United Nations Environment Programme

Distr.
RESTRICTED

UNEP/IG.37/10
3 April 1982

ORIGINAL: ENGLISH

First Meeting of the
Co-ordinating Body on the
Seas of East Asia (COBSEA)

Bangkok, 3 April 1982

REPORT OF THE

FIRST MEETING OF THE CO-ORDINATING BODY

ON THE SEAS OF EAST ASIA

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INTRODUCTION

1. On the initiative of States of the region, the Governing Council of the United Nations Environment Programme (UNEP) in 1977 decided that "steps are urgently needed to formulate and establish a scientific programme involving research, prevention and control of marine pollution and monitoring" for a regional seas programme in Asia (Decision 68(V). Oceans). This decision was followed up by a series of preparatory projects and various meetings leading to the development and adoption of a regional action plan.

2. Meetings related to the adoption of the regional action plan were convened by UNEP as follows:

- First Meeting of Experts to Review the Draft Action Plan for the East Asian Seas, Baguio, 17-21 June 1980;

- Second Meeting of Experts to Review the Draft Action Plan for the East Asian Seas, Bangkok, 8-12 December 1980;

- Intergovernmental Meeting on the Protection and Development of the Marine Environment and Coastal Area of the East Asian Region, Manila, 27-29 April 1981;

- Intergovernmental Meeting on the East Asian Seas Action Plan, Bangkok, 9-11 December 1981.

3. During the two cited intergovernmental meetings the action plan was adopted together with the institutional and financial arrangements for its implementation during the 1982-1983 biennium. With respect to institutional arrangements, it was agreed that "overall authority to determine the content of the action plan, to review its progress and to approve its programme of implementation, including financial implications" would be "vested in the regional periodic meetings of Governments (intergovernmental meetings) participating in the action plan." For this purpose a policy co-ordinating body known as the Co-ordinating Body on the Seas of East Asia (COBSEA) was formed. The overall technical co-ordination of the action plan was vested in UNEP. (Paragraphs 36-40 of UNEP/IG.31/6.)

4. During the Intergovernmental Meeting in Bangkok, December 1981, agreement was reached concerning which projects of the action plan programme should be implemented during 1982-1983 and which national focal point would be responsible for co-ordinating each project. It was also agreed that the secretariat in consultation with the national focal points would develop the agreed projects into operational documents which would be finalized by the First Meeting of the COBSEA.

5. Thus, the First Meeting of COBSEA was convened by UNEP in Bangkok on 3 April 1982.

Attendance

6. Representatives from Indonesia, Malaysia, Philippines, Singapore and Thailand attended. A complete list of participants is contained in Annex I to this report.

Agenda Item 1: Opening of the meeting

7. The UNEP Deputy Regional Representative, Dr. Reynaldo M. Lesaca, addressed the opening session of the meeting on behalf of UNEP. Referring to the resolutions passed at the Manila and Bangkok intergovernmental meetings, he stressed the importance of this First Meeting of the COBSEA in finalizing the approved priority projects so they could be initiated in the near future.

Agenda Item 2: Organization of the meeting

8. In order to be consistent with the procedures used by the ASEAN Experts Group, in conjunction with which COBSEA will ordinarily meet, it was decided that the Chairman, Vice-Chairman and Rapporteur of COBSEA would be designated on the same rotating basis as the ASEAN Experts Group. Thus, the bureau of the meeting was elected by acclamation as follows:

Chairman: Mr. Kasem Snidvongs (Thailand)

Vice-Chairman: Mr. H. Haeruman (Indonesia)

Rapporteur: Mr. S. T. Sundram (Malaysia)

9. The rules of procedure of the Governing Council of UNEP contained in document UNEP/GC.3/Rev.1 were adopted by the meeting.

Agenda Item 3: Adoption of the agenda

10. The meeting adopted the agenda contained in Annex II to this report.

11. The list of working and information documents relevant to the agenda items and made available to the participants in the meeting is contained in Annex III to this report.

Agenda Item 4: Report of the interim co-ordinator

12. Dr. Fong Seck Kong, Singapore, the immediate previous Interim Co-ordinator presented a report of progress achieved in the East Asian Seas programme between the December 1981 Intergovernmental Meeting and the COBSEA Meeting. He highlighted the consultant mission of Dr. Edgardo Gomez who had visited the national focal points of each country and worked with them and, where applicable, the lead institutions in developing the respective project proposals. He pointed out that all the ASEAN countries had either finalized or were finalizing their proposals and that these were placed before the meeting for consideration. The text of Dr. Fong's report is attached as Annex IV to this report.

Agenda Item 5: Modalities of project co-ordination and administration of funds

13. The UNEP representative indicated that on the basis of the final content of projects discussed at the meeting, including budgets, standard UNEP project documents would be drafted and finalized as appropriate with the national focal point, government body or participating institution within each country designated as responsible for implementing the project. In order to do this, it was pointed out that it is necessary to establish who would be the co-signatory with UNEP on the project document as well as who would be responsible for receiving and re-disbursing the funds allocated to the project.

14. After some discussions concerning project administration such as preparation and submission of substantive, management and financial reports related to the project according to UNEP procedures, it was agreed that UNEP would distribute to each national focal point the standard paragraphs used in UNEP project documents relating to these reports as well as some typical examples of reports. It was requested that this be done as soon as possible to enable focal points to explore the most suitable modalities for their own interim administration of projects before receiving the draft project documents.

Agenda Item 6: Finalization of projects and priorities for implementation during 1982-1983

15. Dr. Edgardo Gomez briefly reported on the results of his consultant mission to each of the national focal points and gave a general account of the present state of development of each of the projects to be deliberated upon by the meeting.

16. After some general debate concerning project priorities of each country as well as analysis of overall regional priorities based on interest, capability, existing infrastructure and on-going activities, it was decided that a clear distinction of priorities was not necessary. Therefore, a decision was made that implementation of each project should be initiated and based on those activities which could be realistically undertaken during the remainder of 1982.

17. It was decided to defer the project on pollution control and waste management (EAS 6.2) until 1983. Therefore, it was not discussed in detail.

18. After a general review of the remaining project proposals, the focal point responsible for co-ordinating each project made a presentation of its content. The meeting deliberated on the substantive content of each project and made modifications. The agreed version of the projects is contained in Annexes V to IX to this report. Some of the more important points of discussion concerning the projects aside from their substantive content are contained in the following paragraphs.

19. With respect to the project on oceanography, EAS 1.1 and 1.2, it was decided that the proposed workshops be combined into one workshop to be organized by Thailand. It was agreed that support would be solicited from various international and other bodies for the workshop. Tentatively the venue of the workshop is planned to be in Thailand.

20. Concerning project EAS 2.1, "Oil Pollution Survey and Monitoring," methodology to be followed is described in "Guide to Operational Procedures for IGOSS." Therefore intercalibration and intercomparison of the data through this method should be made. Training is also needed. Further a survey of the site and an initial measurement should be conducted. A co-ordinator on the training, intercalibration and intercomparison exercises should be sought by UNEP.

21. Concerning project EAS 2.2, "Co-operative Research on Oil and Oil-dispersant Toxicity," it was agreed that in order to minimize costs of the project, test animals should be provided so far as possible cost free by countries in which they are available. The only budget allocations should be for shipment of the test animals to the countries participating. Likewise, it was agreed that every effort should be made to obtain free of charge the crude oil test samples as well as dispersant chemicals from countries in which they are easily available.

22. Further with respect to EAS 2.2, the methodology to be employed should be the subject of the workshop proposed therein.

23. In the presentation of details concerning EAS 3.2 and 3.3, the study of concentration levels and trends of non-oil pollutants and the study of their effects on the marine environment, it was stressed that the main activity for 1982 would be a workshop to establish the pollution parameters to be measured, the matrices in which they should be measured, the frequency and location of sampling, adoption of appropriate inter-calibration procedure and finally the methodology to be used. In addition to this, emphasis would be placed on determining the regional capabilities for measuring the levels and effects of non-oil pollutants based on related previous or on-going activities in the region.

24. Referring to EAS 3.2 and 3.3, the UNEP representative indicated that publications containing standard methods already adopted by the Mediterranean and Kuwait Action Plans could be made available to the EAS Regional Workshop in order to minimize development costs. In addition, he explained the possibility of obtaining inter-calibration samples from the International Laboratory of Marine Radioactivity, Monaco in order to facilitate an EAS inter-calibration exercise on non-oil pollutants.

25. In presenting EAS 4.1 and 4.2 concerning the survey of coral resources and the effects of pollutants and destructive factors on them, the representative of the Philippines pointed out that the workshop could most likely be jointly organized with ROSTSEA of UNESCO in Jakarta, since they had indicated having allocated money for a similar workshop. A preliminary consultation made in February 1982 indicated that possibility. The meeting agreed that efforts should be made to follow this up.

26. Further, concerning EAS 4.1 and 4.2, it was explained that in preparing the budget for the project it was assumed that for the most part participating countries would provide needed equipment.

27. For implementation of EAS 7, an existing Data Center such as ASFIS, MEDI and INFOTERRA should be considered.

Agenda Item 7: Allocation of project budgets

28. Recalling the previous discussion (described in paragraph 16 above) the meeting made an analysis of the project activities that could be undertaken during July-December 1982 and allocated budgets for these as appropriate. The projects, their activities and the total funds allocated to each are presented in Annex X to this report.

