the route and fate of pollutants incorporated in the nearshore sediments.

(vi) Those IOCARIBE Member States that have the appropriate expertise and instrumentation should undertake the monitoring, in their coastal waters, of pollutants such as heavy metals and pesticides as recommended by the CARIPOL Steering Committee at its Fourth Session.

These analyses should include the coastal waters, bottom sediments and the tissues of coastal benthic organisms.

(vii) Studies of the local nearshore effects of suspended sediments on living coastal coral reefs should be initiated by those IOCARIBE Member States that consider their coral reefs to be important as a tourist attraction, for ecological reasons, or as wave barriers protecting the shore from erosion.

(viii) The governments of IOCARIBE Member States should be encouraged to support coastal studies in relation to their pollution problems, if they exist, and to adopt enforcible regulations relative to the discharge of potentially toxic substances into their coastal waters.

(ix) The boundary between the waters discharged from polluted estuaries and coastal lagoons and those of the coastal circulation system deserve particular attention. IOCARIBE should encourage its Member States where appropriate to undertake co-operative studies of the effects of the outflow from such coastal areas.

Any one of several polluted bays within the region should be considered for a pilot project in which other Member States could co-operate in order to learn the techniques and to determine possible applications for comparable studies of areas in their own countries.

(x) An attempt should be made by the appropriate IOCARIBE Member States - probably Cuba, Mexico and the United States - to determine the feasibility of establishing the Yucatan Strait as a location in which to monitor the transport of dissolved and dispersed pollutants between the Caribbean Sea and the Gulf of Mexico.

4.2 Preservation of seagrass beds

Seagrass beds in the IOCARIBE region - particularly the abundant Thalassia beds - not only provide food and nursery grounds for various commercial species of finfish and shellfish, but also trap and hold sediments with the resultant stabilization of the nearshore bottom and reduction of coastal erosion.

However, in some areas of the Caribbean, these seagrass beds are being damaged and sometimes removed as a result of human activities.

Recommendation 11

RESERVATION OF SEAGRASS BEDS

It is recommended that IOCARIBE inform its Member States of the ecological importance of the seagrass beds in the Caribbean, as well as their importance in prevanting coastal erosion, and urge them strongly to conduct studies of the processes of grain trapping and sediment accumulation by these beds.

This activity should be undertaken in co-operation and co-ordination with the Unesco Division of Marine Sciences, in relation to the Unesco Major Inter-regional Project on Research and Training Leading to the Integrated Management of Coastal Systems (COMAR).

It is also recommended that IOCARIBE strongly urge its Member States to take steps, if necessary, to terminate the mechanical destruction of these seagrass beds.

4.3 Pilot study areas

In reviewing the various recommendations in this report, it was felt it would be efficient in the initial phase of the implementation of those recommendations relative to the coastal areas if one specific coastal area per Member State were to be designated as the initial study area.

Studies of nearshore dynamics, sediment movement, pollution, etc. would initially be concentrated in these coastal sectors, and scientists from other countries would be encouraged to visit the pilot areas of other Member States to share information and techniques.

Recommendation 12

ESTABLISHMENT OF PILOT STUDY AREAS

IOCARIBE should encourage its Member States to establish pilot areas within which the various coastal recommendations will be implemented. TEMA should be an important component of work in these national pilot areas, and training in coastal process sampling and measurement for both local personnel and some from other IOCARIBE Member States should be included in the programme.

4.4 Satellite data availability

Oceanography from space has become a practical reality within the past decade, and those concerned with coastal processes can utilize satellite data in their work.

However, the availability of satellite imagery and the means whereby appropriate satellite data or imagery can be obtained are not widely known within the IOCARIBE region. Correcting this deficiency would be of considerable benefit to those within the region concerned with the broad spectrum of nearshore activities, including fisheries, pollution, coastal circulation, shoreline modification, and bathymetric mapping.

Recommendation 13

AVAILABILITY OF SATELLITE DATA AND IMAGERY

It is recommended that IOCARIBE request that the IOC Secretary determine the best routes by which to approach those Member States that have, or plan to have, environmental satellites, and determine:

(i) what data and imagery relevant to the Caribbean region are, or will be, available;

(ii) how these data and imagery can be obtained;

(iii) the availability of training courses on satellite-data interpretation; and

(iv) the cost and availability of equipment for receiving satellite data directly.

It is also recommended that IOCARIBE urge its Member States' governments to make available to their coastal researchers any aerial photography that could be used for coastal mapping or for monitoring changes in shoreline configuration.

4.5 Local expert advice

Within some of the IOCARIBE Member States there presently exist usually small but capable groups of marine scientists with coastal marine research expertise or with the potential for developing it. These groups should be identified, whether they are in a governmental agency, university, or independent research organization, and the Member State governments should be encouraged to rely on these groups not only for the data and information required for coastal management decisions but also for solidly based recommendations on the decisions themselves.

Recommendation 14

IDENTIFICATION AND USE OF LOCAL COASTAL MARINE SCIENTIFIC CAPABILITY

It is recommended that IOCARIBE encourage the governments of its Member States to identify and support such groups of coastal marine scientists as may presently exist, and to rely on them for the data and information on coastal processes required for making rational decisions on any coastal-area activity that will in any way affect, or be affected by, the nearshore environment. For those Member States where no such group exists, the governments should be encouraged to use outside consultants in the short term and in the long term, identify where the potential for developing such competence might exist within the country and take appropriate steps to establish such a national capability.

4.6 Directory of marine scientists

Within the IOCARIBE region there presently exists a relatively large number of capable marine scientists, but their capabilities are seldom known to those in the other countries of the region who could utilize these capabilities in helping to solve local coastal problems.

It could be extremely beneficial to Member States, as well as contributing to intraregional co-operation, were a listing of such experts within the region available.

In addition, a listing of selected experts outside the region who are willing and able to assist Member States would also be useful.

Recommendation 15

IOCARIBE DIRECTORY OF MARINE SCIENTISTS

It is recommended that IOCARIBE charge the IOC Assistant Secretary for IOCARIBE (when appointed) with the responsibility of maintaining an up-to-date directory of marine scientists in the region.

The directory entries should include the name, business address, telephone and telex numbers or cable address and area of specialization using as sources initially the various directories of marine research institutions and personnel already available.

An annex to the proposed directory should include selected experts from outside the region.

4.7 Training courses

The United Nations University, the Netherlands and France all either have in being, or in the planning stage, courses of four to six weeks' duration specifically on coastal processes. These courses are planned primarily for scientists and technical personnel from those nations that are less developed in so far as marine research is concerned. However, the availability of these specialized courses is not routinely communicated to the appropriate contacts in the IOCARIBE Member States.

Recommendation 16

INFORMATION ON TRAINING COURSES IN COASTAL PROCESSES

It is recommended that IOCARIBE charge the IOC Assistant Secretary for IOCARIBE (when appointed) with the responsibility of:

(i) Maintaining a list of those courses on coastal-area studies to which candidates from IOCARIBE Member States may apply;

(ii) Ensuring that National Associates, National TEMA Contacts, and other appropriate persons in the region are informed of the availability of such courses as soon as they are announced; and

(iii) Investigating the possibility of IOC Member States instituting such courses.

4.8 Facilitation of international movement of scientific equipment

In co-operative international at-sea research projects within the IOCARIBE area as well as with other IOC projects at sea, a repeated impediment has been the problem of getting research equipment and scientific samples through local customs when joining or departing from research vessels in foreign parts. Although the IOC has traditionally been reluctant to inject itself into national policy matters, the regular recurrence of this hindrance to international co-operation at sea demands that every effort be made to alleviate this problem.

Recommendation 17

FACILITATION OF INTERNATIONAL MOVEMENT OF SCIENTIFIC EQUIPMENT

It is recommended that, during the planning stage of co-operative international marine research expeditions, government-to-government discussions take place between the concerned IOCARIBE Member States to try tc obtain duty-free and expeditious movement of scientific equipment through the often cumbersome customs process. In addition, IOCARIBE should request that the IOC Secretary investigate possible mechanisms for facilitating the international movement of scientific equipment.

5. CONCLUSIONS

The group discussed at length the traditional problem of converting a series of recommendations into a workable plan of action. It was felt that coastal problems exist to varying degrees in all of the IOCARIBE Member States and that solutions to these problems constituted a goal shared by all the countries of the region.

Studies leading to an adequate understanding of the physical processes of the nearshore ocean - particularly coastal dynamics and sediment transport - will provide the basic scientific information required by those charged with making decisions on coastal activities. Such activities include the siting of sewage discharge pipes from coastal communities and the location of coastal power or desalination plants that inject heat or brine into coastal waters, preservation of beaches and coral reefs important to the tourist trade, control of coastal pollution, port and harbour development, commercial and recreational fisheries and others. In the recommendations that are part of this report, the group has attempted to provide guidelines and suggestions that will assist IOCARIBE Member States in the preparation of coastal-area projects directed towards the solution of their coastal problems.