Agenda Item 8: Other business

29. The UNEP secretariat gave a brief progress report on the preparatory activities which had been requested of them (paragraph 29 of UNEP/IG.31/6 refers). The secretariat has in hand the raw material needed for the production of a Draft Directory on Marine Science of the EAS Region as well as a Bibliography of Oceanography and Pollution References. The meeting agreed that the secretariat should proceed as soon as possible with finalizing the printing of the Directory.

30. The secretariat indicated that national focal points would be contacted in order to obtain the information necessary to compile a Directory of Environmental Management Institutions and to identify the "relevant on-going nationally, regionally and internationally supported development projects which demonstrate sound environmental practices" (paragraph 29 of UNEP/IG.31/6 refers). The secretariat expressed hope that enough results would be available by the next meeting of CGBSEA to be able to present substantial reports on these activities.

31. A proposal for the "Compilation and Synthesis of Existing Data on the Physical Oceanography of the South China Sea" was presented by Thailand. After reviewing the proposal it was agreed that the secretariat should seek outside funding for this project. The secretariat indicated that it will try to arrange for a consultancy from other sources of funds to enable an oceanographic data specialist from Thailand to utilize the UNEP regional seas computer system or another international organization's oceanographic data system in order to gather some of the data described in the project proposal.

32. A discussion concerning seeking outside funding for the EAS action plan programme resulted in a request to the Chairman to write a letter on behalf of CGBSEA to UNEP asking the secretariat and the UNEP Regional Office for Asia and the Pacific to try to identify sources of such funds.

33. It was agreed that the next CGBSEA meeting will be held in November 1982. Indonesia kindly offered to host the meeting.

Agenda Item 9: Adoption of the report

34. After reviewing its contents and annexes, the meeting unanimously adopted this report.

Agenda Item 10: Closure of the meeting

35. An expression of thanks from the delegate from Malaysia was given on behalf of the CGBSEA Chairman to UNEP.

36. The meeting was formally closed by the Chairman at 6:50 p.m. on 3 April 1982.

ANNEX I

First Meeting of the
Co-ordinating Body on the
Seas of East Asia (COBSEA)

Bangkok, 3 April 1982

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ANNEX II

First Meeting of the
Co-ordinating Body on the
Seas of East Asia (COBSEA)

Bangkok, 3 April 1982

AGENDA

1. Opening of meeting

2. Organization of meeting

3. Adoption of agenda

4. Report of Interim Co-ordinator

5. Modalities of project co-ordination and administration of funds

6. Finalization of projects and priorities for implementation during 1982-1983

   6.1 Oceanography

   6.2 Assessment of oil pollution

   6.3 Assessment of non-oil pollution

   6.4 Coral ecosystems

   6.5 Oil pollution control

   6.6 Pollution control and waste management

   6.7 Information and data exchange

7. Allocation of project budgets

8. Other business

9. Adoption of report

10. Closure of meeting

ANNEX III

First Meeting of the
Co-ordinating Body on the
Seas of East Asia (COBSEA)

Bangkok, 3 April 1982

LIST OF DOCUMENTS

Working documents

UNEP/IG.37/1	Agenda
UNEP/IG.37/2	Annotated Agenda
UNEP/IG.37/3	Draft Project Proposal for Assessment of Oceanographic Phenomena
UNEP/IG.37/4	Draft Project Proposal for Assessment of Oil Pollution (2 parts)
UNEP/IG.37.5	Draft Project Proposal for Assessment of Non-oil Pollution
UNEP/IG.37/6	Draft Project Proposal for the Assessment of the Impact of Pollution on, and Habitat Degradation of Coral Ecosystems
UNEP/IG.37/7	Draft Project Proposal on Pollution Control and Waste Management
UNEP/IG.37/8	Draft Project Proposal on Information and Data Exchange
UNEP/IG.37/9	Compilation and Synthesis of the Existing Data on the Physical Oceanography in the South China Sea
UNEP/IG.37/10	Report of Meeting

Information documents

UNEP/IG.37/INF.1	List of Documents
UNEP/IG.37/INF.2	List of Participants
UNEP/IG.31/3	Draft Programme Document for the East Asian Seas Action Plan
UNEP/IG.31/6	Report of the Intergovernmental Meeting on the East Asian Seas Action Plan

ANNEX IV

Report of the Interim Co-ordinator to the Co-ordinating Body on the Seas of East Asia (COBSEA)
Bangkok, 3 April 1982

1. The First Inter-Governmental Meeting on the Draft Action Plan (DAP) for the East Asian Seas (EAS) was held in Manila from 27-29 April 1981 followed by the ASEAN Ministerial Meeting on the Environment from 30 April - 1 May 1981. The ASEAN Ministers adopted the DAP on EAS agreed upon at the Inter-Governmental Meeting. The EAS Action Plan will not be an ASEAN project but remain a UNEP project to be co-ordinated by the ASEAN Experts Group on the Environment. A separate Committee, Co-ordinating Body on the Seas of East Asia, was formed to decide on policy issues on the Action Plan.

2. The Second Inter-Governmental Meeting on the Action Plan for the EAS was held in Bangkok from 9-11 December 1981. The Trust Fund was set up for 1982 and 1983 with the following contributions from each country annually.

(i)	Indonesia	US $30,000
(ii)	Philippines	US $19,000
(iii)	Thailand	US $19,000
(iv)	Malaysia	US $17,000
(v)	Singapore	US $ 1,000
		US $86,000

Due to budgetary constraints, UNEP has to reduce its contributions to US $50,000 for 1982. Seven projects were identified as priority projects for implementation with each ASEAN country co-ordinating at least one project. The list of the projects and the lead countries are attached. UNEP sent a consultant, Mr. Ed Gomez, to each of the ASEAN countries during January to March 1982 to finalize these project proposals.

3. Mr. Gomez found that all the ASEAN countries have either finalized or are finalizing their project proposals. Thailand has a National Committee and four Sub-committees to deal with the projects. Thailand also wishes to offer to the other ASEAN countries the use of her Oceanographic ship with the latter paying for the fuel used by the ship.

4. From the project proposals put up by the various lead countries, UNEP will prepare a single project document containing all the projects in the form of sub-contracts for the respective lead countries to execute. However, the projects cannot be implemented unless there is US $50,000 in the Trust Fund.

5. Mr. Gomez has also visited various UN agencies such as UNESCO, PEPAS, WHO and ESCAP. He indicated that Mr. Nakamura of WHO has expressed interest in the projects related to land-based pollution. The Economic Co-ordinating Unit of ESCAP has offered technical assistance and where its projects overlapped with the EAS Action Plan, it has suggested that the projects should complement one another.

6. As the administration of funds would be one of the major agenda items for the COBSEA Meeting, Mr. Elder of UNEP has been requested to prepare a paper on this issue.

7. Mr. Ed Gomez has informed the Interim Co-ordinator that UNEP is considering increasing its contribution to the Action Plan from US $50,000 to US $75,000 subject to the approval of the Governing Council Meeting to be held in Nairobi from 20 May - 2 June 1982. This has been confirmed by Mr. Stjepan Keckes, Director, Regional Seas Programme Activity Centre, UNEP, Geneva when he was in Singapore on 16 March 1982. Mr. Keckes urged ASEAN countries to consider attending the Governing Council Meeting so as to exert a concerted effort to obtain the Governing Council's approval for the increase in UNEP's contribution. He also advised ASEAN countries to reach a common strategy at the COBSEA Meeting.

8. Mr. Keckes has also informed the Interim Co-ordinator that funds may be secured from sources such as the Swedish International Development Agency (SIDA) to fund some of the projects under the Action Plan.

ATTACHMENT

PROGRAMME PRIORITIES AND LEAD COUNTRIES/INSTITUTIONS

PROJECT/SUBPROJECT	LEAD COUNTRY/INSTITUTION
Project 1: Oceanography	
EAS 1.1 Observation of maritime meteorological phenomena	Thailand/National Environment Board (NEB)
EAS 1.2 Study of oceanographic features	Thailand/National Environment Board (NEB)
EAS 1.3 Oceanographic reference stations	Deferred for reconsideration in 1984/85
Project 2: Assessment of Oil Pollution	
EAS 2.1 Survey of sources and monitoring of oil pollution	Indonesia/Oil and Gas Technology Development Center (Lemigas)
EAS 2.2 Co-operative research on oil and oil dispersant toxicity	Malaysia/Fisheries Research Institute
Project 3: Assessment of Non-Oil Pollutants	
EAS 3.1 Survey of rivers and land-based sources of non-oil pollutants	(Project completed during 1979-1981 by UNESCO and WHO/PEPAS)
EAS 3.2 Study of concentration levels and trends of non-oil pollutants	Philippines/National Environment Protection Council (NEPC)
EAS 3.3 Study of the effects of non-oil pollutants on the marine environment	Philippines/National Environment Protection Council (NEPC)
Project 4: Mangrove and Coral ecosystems	With respect to coral resources only*

* With respect to the mangrove resources, a UNESCO/UNDP project will cover both sub-projects. Monitoring of this project and other comparable programmes of regional or international organizations with regard to its relevance to the East Asian Seas Action Plan will be done by the Philippines.

EAS 4.1	Survey of the state of mangrove and coral	Philippines/University of Philippines Marine Sciences Center
EAS 4.2	Effects of pollutants and destructive factors on mangrove and coral communities and related fisheries	Philippines/University of Philippines Marine Sciences Center

Project 5: Oil Pollution Control

EAS 5.1	Training programme for oil pollution control	Deferred for reconsideration in 1984/85
EAS 5.2	Support programme for contingency planning	Indonesia/Ministry for Development Supervision and Environment in collaboration with Pertamina and Department of Communication for implementation in 1983
EAS 5.3	Operational pollution from ships	Deferred for reconsideration in 1984/85
EAS 5.4	Regional advisory services	Deferred for reconsideration in 1984/85

Project 6: Pollution Control and Waste Management

EAS 6.1	Waste discharges into coastal waters	Deferred for reconsideration in 1984/85
EAS 6.2	Marine sites for dumping of hazardous wastes	Singapore/Ministry of the Environment

Project 7:	Information and Data Exchange	Indonesia/Ministry for Development Supervision and Environment in co-operation with the National Science Institute

ANNEX V

PROJECT PROPOSAL FOR ASSESSMENT OF THE OCEANOGRAPHIC PHENOMENA WITH PARTICULAR REFERENCE TO HYDROGRAPHY, WATER MASSES, WATER CIRCULATION AND THEIR EFFECTS ON POLLUTION DISPERSION PATTERNS INCLUDING DETAILED OCEANOGRAPHIC SURVEYS

Part 1: Observation of Maritime Meteorological Phenomena and their Influence on Water Movements

Part 2: Study of Oceanographic Features with Emphasis on Hydrography, Water Masses, Water Circulation and their Effects upon Pollution Dispersion Patterns

NOTE: (i) This project proposal was prepared by the focal point of Thailand. Parts 1 and 2 correspond to draft projects EAS 1.1 and EAS 1.2 in UNEP/WG.31/3 "Programme Document for the East Asian Seas Action Plan."

(ii) Paragraph 19 of UNEP/IG.37/10 "Report of the First Meeting of the Co-ordinating Body on the Seas of East Asia (COBSEA)" should be taken into account in the implementation of this project.

PART 1

1. PROJECT IDENTIFICATION

1.1 Project Title: Observation of Maritime Meteorological Phenomena and Their Influence on Water Movements

1.2 Project Implementation: Thailand

1.3 Duration of Project: July 1982 - December 1983

1.4 Cost of Project (in US Dollars):

Total project cost (Parts 1 and 2):	$32,800
funded through UNEP:	$16,400
funded through the EAS Trust Fund:	$16,400

2. OBJECTIVES

2.1 Long-term Objectives

The influence of meteorological factors on oceanographic processes has been recognized. One of the better known effects is that changes in prevailing wind directions associated with monsoons bring about corresponding changes in sea surface current patterns in the East Asian Region. However, maritime meteorological data remain scanty. Since meteorological processes contribute significantly to large scale water circulation, a programme of monitoring meteorological parameters would greatly enhance understanding of the oceanographic phenomena in the area as well as aid environmentalists in making models for predicting dispersion patterns of pollutants based on meteorological and oceanographic conditions.

2.2 Immediate Objectives

- To obtain and analyze existing maritime meteorological data;
- To collect relevant maritime meteorological data at different localities and during the four dominant oceanic seasons;
- To assess the response of the ocean environment to meteorological conditions.

3. PROJECT DESCRIPTION

3.1 Background Information

With increasing industrialization and population growth in the East Asian countries, the input of pollutants to the region's marine environment has likewise steadily increased. Much has yet to be known about the pathways and dispersion patterns of these pollutants in the seas. As ocean waters are the inevitable carriers of these materials and since their movement and circulation are greatly influenced by meteorological factors, there is a need to obtain maritime meteorological data and relate their influence to the physical oceanographic processes that take place.

3.2 Project Activities

Thailand proposes the South China Sea with specific reference to the Gulf of Thailand as a study site for the first phase. This area will include coastal and ocean areas greatly influenced by changes in water conditions which are also closely monitored by oceanographic stations.

Instruments and methodologies need to be intercalibrated and standardized. Where ocean-going vessels are utilized for the programme, a training seminar will have to be conducted for personnel who will be directly involved in data gathering. Thailand will host this seminar.

The data to be gathered shall include wind direction, wind velocity, duration, wind fetch, cloudiness, evaporation and NOAA satellite imageries for which Thailand already has a receiving station. Monitoring will be done primarily during the four main oceanic seasons according to the summary of Northern Hemisphere Monsoon Seasons.

Bimonthly Period	Monsoon Regime
November-February	Northeast Monsoon
March-April	Transition of NE to SW monsoon
May-September	Southwest Monsoon
October	Transition of SW to NE monsoon

Together with oceanographic data obtained, the influence of maritime meteorological conditions will be assessed.

Expected output by April 1983 will be a preliminary report on basic knowledge of marine meteorology of Thailand.

3.3 Institutional Framework

State	National Institutions
Thailand*	(1) National Environment Board (co-ordinator) (2) Meteorological Department (principal investigator) (3) Hydrographic Department (4) Chulalongkorn University, Marine Science Department (5) Kasetsart University, Marine Science Department (6) Fisheries Department (7) Asian Institute of Technology
Indonesia	
Malaysia	
Philippines	
Singapore	

Determination of additional participation will be the responsibility of the focal point co-ordinating the project.

* Personnel of the above institutes will commit 15% of their work time to this project.

3.4 Workplan and Timetable

Activities	Starting and ending
Identification of study area and parameters	July-August 1982
Initial surveys	August-October 1982
Monitoring	October-November 1982
Evaluation and analysis data	August-November 1982
Report preparation	October-December 1982
Workshop (see EAS 1.2)	August 1982

PART 2

1. PROJECT IDENTIFICATION

1.1 Project Title: Study of oceanographic features with emphasis on hydrography, water masses, water circulation and their effects upon pollution dispersion patterns

1.2 Project Implementation: Thailand

1.3 Duration of Project: July 1982 - December 1983

1.4 Cost of Project (in US dollars) (refer to paragraph 1.4 of Part 1)

2. OBJECTIVES

2.1 Long-term Objectives

While the input of pollutants into the waters of the East Asian region is continually increasing, prediction of their pathways and possible dispersion patterns remain limited by the lack of information on the oceanographic characteristics in the area. There is thus a need to obtain a better understanding of the oceanographic phenomena, hydrographic features, water masses, and major physical dispersion processes in the East Asian seas, with particular emphasis on the coastal waters and estuarine areas. Likewise, there is a need to collect sufficient baseline data on the major circulation patterns and their seasonal fluctuation in coastal waters in order to assist policy makers and development planners in formulating sound policies and guidelines to effectively deal with coastal and oceanic pollution patterns.

2.2 Immediate Objectives

- To study the hydrographic features of the region including physical oceanographic parameters and processes that influence pollution dispersion patterns;

- To obtain and analyze existing oceanographic data in the region and assess their influence on dispersion patterns of pollutants;

- To study and quantify the predominant coastal circulation and water movement patterns in the region, including major oceanic currents, tidal movements, turbulence, and vertical mixing;

- To provide training to scientists and technicians in methods and techniques relevant to the project activities;

- To prepare models on the combined effects of oceanographic phenomena in the region and on the physical dispersion processes of various types of pollutants, and to predict the possible pollution distribution profiles in the future.

3. PROJECT DESCRIPTION

3.1 Background Information

With the designation of "oceans" as a priority area by the UNEP Governing Council and with the agreement on the Action Plan, a project component to study the oceanographic characteristics in the East Asian seas was agreed in order to better understand the region's marine realm and its oceanographic processes and to obtain baseline data on water circulation patterns that would cause dispersion of man-made pollution in the coastal as well as oceanic areas. Since physical interdependence of ecological systems transcent national and political frontiers and marine pollution is transnational in character, the development of coastal resources and inherent environmental protection can only be achieved with the full support and co-operation of all States in the East Asian region.

3.2 Project Activities

Available oceanographic survey data and information on the East Asian Seas need to be evaluated to obtain a better idea of the existing marine realm and environmental quality of the region. An area that needs to be studied more extensively is the South China Sea with special reference to the Gulf of Thailand.

For the standardization and intercalibration of methods and instruments by various participating agencies in the region, Thailand proposes Indonesia to be the host of this workshop. After this, detailed oceanographic cruises shall follow during the region's two oceanic seasons, namely: Southwest (May-September) and Northeast Monsoon (November-February), due to the past experience that the oceanic current in the transition period is not well-defined.

Emphasis should be placed on measurements of oceanic currents, hydrographic studies to elucidate the state of stability and stratification, and characterization of the major water masses and their physico-chemical properties. Also to be measured are tidal fluctuations particularly in coastal areas. Processing and interpretation of data will then take place.

Expected output by April 1983 will be a preliminary report on hydrography of the study area.

3.3 Institutional Framework

State	National Institutions
Thailand*	(1) Environment Board of Thailand (co-ordinator) (2) Hydrographic Department (principal investigator) (3) Chulalongkorn University, Marine Science Department (4) Fisheries Department (5) Meteorological Department (6) Kasetsart University, Marine Science Department (7) Asian Institute of Technology (8) Harbour Department (9) Port Authority of Thailand
Indonesia	
Malaysia	
Philippines	
Singapore	

Determination of additional participation will be the responsibility of the focal point co-ordinating the project.

* Personnel of the above institutes will commit 15% of their work time to this project.

3.4 Workplan and Timetable

Activities	Starting and ending
Planning of project details/workplan	July-November 1982
Acquisition of instruments	July-November 1982
Workshop on standardization and intercalibration	July-November 1982
Oceanographic cruise during the Northeast Monsoon	December 1982
Data analysis and report preparation	February 1983

ANNEX VI

PROJECT PROPOSAL FOR

ASSESSMENT OF OIL POLLUTION

Part 1 Survey of Sources and Monitoring of Oil Pollution in the Marine and Coastal Areas

Part 2 Co-operative Research on Oil and Oil Dispersant Toxicity

NOTE: (i) Part 1 of this project proposal was prepared by the focal point of Indonesia. Part 2 was prepared by the focal point of Malaysia. Parts 1 and 2 correspond to draft projects EAS 2.1 and EAS 2.2 in UNEP/WG.31/3 "Programme Document for the East Asian Seas Action Plan."