However, after much discussion, it was agreed that the group could not, and probably should not, prepare a detailed and specific project plan.

There are several reasons behind this decision:

(i) Although the need for the scientific basis for coastal-area decisions is common to all Member States of the IOCARIBE region, the intensity of the numerous physical processes involved and the different geomorphic characteristics of the coasts vary so greatly from country to country that a meaningful region-wide generic project could not be prepared.

(ii) The present levels of coastal-research expertise and availability of sampling, measuring and analytical equipment and instrumentation to carry out such a project vary from almost zero in some small island nations to highly sophisticated in some of the other Member States.

Member States would in all probability reject any project that was not site-specific for a recognized problem in their own country.

(iii) There has always been a national reluctance to accept and participate in a project in the preparation of which that nation played no part.

Therefore, the group believes that the conversion of its recommendations into one or more specific coastal-research projects must be the task of the IOCARIBE Member States themselves.

Recommendation 18

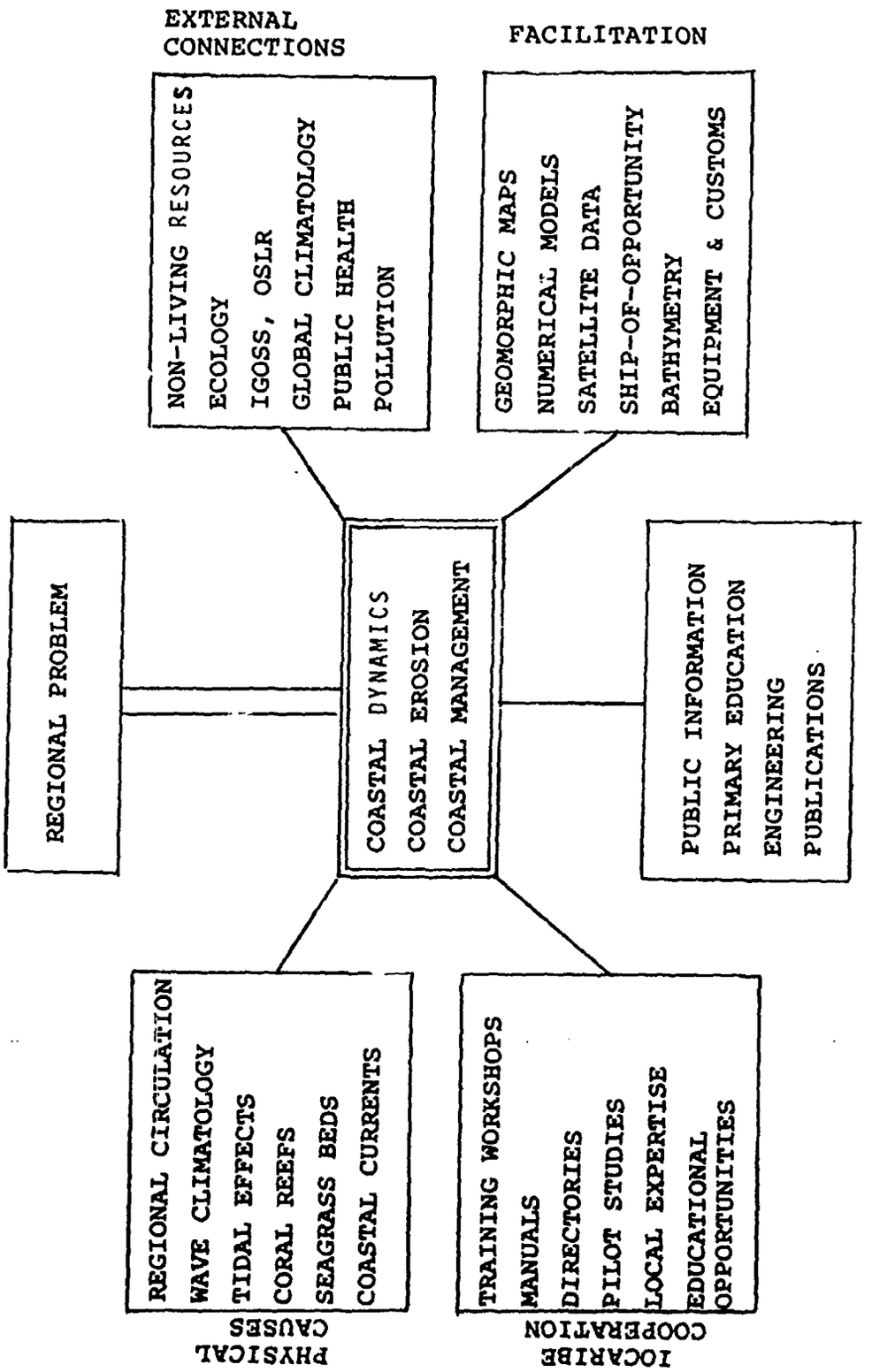
PREPARATION OF PROJECT PLANS

It is recommended that IOCARIBE at the first session of the Subcommission meeting in Curaçao, August 1984, consider the recommendations of this report as guidelines for the preparation of one or more specific project plans.

Further, it is strongly recommended that, during that Subcommission's session, a small ad hoc working group be convened and charged with the preparation of a feasible action plan for one or more coastal research projects that can be adopted in plenary and implemented by Member States as soon as possible.

A chart showing the connections between the various topics considered during the consultation is appended.

CONNECTIONS BETWEEN THE VARIOUS TOPICS CONSIDERED DURING THE CONSULTATION



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ANNEX V

GUIDELINES FOR A REGIONAL NETWORK OF HIGHER EDUCATION AND RESEARCH INSTITUTIONS

1. OBJECTIVES

To establish efficient co-ordination mechanisms between the higher education institutions and research centres in the area of IOCARIBE, with the purpose of benefiting from existing capacities in marine sciences in the countries of the region and to strengthen them, especially regarding formation of human resources at the post-graduate level and high quality research.

2. CO-ORDINATION

The Sub-Commission will act, for the purposes of this network, as an intermediate for stimulating the flow of information to the Member States and the institutions within the system. In this way, international co-operation among the countries of the region will be enhanced, including the possible generation of specific projects in the Voluntary Assistance Programme (VAP) of IOC.

3. MECHANISMS