(ii) Paragraphs 20-22 of UNEP/IG.37/10 "Report of the First Meeting of the Co-ordinating Body on the Seas of East Asia (COBSEA)" should be taken into account in the implementation of this project.

PART 1

1. PROJECT IDENTIFICATION

1.1 Project Title: Survey of oil pollution sources and monitoring of oil pollution in the marine and coastal environment (EAS 2.1)

1.2 Project Implementation: Indonesia

1.3 Duration of Project: July 1982 - December 1983

1.4 Cost of Project: (in US dollars)

Total Project Cost:	$17,700
Funded through UNEP:	$8,850
Funded through EAS Trust Fund:	$8,850

2. OBJECTIVES

2.1 Long Term Objectives

Oil pollution of marine and coastal environments is widely recognized as a problem in the region. An adequate picture, however, has yet to be formed as to the extent and level of catastrophic as well as chronic oil contamination in the waters and on the beaches of east Asia. Furthermore, to be useful and significant such information should be standardized and collected on a regular basis. A further objective is the assessment of dispersion processes and the degradation of petroleum products in the marine environment.

2.2 Immediate Objectives

- To determine the levels of oil pollution in Sea Water and on beaches from as many actually and potentially contaminated areas as possible;
- To monitor changes in such levels over certain periods of time.

3. PROJECT DESCRIPTION

3.1 Background Information

Marine and coastal pollution by petroleum hydrocarbons has been identified as a problem by various meetings in the region during the last few years. The seriousness of this type of contamination on a regional scale has been pointed out at among others the IOC/FAO(IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters (Penang, Malaysia, September 1979) and the FAO/UNEP Expert Consultation Meeting on Assessment of Oil Pollution and its Impact on Living Aquatic Resources in South East Asia (Manila, Philippines, February 1980).

Monitoring of oil pollution is being undertaken by some countries and also Indonesia, Malaysia, Philippines, Thailand and Singapore in order to assess the extent of oil pollution as well as to know the deterioration of the ecosystem. The activities depend upon the conduct of suitable baseline surveys appropriate for measuring oil in water. Another indication of oil contamination is stranded tarballs on the beach. However, the data available for these countries are not comparable because of the different methods used.

A more systematic action should be made on the methods of the monitoring, survey, sampling, analysis and the handling of data. There is a need for standardization of methods to ensure intercomparability of data as well as for rapid processing of data and for distribution of results.

3.2 Project Activities

Four different methods for determining oil pollution in seawater and on beaches are proposed here, which are complementary to each other, each providing a different kind of information that would contribute to the overall picture.

The technique ranges from simple visual observations to methods requiring special equipment and some degree of expertise. This is to ensure the participation of all existing facilities in at least one monitoring activity. Quality control of analytical procedures should be introduced within and among the laboratories participating in the project by a regional intercalibration and intercomparison exercise using standard references.

3.2.1 Survey and Monitoring

The survey should be carried out in the areas that are vulnerable to oil pollution. The vulnerable areas are the nursery and spawning grounds of fishes such as coral reefs and mangrove communities, touristic and recreational areas and marine conservation zones.

Special consideration should be given to the areas where activities related to the oil industry exist such as refineries, offshore operations and shipping lanes.

The proposed activities are:

- recording of observed oil slicks where visual observation on a regular basis should suffice.
- sampling of dissolved/dispersed petroleum hydrocarbons in the ocean surface water.
- collection of floating, particulate petroleum residues by Neuston net.
- measurement of the density of stranded tarballs on beaches.

Monitoring should then be conducted in order to follow the extent of the oil contamination in the area.

3.2.2 Methodology

A standard methodology to collect samples, to measure and analyze the contaminants should be adopted by the participating countries in order to

obtain a regional interpretation. The "Guide to Operational Procedures for the IGOSS Pilot Project on Marine Pollution (Petroleum) Monitoring" from the IOC/WMO Manual and Guide No. 7 and its Supplement should suffice to carry out analysis and measurement, sampling and reporting.

3.2.3 Location

Location of the dispersed oil and accumulation of tarballs is very dependent on wind action, ocean currents and tidal movements. Generally the sea currents are ruled by the monsoon. The monsoon changes the direction of the current circulation twice a year and is practically reversed in large areas at the time of the strongest influence. The Southwest monsoon currents are dominant in the middle part of the South China Sea and Java Sea; partly entering westward to the Strait of Malacca. Reversing of the current direction occurs during the Northeast monsoon. The Strait of Malacca has a northwesterly current throughout the year.

During the Northeast monsoon there is current in a westward direction in the Java Sea, coming from the Celebes Sea through the Strait of Macassar. This current is dominantly influenced by the current system in the Pacific Ocean. Reversing currents occur on the North shoreline of the island of Sualwesi during the whole year.

A detailed explanation of the oil contamination in the Malacca Strait may depend on geography which may produce local current features as well as activities such as refining, offshore production and tanker traffic all of which are densely concentrated in that area. This will also apply to the Strait of Macassar and the Celebes Sea since similar activities are increasing in magnitude in those areas.

Thus the critical areas for the study of oil contamination in the Southeast Asian Waters are:

- The Strait of Malacca including the Strait of Singapore;
- The Southern part of the South China Sea including the Gulf of Thailand and
- The Celebes Sea

These waters are proposed as the areas for a joint survey, since each is commonly bordered by at least three participating countries. The most vulnerable areas within each to be monitored should be decided by the individual countries to be monitored.

A joint training exercise and courses for the personnel involved in the project should be arranged within the project.

3.2.4 Output

The output of the project would be an accurate and representative assessment of the vulnerability of the coastal resources due to oil pollution through a compatible methodology.

Monitoring and assessment activities will be carried out for a duration of 18 months on a semi-annual basis, except for the oil slick observation. It is suggested that on a national level, the activities of the project be co-ordinated by a National Co-ordinating Group chaired by a National Co-ordinator. Activities of the National Co-ordinating Group may also include: translation of instructions and log forms into the different languages, and dissemination of information to all sectors concerned. A meeting of national co-ordinators is recommended to precede the operational start of the project activities. Further meetings may be called to undertake periodic evaluations and consider possible adaptations of the procedures.

3.3 Institutional Framework

States	National Institutions
Indonesia	To be determined by project co-ordinator in consultation with National Focal Points.
Malaysia	
Philippines	
Singapore	
Thailand	

3.4 Workplan and Timetable

Activities	Month
Identification of study sites	July-September 1982
Training Course	August-October 1982
Initial Measurement	November-December 1982
Preparatory Meeting I	February 1983
Semi-Annual Monitoring I	March 1983
Evaluation	April 1983
Preparatory Meeting II	August 1983
Semi-Annual Monitoring II	September 1983
Evaluation	October 1983

PART 2

1. PROJECT IDENTIFICATION

1.1 Project title: Co-operative research on oil and oil dispersant toxicity (EAS 2.2)

1.2 Project Implementation: Malaysia

1.3 Duration of Project: July 1982 - December 1983

1.4 Cost of Project (in US dollars):

Total project cost:	$25,300
funded through UNEP:	$12,650
fund through the EAS Trust Fund:	$12,650

2. OBJECTIVES

2.1 Long-term Objectives

That oil dispersants commonly used to treat oil spills are toxic is widely established, and several countries have introduced toxicity tests and restrictions on the use of high-toxicity products. There is need, however, to co-ordinate these activities on a regional basis. The ultimate goal is to identify those dispersants which are of low toxicity in combination with different types of oil, to all species tested by the participating countries, and to make a list of products approved for use throughout East Asia. This will aid regional co-operation in cleaning up oil spills, and will also help laboratories to introduce standard procedures.

2.2 Immediate Objectives

- To determine the susceptibility of key species, particularly economically important ones and their different life stages, to oil contamination, and to varying mixtures of oil and oil dispersants, as a broad platform of baseline data for future management decisions;

- To define the ecological conditions under which dispersants and dispersed oil are likely to have a significant ecological impact;

- To co-ordinate procedures and results of toxicity tests on oil dispersants throughout the region.

3. PROJECT DESCRIPTION

3.1 Background Information

The problem of oil spills is an important one in East Asia. This is due to the fact that many countries are dependent for their supply on oil transported by sea. This is accompanied by perennially high risks of accidents involving the transport and/or transfer of oil. The use of chemicals to disperse the oil on the ocean surface water has been generally resorted to. A significant drawback, though, is the toxicity of the chemically dispersed oil, which sometimes surpasses that of untreated oil. Thus, there is a need to identify the dispersants that inflict the least damage on the organisms and their environment under different ecological conditions.

3.2 Project Activities

Results of static acute toxicity tests may provide a preliminary data base. Though widely criticized, experience has shown that tests of this type have great practical application. This is especially true in light of general limitations of finances, manpower, time, and technology. Hence, the first year of the study will be devoted to the standard toxicity test.