The co-ordination of the institutions participating in this network will be by the following mechanisms:

- exchange of information;
- exchange of personnel;
- divulgation of scientific events.

3.1 EXCHANGE OF INFORMATION

3.1.1. The exchangeable information will be put into two categories:

a) offers

b) needs

3.1.2 In each of these two parts, the following kinds of information will be included:

a) Formal post-graduate programmes - short specialization courses

All the conditions must be included, pre-requisites, credits given, and funding when appropriate;

b) Research projects

These are projects in execution or in preparation but with assured resources for execution (objectives, methods, cruises, inter alia, must be included);

c) Personnel

High level research staff and/or post-graduate students. (Information on the available personnel and the need for new personnel will be given).

d) Facilities

Includes information on: infrastructure, equipment and vessels.

e) Documentation

Includes: data, journals, papers, books, microfilms, etc.

3.1.3 The Assistant Secretary responsible for IOCARIBE will establish the forms to complete and unify the presentation of the information described in 3.1.2.

3.1.4 All the courses and projects regularly offered and executed in the Member States and in relation to IOCARIBE regional co-operation will be included.

3.1.5 The literature and documentation exchange will be directly made between the institutions involved taking advantage of the facilities for divulgation that the IOC Assistant Secretary responsible for IOCARIBE might establish.

3.1.6 The costs of the exchange will be covered by the institutions involved. Nevertheless, the IOC should make some resources available in support of such exchange of information.

3.1.7 Scientists of the region will be encouraged to publish their scientific papers in the existing journals and periodical publications of the involved institutions. The Assistant Secretary will inform participating institutions and scientists of the journals open to contributions, and their requirements.

3.2 EXCHANGE OF PERSONNEL

3.2.1 Personnel exchange will improve the academic level at the post-graduate level, utilizing the facilities offered by some higher research and education institutions in the region. Direct and personal contact between the researchers of the region will be stimulated as one means of accomplishing the objectives of the Sub-Commission.

3.2.2 Personnel exchange could take the form of:

a) Visits: formal
informal

b) Meetings: workshops
seminars
conferences

c) Participation in courses and study programmes:

- formal (post-graduate students)
- for lecturers
- for technicians
- for post-doctorate offers
- during sabbatical exchanges

d) Participation in research projects:

- exchange of researchers
- co-operative cruises

3.2.3 Personnel exchange will be done utilizing the different existing mechanisms, complemented with those that the Assistant Secretary will identify. This exchange will be strongly stimulated by the information flux proposed in 3.1.