Standards must be established for the oil dispersants and types of oil and organisms to be tested, and against which other products and specimens in the region may be referred or intercalibrated. For the oil dispersant, ten reference standards should be selected from all the oil dispersants offered for sale and use in each participating country. Tests should compare the effect of oil alone with the effects of oil and dispersant mixtures. For oil, a light Arabian crude oil is recommended as the regional standard. All standard oil for the pilot project should be obtained in a single batch in sealed 20-litre containers. For standard reference species, each country may test any number of species of local interest which may then be compared with regional and sub-regional standards, and thus with other species throughout the region. Different developmental stages can be compared as well. Criteria to be met are: that the species must be readily available throughout the region; they must be obtainable in large numbers at low cost, they must be resistant to laboratory handling, and should have an easily recognized death point. The reference organism is to be either the banana prawn, Penaeus merguiensis, or tiger prawn, Penaeus monodon. They should be 5-7 cm long, either collected from their natural habitat in unstressed areas, and acclimitised for a certain period of time or obtained from hatcheries.

The standard test adopted would be that of Thompson (1980). The test will determine percentage mortalities in the test species following a 100 minute exposure to light Arabian crude oil (5 tanks) and light Arabian crude oil plus dispersant (5 tanks) at a temperature of 25 degrees C. The student's t-test will be used to determine possible significant differences in results between the two sets of tanks. Initial experiments should determine mortalities in oil alone, using seawater controls. A test concentration producing mortalities of around 50% should be selected. This may vary from species to species.

Once the core data have been determined using the standard oil, test species, temperature and dispersants, variables may be changed, one at a time, in a wider test programme. Other types of oil that would require testing are crude oils from Malaysia, Indonesia and Philippines and topped Arabian light and fuel oil. For organisms, shrimps, grouper, sea perch, snapper, bangus fingerling, glass fish, cockle, mussels and oysters are recommended. Results from toxicity experiments would be of greater value if they enabled scientists and policy planners to predict the toxicity of oil, and of oil in varying combinations with oil dispersants, in actual field conditions. Further toxicity tests should then be designed to incorporate two general areas of variability: that encountered in the relative toxicities of different substances, and that associated with the complexity of marine ecosystems.

One problem to be addressed is the form of physical agitation to be simulated in the experiments. Mechanical dispersion in aquaria may be relevant where the results are applied to coastal waters characterized by much water movement such as wave action that would result in physical dispersion of oil and/or oil dispersants. Other types of experimental manipulations will be applicable in the investigation of enclosed and sheltered waters such as in the case of the Philippines. Similar problems concern in the incorporation of other environmental variables in the different experimental designs. The setting up of such experiments will depend on the specific field conditions to be investigated.

It is proposed that at least one researcher from each participating laboratory be trained in toxicity testing of oil and oil dispersants in an established laboratory. It is also proposed that the services of a visiting expert be considered for the project, to enable participating laboratories to resolve problems that may arise during the course of the project.

Throughout the duration of the project, iteration should be fostered among the participating laboratories and results communicated at quarterly intervals.

3.3 Institutional Framework

States	National Institutions
Indonesia	(1) (2) (3)
Malaysia	(1) Fisheries Research Institute (2) (3)
Philippines	(1) (2) (3)

Singapore	(1) (2) (3)
Thailand	(1) (2) (3)

Note: Further participation to be determined by National Focal Point responsible for the project.

3.4 Workplan and Timetable

Activities	Starting and ending
1. Training/workshop	July - August 1982
2. Selection of standards	August - September 1982
3. Standard test	August - December 1982
4. Visit of expert	October/November 1982
5. Preparation of preliminary report	November - December 1982

Expected output of the project:

1. Trained personnel

2. Adoption of standards, testing method/equipment with assistance of visiting expert

3. Preliminary test results

4. Identification of least toxic oil dispersants for use in the region

5. Capability to conduct toxicity tests on new product

6. Availability of training facilities in oil/oil dispersants testing in the region

ANNEX VII

PROJECT PROPOSAL FOR ASSESSMENT OF NON-OIL POLLUTANTS, ESPECIALLY METALS, ORGANICS, NUTRIENTS AND THEIR ENVIRONMENTAL IMPACT

Part 1 Study of the Concentration Levels and Trends of Non-Oil Pollutants

Part 2 Study of the Effects of Non-Oil Pollutants on the Marine Environment

NOTE: (i) Parts 1 and 2 of this project proposal were prepared by the focal point of the Philippines. Parts 1 and 2 correspond to draft projects EAS 3.2 and EAS 3.3 in UNEP/WG.31/3 "Programme Document for the East Asian Seas Action Plan."

(ii) Paragraphs 23 and 24 of UNEP/IG.37/10 "Report of the First Meeting of the Co-ordinating Body on the Seas of East Asia (COBSEA)" should be taken into account in the implementation of this project.

PART 1

1. PROJECT IDENTIFICATION

1.1 Project Title: Study of concentration levels and trends of non-oil pollutants (EAS 3.2)

1.2 Project Implementation: Philippines

1.3 Duration of the Project: July 1982 - December 1983

1.4 Cost of Project (in US Dollars, 1982):

Total Project Cost (Parts 1 and 2):	$30,600
funded through UNEP:	$15,300
funded through EAS Trust Fund:	$15,300

2. OBJECTIVES

2.1 Long-Term Objectives

The move of East Asian nations towards industrialization, coupled with rising population levels, has resulted in increasing levels of pollutants in the environment. Introduction of unknown levels of organic and inorganic compounds raises the issues of biodegradability, biological magnification, and related ecological and health hazards. The concept of the sea as a "safe dumping ground" has become untenable. There is therefore a need to upgrade the region's capability to assess levels of environmental contaminants from the chemical, biological, and microbiological points of view. This is for a three-fold purpose as follows: to evaluate the quality of coastal/marine waters; to evaluate the effectiveness of existing pollution control measures; and to formulate the appropriate abatement measures.

2.2 Immediate Objectives

- To assess the levels of non-oil pollutants (heavy metals, organics, nutrients, and sediments) in the coastal zone;
- To set up or identify a network of institutions capable of monitoring these pollutants, especially low levels of metals and halogenated organic compounds in marine organisms (particularly shellfish);
- To assist participating states in the improvement and expansion of analytical and water quality monitoring activities.

3. PROJECT DESCRIPTION

3.1 Background Information

The accelerated pace of development and urbanization in the region and subsequent increases in silt and sediment loads pose problems of efficient waste disposal.

Introduction of raw industrial effluents and domestic sewage into the marine environment may have several deleterious effects. Agro-industrial chemical pollution will eventually have to be dealt with by any and all developing countries. Recalcitrant molecules such as halogenated organics can be biologically magnified owing to their liophilic nature and may reach toxic levels as they move through food chains to man. Extremely high levels of domestic wastes, on the other hand, represent an oxygen stress to the marine ecosystem and may significantly depress productivity.

There are also indications of chronic public health problems in some areas that show a positive correlation with pollution levels. Incidence of health problems may be due to bathing in contaminated waters or from ingestion of contaminated fishery products, particularly shellfish. In addition to direct effects on humans, high organic and nutrient loads may be the cause of poor water quality and the incidence of red tides in some areas.

The sea should no longer be conceived of as a dumping ground since municipal/small-scale fisheries are highly dependent on productivity of coastal waters. The sanitary quality of these waters should also be maintained for recreational and aesthetic reasons. The levels and trend of important pollutants in coastal waters and in marine biota must be monitored so that appropriate measures may be instituted to avert possible serious consequences on the ecosystem as a whole, and on man in particular.

3.2 Project Activities

The project must not be viewed merely as a monitoring programme. Instead, specific reference will have to be made on land and water-based activities which contribute to the pollution load in the coastal zone and thus affecting the concentration levels and trends of the pollutants in question. Among the operational phases of the project are the following:

a) Finalization of project methodology and assessment of the national capabilities

This step primarily involves the identification of specific study areas in each country, the parameters to be determined, the methodology to be utilized, and the organisms to be monitored. An assessment will also be made regarding national capabilities with respect to the project in terms of manpower, equipment, and financial resources. This step will be undertaken at the regional level to be co-ordinated by UNEP and the expert panels.

Selection of study areas could be based on usage (e.g. bathing beaches, outfalls, shellfish growing areas) or on the degree of disturbance (e.g. pristine, developed, planned for development).

Parameters to be monitored would be derived from among the non-oil pollutants, e.g. nutrients, heavy metals, organics, sediments. Analysis will be made on water and sediment samples.

Test organisms will also have to be determined. These could be shellfish and other fish and algal species.

Finally, the assessment of national capabilities will be made with a view to identifying country needs especially in terms of equipment and expertise upon which request for supplementary assistance could be based.

b) Characterization of the study sites and review of previous studies

The study sites will be identified in each country and ecological profiles will be made on each. This essentially consists of the delineation of the drainage basin and the significant components such as resources and utilization in each. Potential point and non-point pollution sources will also be identified and, if possible, indicated in maps of appropriate scales.

If available, reference will also be made to previous studies particularly those on the volume and composition of effluent from pollution sources and on the concentration levels of pollutants in the study sites selected. This activity will be undertaken at the national level.

c) Site specific monitoring programme design and standardization of methodology

This phase involves two activities:

- Site specific monitoring programme design to ascertain institutional linkages, parameters, frequency of sampling and analysis, methods (on a national level)

- Interlaboratory exercises to determine the validity of data (on a regional scale) and to standardize sampling methods and analytical techniques.

d) Monitoring and assessment of selected parameters and organisms in the study sites

This activity is to be undertaken for a period of one year by the participating institutions in each of the countries.

e) Data analysis and report preparation

f) Project evaluation and formulation of recommendations

Among the recommendations to be formulated will be the continuation of the surveillance/monitoring activity.

3.3 Institutional Framework

States		National Institutions
Indonesia	(1)	
	(2)	
	(3)	
Malaysia	(1)	
	(2)	
	(3)	
Philippines	(1)	National Environmental Protection Council
	(2)	National Pollution Control Commission
	(3)	Philippine Atomic Energy Commission
	(4)	Ateneo University
	(5)	Silliman University
Singapore	(1)	
	(2)	
	(3)	
Thailand	(1)	
	(2)	
	(3)	

Note: Additional institutional participation will be determined by the national focal point responsible for co-ordinating the project.

3.4 Workplan and Timetable

Activity	Starting and Ending
Finalization of project methodology and assessment of national capabilities	July-December 1982
Characterization of the study area and review of previous studies	October-December 1982
Site specific monitoring program design and standardization of methods	July 1982-September 1983
Monitoring and assessment of selected parameters and organisms in the study sites	October 1983-September 1984
Data analysis and report preparation	October 1984-March 1985
Project evaluation	April-June 1985

PROPOSED
MONITORING PARAMETERS

Parameter	Medium			Sampling Frequency			Analytical Method
	Water	Sediment	Marine Organism	Water	Sediment	Marine Organisms	
Bacteriological	X		X	W			Total, focal coliform
Floating Particulates	X			W			Flotation funnel separation
Suspended Solids	X			W			
pH	X						Glass fiber filtration
Arsenic	X	X	X	Q	Q	Q	Metals: AAS Method Digestion AAS method
Cadmium	X	X	X	Q	Q	Q	
Copper	X	X	X	Q	Q	Q	
Lead	X	X	X	Q	Q	Q	
Mercury	X	X	X	Q	Q	Q	
Zinc	X	X	X	Q	Q	Q	
Cyanide	X	X	X	Q	Q	Q	
Identifiable chlorinated Hydrocarbons	X	X	X	M	M	M	Gas chromatographic method
Salinity	X			W			Salinometer
Temperature	X			W			Thermometer
Dissolved oxygen	X			W			
Species Lists			X			M	
Biomass.			X			M	
Total Phosphate	X			W			
Total Nitrogen	X			W			

W = Weekly
M = Monthly
Q = Quarterly

PART 2

1. PROJECT IDENTIFICATION

1.1 Project Title: Study of the effects of non-oil pollutants on the marine environment (EAS 3.3)

1.2 Project Implementation: Philippines

1.3 Duration of Project: July 1982-December 1983

1.4 Cost of Project (in US dollars, 1982):

Total Cost of Project (Parts 1 and 2):	$30,600
funded through UNEP:	$15,300
funded through EAS Trust Fund:	$15,300

2. OBJECTIVES

2.1 Long-term Objectives

East Asian countries rely heavily on marine fisheries as a principal protein source. Maintenance of optimum levels of productivity of these resources entails monitoring and assessment of the effects of pollutants on the marine biota. How heavy metals, organics, silt, and sediment loads influence euthrophication, productivity, human health, and recreational amenities in the coastal zone needs to be addressed. Some of the most damaging effects on economically important species by contaminants like the polychlorinated organics (DDT, PCB's, etc.), and heavy metals (e.g. mercury and cadmium) are not as readily apparent as their toxicological effects. Some of these effects, like decreased survival of juvenile forms and subtle chromosomal changes, require sophisticated studies.

Since fisheries are a vital economic activity of the region, there is a need to develop the limited capabilities of the different countries for investigating the effects of industrial and domestic discharges into the marine environment and for assessing the effects of siltation and sedimentation on the marine biota.

2.2 Immediate Objectives

- To assess the effects of turbidity and siltation on the ecophysiology, productivity and behaviour of selected species, particularly in the estuaries;

- To determine the effects of specific contaminants belonging to the two classes, the heavy metals and the polychlorinated organics, on important marine organisms;

- To assess the effects of organic and nutrient loads on marine biota including phytoplankton;

- To design and implement a program for the sanitary and health surveillance of coastal recreational areas and of shellfish growing in water.

3. PROJECT DESCRIPTION

3.1 Background Information

Increasing industrialization and urbanization of many parts of East Asia is resulting in the mobilization and discharge of large quantities of actually or potentially harmful materials, both organic and inorganic, into the marine environment. Domestic wastes, although largely degradable, constitute an oxygen stress to the marine ecosystem and may be a source of pathogens. On the other hand, the physico-chemical properties of polychlorinated organics such as DDT and PCB, and of heavy metals like mercury, lead and cadmium, render them particularly noxious to marine life. Their effects range from visible changes in organisms such as death, disease symptoms and other morphological alterations, to changes in various physiological and behavioral functions, to more subtle genetic aberrations. These changes which may affect the condition of whole species groups on which man is dependent economically and which may also affect the balance of the entire ecosystem must be studied so that preventive measures may be adopted. Effects of siltation and sedimentation of rivers and coastal areas, particularly on the living resources of estuaries must also be evaluated to protect fishery resources and marine communities.

3.2 Project Activities

Project activities essentially consist of laboratory and in situ bioassays and epidemiological studies to correlate health effects and degree of pollution in the coastal areas. Thus, to attain the project's objectives, the following activities are to be undertaken:

a) Finalization of operational norms and assessment of national capabilities with respect to project implementation

Completed studies related to the project will be reviewed from which the project design will be derived.

The output from this activity would be the criteria for the selection of the study sites in each country in addition to the parameters to be determined and correlated, the test organisms to be used and the methodology to be employed. This is to be undertaken by an expert panel at the regional level.

The participating institutions/laboratories will also have to be identified and assessed so as the proper representations can be made with funding agencies for supplementary assistance.

b) Standardization and testing of methodology

This will be undertaken on a regional scale wherein training and interlaboratory comparison and calibration activities will be made. Projected specific methodologies will be on the following:

- laboratory bioassays

  to correlate turbidity and silt levels with respiration, productivity and behavior of selected marine species;

  to correlate pesticide and heavy metal concentrations with respiration of selected marine species;

  to evaluate the toxicity of heavy metals and pesticides to selected marine organisms;

  to determine effects of organic and nutrient loads on selected marine organisms and phytoplankton

- in situ bioassays

  substantiate results of the laboratory bioassay tests

- epidemiological studies

  to correlate incidence of water-borne diseases on the sanitary conditions of the specific study sites.

At the national level, testing of methodology is to be undertaken to further verify the validity and practicability of the bioassays and the epidemiological studies. Further, consultations and interactions at the regional level are also envisioned in this activity.

c) Initiation of laboratory and field studies on selected organisms and contaminants

d) Data analysis and report preparation

e) Project evaluation and formulation of recommendations

This project presupposes prior approval and operation of EAS 3.2 (Part 1).

3.3 Institutional Framework

States	National Institutions
Indonesia	(1) (2) (3)
Malaysia	(1) (2) (3)
Philippines	(1) Nat. Environmental Protection Council (2) Nat. Pollution Control Commission (3) Phil. Atomic Energy Commission
Singapore	(1) (2) (3)
Thailand	(1) (2) (3)

Note: Additional institutional participation will be determined by the national focal point responsible for co-ordinating the project.

3.4 Workplan and timetable

Activity	Starting and ending
Finalization of operational norms and assessment of national capability	July-September 1982
Standardization and testing of methodology	October 1982-March 1983
Initiation of laboratory and field studies on selected organisms and contaminants epidemiological studies	April-November 1983
Data analysis and report preparation	December 1983-February 1984
Project evaluation	March 1984

ANNEX VIII

PROJECT PROPOSAL FOR ASSESSMENT OF THE IMPACT OF POLLUTION ON, AND HABITAT DEGRADATION OF CORAL ECOSYSTEMS

Part 1: Survey of the State of Coral Resources

Part 2: Effects of Pollutants and Destructive Factors on Coral Communities and Related Fisheries

NOTE: (i) This project proposal was prepared by a consultant in co-operation with the focal point of the Philippines. Parts 1 and 2 correspond to draft projects EAS 4.1 and EAS 4.2 in UNEP/WG.31/3 "Programme Document for the East Asian Seas Action Plan."

(ii) Paragraphs 25 and 26 of UNEP/IG.37/10 "Report of the First Meeting of the Co-ordinating Body on the Seas of East Asia (COBSEA)" should be taken into account in the implementation of this project.

PART 1

1. PROJECT IDENTIFICATION

1.1 Project Title: Survey of the State of Coral Resources (EAS 4.1)

1.2 Implementation: Philippines

1.3 Duration of the Project: July 1982 - December 1983

1.4 Cost of Project (in US dollars):

Total project cost:	$27,500
funded through UNEP:	$13,750
funded through the EAS Trust Fund:	$13,750

2. OBJECTIVES

2.1 Long-term Objectives

In view of the significant contributions of coral reefs to the productivity of coastal waters, and of the extreme vulnerability of these ecosystems to increasing rates of degradation, there is now an urgent need for rational management of these resources. Any effective management scheme, however, must begin with sound knowledge of the extent and condition of these resources. This involves obtaining sufficient information on their geographic range and distribution in each country, as well as their type, structure and species composition. The scientific data gathered should be supplemented by observations on the socio-economic conditions of local populations dependent on these resources.

Comprehensive surveys of coral resources will encounter limitations in technology, time, manpower and financial resources. Where sophisticated methods such as remote sensing are inapplicable, simple survey and monitoring techniques should be designed which would enable the gathering of data with the participation of people with a minimum of training. Sufficient information should be obtained which could serve as a basis for management decisions to be drawn up immediately, as well as for more comprehensive studies to be conducted in the future. Such knowledge should also be useful in the allocation of these resources according to priority areas in order to preserve the various ecosystems, while at the same time maintaining their roles as sources and means of sustenance for the populations dependent on them.