3.3 DIVULGATION OF SCIENTIFIC EVENTS

3.3.1 Participation of scientists of the region in seminars, conferences, workshops and other scientific meetings programmed by the involved institutions will be stimulated, as well as frequent contact between scientists of the region.

3.3.2 Periodical divulgation of the up-dated information of all programmed events, their requirements and possible sources of funding will be done.

3.3.3 The organization of regional events for special objectives within the framework of IOCARIBE activities will be stimulated.

4. PARTICIPATION

4.1 Participation in the system will be open to all interested higher education institutions and research centres with the required level and capacity to accomplish the system's objectives.

4.2. All the academic requisites and other internal regulations of participant institutions will be reported.

5. UPDATING

The relevant information will be contained in a Directory which will be up-dated by the Assistant Secretary from time to time. Nevertheless, additions and modifications could be circulated as soon as they become known to the Assistant Secretary.

6. FUNDING

6.1 Funds for executing the co-ordination activities will come mainly and directly from the Member States of the Sub-Commission.

6.2 The Assistant Secretary responsible for IOCARIBE could search for other additional funding resources coming from other IOC Member States and/or international organizations.

7. COMMUNICATION CHANNELS

The same official channels established for the IOCARIBE communication flow will be used. All the information provided by the involved institutions could be received by the National Contacts and vice-versa. Nevertheless, direct contact between institutions and between interested persons will be encouraged.

8. EVALUATION

With the objective of evaluating and quantifying the results and performance of the system, the IOC Assistant Secretary will maintain statistics on the interactions between participating institutions. The results will be presented to the Sessions of the Sub-Commission.

ANNEX VI

LIST OF PARTICIPANTS

I. IOCARIBE OFFICERS

Chairman	Dr. Manuel M. Murillo Director Centro de Investigación en Ciencias del Mar y Limnología - CIMAR Universidad de Costa Rica Ciudad Universitaria Rodrigo Facio San José Costa Rica Tel: 24-37-10
Vice-Chairman	Dr. Harris B. Stewart, Jr. Director Center for Marine Studies Old Dominion University Norfolk, VA 23508 USA Tel: (804) 440-3989

II. PARTICIPANTS FROM MEMBER STATES

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III. REPRESENTATIVES OF ORGANIZATIONS

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ANNEX VII

LIST OF ACRONYMS AND ABBREVIATIONS

AID	Agency for International Development
ASFA	Aquatic Sciences and Fisheries Abstracts
ASFIS	Aquatic Sciences and Fisheries Information
CARIPOL	Marine Pollution Monitoring for the Caribbean
CCCO	Committee on Climatic Changes and the Ocean
CERDA	Coastal Environment Research Demonstration Areas
CICAR	Co-operative Investigation of the Caribbean and Adjacent Regions
COMAR	Unesco Major Interregional Project on Research and Training Leading to the Integrated Management of Coastal Systems
COSALC	Coastal Systems of Latin America and the Caribbean
FAO	Food and Agriculture Organization of the United Nations
GEMSI	Group of Experts on Mehtods, Standards, and Intercalibration
GIPME	Global Investigation of Pollution in the Marine Environment
GOS	Global Observing System
GTS	Global Telecommunication System
ICSPRO	Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography
ICSU	International Council of Scientific Unions
IDRC	International Development Research Centre
IGOSS	Integrated Global Ocean Station System
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IREP	International Recruitment Project
ITA	IGOSS Telecommunications Arrangement
MARPOLMON	Marine Pollution Monitoring Programme
NODC	National Oceanographic Data Centre
OAS	Organization of American States
OCE (Unesco)	Division of Marine Sciences

OETB	Ocean Economics and Technology Branch
OSLR	Ocean Science in Relation to Living Resources
OSNLR	Ocean Science in Relation to Non-Living Resources
OTEC	Ocean Thermal Energy Conversion
PAHO	Panamerican Health Organization
RNODC	Responsible National Oceanographic Data Centre
TEMA	Training, Education and Mutual Assistance in the marine sciences
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VAP	Voluntary Assistance Programme
WATS	Western Atlantic Turtle Symposium
WCRP	World Climate Research Programme
WECAFC	Western Central Atlantic Fishery Commission
WESTPAC	Programme Group for the Western Pacific
WHO	World Health Organization
WMO	World Meteorological Organization
WWW	World Weather Watch