2.2 Immediate Objectives

- To gather information on the location, extent, distribution, type, and dynamics of coral resources.

- To determine the present state and rates of degradation of these resources.

- To determine the socio-economic aspects of local populations that have a bearing on the state of the coral resources on which they are dependent.

3. PROJECT DESCRIPTION

3.1 Background Information

Southeast Asia lies in that part of the world which is noted for harboring the highest degree of coral reef development and diversity, the West-Indo Pacific region. Coral reefs rank among the most productive of marine ecosystems. By virtue of the exceeding complexity of their dynamics and trophic structures, coral reefs generate and recycle nutrients which serve as a vital food source for a host of organisms.

Coral reefs also provide a variety of habitats which serve as feeding, breeding and nursery grounds for indigenous and transient aquatic populations. It is noteworthy that the great majority of the people of Southeast Asia depend on these high rates of production for a significant portion of their sustenance, such as animal protein in the form of fish, molluscs and crustaceans. Additional benefits are the physical protection afforded from the destructive forces of the sea, and contribution to land accretion.

Because coral reefs are extremely vulnerable to destructive factors, their deterioration is proceeding at an alarming rate in many parts of Southeast Asia. To lay the groundwork for conservation programs, comprehensive surveys of coral resources are to be conducted in those countries where they have not been done.

3.2 Project Activities

Preliminary data gathering

A. Establishment of existence and extent of coral reefs in each country

This information will comprise the working framework of the surveys to be conducted, and will serve as a basis for the selection of study sites. It should contain the following: geographic location, extent, and distribution of coral reefs in each country. The above data may be obtained from:

1. Published and unpublished literature - technical reports, popular and scientific articles, public documents, etc.

2. Topographic maps

   Landsat imageries

3. Interviews with local authorities and inhabitants of an area

4. Actual spot checks

Compilation of previous studies

All previous studies on the coral resources of each country should be integrated to form a preliminary picture, to be developed by the subsequent surveys, and to contribute to the working framework of the entire project. Past studies on the following would be especially useful.

1. Taxonomy

2. Distribution

3. Reef type, morphology and structure

4. Community structure

5. Reef dynamics - e.g. growth
   productivity
   recycling of nutrients

6. Ecology

7. Environmental impact assessments

The above work should then be organized into a bibliography of coral reef studies to serve the entire region.

Establishment of a working definition for coral reefs

Scientists do not yet seem to have reached a consensus as to the correct definition of a "reef", and the structures that should be included in this category. For the purposes of this study, however, any coral community of appreciable extent that contributes significantly to the productivity of the surrounding waters and to the morphological features of the adjacent coastline should be considered. It should not be too critical at this point that a particular "reef" under consideration should possess all the characteristic physiographic zones, or be built up to any significant relief.

Selection of survey sites

The basis of selection of survey sites is that they be as representative as possible of the state of coral reefs in the country. Possible criteria to be followed are:

(i) that stations be selected in each major geographic zone of the country;

(ii) that reefs representing different types of coastal exposure be surveyed (e.g. windward, protected);

(iii) that distinctive environmental situations be taken into account (e.g. estuaries, lagoons, banks, channels, cays); and

(iv) that control areas be selected, as well as areas presently subjected to environmental stress, and areas likely to be subjected to such.

Other factors to consider are accessibility, availability of local facilities, and security of the area.

Actual surveys

A. Preliminary assessment

Where time is not pressing, it would be useful to conduct an initial, rapid survey of the study area. This could be accomplished by covering the area by swimming, or with the aid of a glass-bottomed boat or underwater sled, while noting down general descriptive characteristics. The latter may include: an estimate of areal extent; general state of the reef (flourishing or stressed); type of reef (fringing, barrier, patch reef); zonation, if distinctive enough; predominant communities (algae or coral); type of sediment (silt, sand, rubble, rock, etc.); existence and dimensions of major geographic features such as lagoons. This initial survey would then serve as a basis for selecting the representative sections of the reef at which to lay down the transects and quadrats for more detailed sampling and measuring. It would also provide an idea as to how many transects and quadrats would constitute an adequate sampling of the area.

B. Determination of existing structural, growth and ecological conditions

It is suggested that the method developed by the Marine Sciences Center of the University of the Philippines be adopted for reasons of (1) intercomparability with data already gathered on a large scale for Philippine reefs; and (2) the proven effectiveness of the method for the purposes of this project. While relatively rapid and simple in application, it allows for data to be gathered on the following: reef profile, hard and soft coral cover, both living and dead; abundance (optional); dominant coral types, taxa, or growth forms;

sediment type; and conspicuous associated organisms, such as sponges, algae and seagrasses. To a lesser extent, the data thus gathered would yield approximate information on distribution of corals and zonation of the reef.

Coral cover and abundance are considered indices of the state of health of a coral reef. The same is true for certain species of fish and algae.

Where it is not possible to identify corals to species, generic or family listings should suffice. Descriptions of growth form are also useful, especially in the characterization of particular environmental regimes (e.g. with regard to light, water movement, etc.). If necessary, specimens for identification (but properly documented as to locality, depth and time of collection) may be sent to known taxonomists in the region who are willing to extend their assistance.

A survey data sheet has been developed, also by the Marine Sciences Center, as a guide for the field worker to ensure that data gathering is as exhaustive as possible (see Appendix A).

If the reef is visibly stressed, it is suggested that a visual assessment of the damage, at the least, be made. This would include estimates on the extent of the damage, and the possible factors that could have caused it. A field assessment of cases of reef destruction may be supplemented by a questionnaire to be distributed to local authorities (to be discussed later).

A description of the recommended method is as follows: Its features draw from the various transect and quadrat techniques developed by field workers in the past (see, for example, the fifth UNESCO monograph on oceanographic methodology, Coral Reefs: Research Methods, edited by D. R. Stoddart and R. E. Johannes). A transect line is laid out perpendicular to the coastline, from the portion of the reef that is furthest inshore, up to and over the crest, and down to the foot of the slope. Where the terrain is relatively horizontal, a 1 m^2 steel or brass quadrat divided into sixteen 25 x 25 cm squares is laid down at 20 - m intervals. Counts of squares are then made based on occupation by the different categories indicated in the survey data sheet. Where ambiguity exists, a coverage of 50% or more in a square is to be counted, while that below 50% is disregarded. For an index of abundance or density, counts of all individual live coral colonies within a quadrat may be made.

The sampling interval of 20 m may be reduced to 10 at the reef slope to account for more distinct zonation in this region.

C. Monitoring of physico-chemical parameters

Salinity should be monitored in areas where it is particularly critical, such as near river mouths or desalination plants.

Turbidity is a useful parameter, since it provides a ready indication of water quality and possible ecological stress in many cases. It may be measured with a standard Secchi Disc, or by estimates of horizontal visibility.

D. Assessment of socio-economic conditions of local populations

The proposed questionnaire (Appendix 3) is intended to generate data on the relevant socio-economic aspects pertaining to local populations that depend to varying extents on a reef's resources. A picture of the condition of a reef as obtained by field surveys is incomplete without knowledge on the nature of the factors that may have brought it about, which more often than not are man-caused.

E. Workshop on Methodology

A workshop to standardize the methods of reef survey is planned in the early stages of the project. Final revisions of the methodologies proposed will be made at that time.

Expected Output
(for first 6 months)

1. Synthesis of existing data

2. Adoption of standard methods for use in the region

3. Trained personnel

4. Report of initial field surveys (for the project)

5. Assessment of status of coral reefs in the region with respect to extent and condition

3.3 Institutional Framework

Indonesia	(1)	
	(2)	
	(3)	
Malaysia	(1)	
	(2)	
	(3)	
Philippines	(1)	Marine Sciences Center, Univ. of Philippines
	(2)	Natural Resources Management Center
	(3)	Bureau of Fisheries and Aquatic Resources
Singapore	(1)	
	(2)	
	(3)	
Thailand	(1)	
	(2)	
	(3)	

Determination of additional institutional participation will be the responsibility of the focal point co-ordinating this project.

3.4 Workplan and Timetable

Activities	Starting and ending
Gathering and analysis of existing data	July - December
Workshop on survey methods	July
Selection of survey sites	August - September
Actual surveys	October - December
Data analysis and report preparation	November - December

APPENDIX A
REEF SURVEY DATA SHEET

Location (Island): _____ Observers: _____

Date: _____ Time of Observation _____ Methods: _____

VISIBILITY: Horizontal - _____ m Vertical - _____ m

LOCALITY (Specific location)

_____

DISTANCE FROM SHORE

Shallow end _____

Deep end _____

_____

CAUSE OF DESTRUCTION

EXTENT OF DAMAGE

CONDITION OF REEF								
STA	DEP	HC	SC	DC	R	S	(Optional)*	NOTES
300								
280								
260								
240								
220								
200								
180								
160								
140								
120								
100								
80								
60								
40								
20								
0								
AVG								
%								

DOMINANT TAXA OR FORMS

_____

CONSPICUOUS ASSOCIATE ORGANISMS

Fish -

Invertebrates -

Algae

_____

REMARKS

*This column to be used for coralline algae or other components considered important by the investigator.

APPENDIX B

QUESTIONNAIRE

I. Population

A. Size
B. Major means of livelihood
C. Percentage dependent on reef resources

II. Harvestable resources (in commercial quantities) associated with the reefs

- Corals
  Other Invertebrates
  Fish
  Seaweeds

- For each of the above categories, obtain information on:

A. Quantity harvested (e.g. $kg/m^2/mo.$)
   Frequency of harvesting

B. Means of harvesting (e.g. type of gear used)

C. Management schemes, if any

III. Stress to the reef

A. Existence of the following indices:

1. Decrease in harvestable quantities of certain organisms
2. Decrease of live coral cover
3. Increase in dead coral cover and/or rubble
4. Decrease in water quality/clarity

B. Reports or evidence of the following perturbations:

1. Excessive harvesting
2. Destructive fishing techniques
   e.g. Blasting
        Muro-ami
        Bottom trawling
        Use of poisons
3. Poaching
4. Siltation
5. Pollution
6. Physical disruption of the reef environment
   e.g. Dredging
        Construction along the coast

- Include estimates of extent, scale and duration

NOTE: If quantitative estimates cannot be provided, even narrative or descriptive accounts would be useful.

PART 2

1. PROJECT IDENTIFICATION

1.1 Project Title: Study of the Effects of Pollutants and Destructive Factors on Coral Communities and Related Fisheries (EAS 4.3)

1.2 Implementation: Philippines

1.3 Duration of Project: July 1982 - December 1983

1.4 Cost of Project (in US dollars) (see 1.4 in Part 1):

2. OBJECTIVES

2.1 Long-term Objectives

In monitoring the effects of various destructive factors on coral reefs, the response of the entire ecosystem should be considered, since all aspects are interrelated. Studies should be designed to obtain a holistic view of its structure, organization and dynamics. An understanding of both direct and indirect influences is important. Emphasis is given to long-term impacts although short-term effects may be critical as well.

At the level of the individual components of the ecosystem it is important to consider the threshold levels, or the critical limits, at which the different factors actually inflict harm on the organisms. This objective should be viewed in the light of Project EAS 3.3.

An important consideration is the effect of the different destructive factors on the productivity of the coral reef ecosystem. This involves aspects of primary production and trophic dynamics, with attention focused ultimately on fish production which is of critical concern in the Southeast Asian region. A related, equally important problem is that of obtaining optimum sustainable yields for both stressed and unstressed reefs. An ultimate goal would be to be able to predict with reasonable accuracy the effects of stresses on fisheries productivity and to formulate the proper conservation measures for this resource.

The picture would be incomplete without knowledge of the socio-economic conditions of populations dependent on the coral resources. An essential feature of such a study would be existing exploitative and management practices, and their resulting impacts on these resources.

2.2 Immediate Objectives:

- to assess the nature, extent and levels in coral reef ecosystems of the different destructive factors, including pollution, siltation, excessive exploitation, and blasting;

- to determine the effects of these stresses on the biology and community structure of the major organisms;

- to monitor the important physical and chemical parameters and the changes they may undergo due to the above stresses.

- to correlate the degree of destruction of coral reefs with their productivity with emphasis on fish production;

- to consider the possibility of regeneration of these resources under varying stages of degradation;

- to compare the responses and resilience of stressed and unstressed ecosystems; and

- to derive an understanding of the socio-economic profiles of local populations and how these have a bearing on the state of preservation or deterioration of nearby coral reefs.

3. PROJECT DESCRIPTION

3.1 Background Information

Coral reef ecosystems have evolved adaptive mechanisms to cope with natural stresses. The escalation of destructive factors of anthropogenic origin, however, is relatively recent, and has exacted a severe toll on these resources. There is need for quantitative assessments of the effects of these man-induced stresses.

Man has inflicted damage on coral reefs either by selective harvesting of species of both plants and animals, or by direct physical alteration of the environment. The more important factors are pollution, unrestricted exploitation of organisms, large-scale clearing or denudation, siltation, and blast fishing.

Since they are situated in the coastal zones, coral reefs are highly vulnerable to pollution from agricultural, industrial and municipal sources based on land. In many Southeast Asian countries, pollution by organic wastes is heavy in the vicinity of factories processing sugar, wood, rubber, pineapple, palm oil, tapioca and other agricultural products. These are characterized by a high Biological Oxygen Demand (BOD) upon decomposing, and cause the depletion of oxygen in the surrounding waters. Other pollutants from land-based sources are the heavy metals, chlorinated hydrocarbons, and various petroleum products.

The uncontrolled gathering of reef biota is a problem in many parts of the region. Coral reefs provide man with a variety of useful organisms such as seaweeds, molluscs, crustaceans, fish, and the coral themselves. Overexploitation may result in physical deterioration of the entire reef and serious imbalances in the dynamics of the ecosystem. Large tracts of coral reefs are also destroyed by dredging necessitated by coastal development or the construction of navigation channels.

A particularly serious problem in Southeast Asia is that of siltation. A major cause of this is widespread deforestation and other practices associated with land clearing, such as for agricultural purposes. An important source of siltation in Thailand is offshore tin dredging; in Singapore, harbor dredging and reclamation. Levels of siltation constitute a threat when they exceed the threshold limits of the different organisms. Silt exerts a destructive influence by interfering with vital environmental factors like incident light and planktonic food supply. It also affects the organisms directly, such as by smothering, abrasion, and clogging of the food and respiratory passages.

Because of the increasing demand for food, fishermen have increasingly resorted to blasting as a quick and easy way for catching fish. Though illegal, this practice has become widespread. Depending on the size of the explosive, small or large portions of the reef are destroyed. Recovery or regeneration usually takes decades, if at all.

Of utmost concern is the effect of the various destructive factors on the productivity of coral reefs, particularly fisheries production. Different species of fish and crustaceans are partially or wholly dependent on the trophic cycles of these ecosystems, and are variously affected by such phenomena as biomagnification of toxic, non-degradable substances. In addition, decreasing fish productivity is believed to be directly linked to the simultaneous degradation of coral resources.

Finally, since people and natural resources are inextricably linked, a most important consideration is the socio-economic condition of local populations dependent on the productivity of coral reefs. This is especially relevant in Southeast Asia where a significant percentage of the people derive their means of livelihood from these resources.

3.2 Project Activities

Selection of study sites and preliminary data gathering

The response of a coral reef ecosystem to varying degrees of environmental stress may be elucidated by comparative studies of different reef areas. Undisturbed or control areas, as well as those subjected to increasing levels of environmental perturbation, should be monitored periodically over the four year period of the project.

Monitoring will be facilitated by the selection as study sites of areas already known, documented, or reported as being disturbed. Any number of the following causes of degradation (adapted from the IUCN Coral Reef Committee list) may be investigated:

A. Collecting and fishing in excess or illegally

1. Collecting of shells and corals by tourists or commercially

2. Collecting of reef fish for aquariums

3. Collecting of coral-reef resources for local populations

4. Spear-fishing

5. Commercial fishing in reef areas

6. Dynamite used for fishing and for public works

7. Poison and other toxic chemicals used for fishing

8. Other destructive fishing methods (e.g. muro-ami)

B. Pollution

1. Pesticides and detergents

2. Sediments from soil

3. Sewage and eutrophication

4. Oil

5. Thermal effluents

6. Industrial wastes

7. Heavy metals

8. Radioactivity

C. Disturbance

1. Dredging activities

2. Constructional activities contiguous to reefs

3. Recreational impacts (scuba and snorkel activities, boating and anchor damage)

4. Introduction of alien or exotic species

5. Acanthaster problems

6. Mining of coral rock, sand, and shellgrit

7. Oil and gas drilling, mineral prospecting.

All existing information on a particular site should be gathered prior to monitoring. This may be obtained from published and unpublished literature and from interviews with local officials or private citizens.

Environmental monitoring

Monitoring of identified sites is to be on a quarterly basis for the first 24 months and semi-annually thereafter. The nature of the stress under investigation will determine the relevant physical and chemical parameters to measure. These may include:

A. Physical parameters

1. Nature, extent, and degree of physical dmage to the reef - to be assessed by visual observations and photographs

2. Temperature - with the use of minimum-maximum thermometers or with continuous recording thermographs, to be supplemented with spot measurements using ordinary thermometers

3. Water movement - with the use of current meters, dyes, drogues and/or clod cards

4. Turbidity - with Secchi disks, turbidity meters, or by estimates of horizontal visibility under water

5. Sedimentation rates - with sediment traps. For purposes of intercomparability of data, standard dimensions should be established - mouth aperatures in the order of a few centimeters in diameter would be suitable. Depending on the nature of the sedimentation (e.g. bedload or suspended sediment), the traps are set at varying levels of the water column.

6. Sediment composition by particle size - with standard sieves.

B. Chemical parameters

Water or sediment samples may be collected at different points on a reef, to be determined by the prevailing stress gradient. These may then be analyzed in the laboratory for the following:

1. Nutrients

2. Heavy metals

3. C.O.D.

4. B.O.D.

5. Chlorinated hydrocarbons

6. Sewage

Certain parameters are readily measured in the field, such as salinity, dissolved oxygen, and pH. Where appropriate, the assessment of pollutants may be referred to projects EAS 3.2 and EAS 3.3.

Biological parameters

Permanent transects should be established for periodic monitoring. The number of transects should adequately represent a reef area. They should also encompass all significant gradients of the existing stress.

1. Corals

These are an essential component to monitor as they are the primary reef-builders. Two aspects should be considered: community structure and the response of individual corals.

The characteristics of community structure relevant to the present project may be monitored using the method recommended for Part 1. This method allows for data to be gathered on live and dead coral cover, and possibly abundance. It also provides for species composition which gives a rough idea of diversity. In addition, the data gathered may yield information on distribution, this being significant in relation to the gradient of stress along the reef. The method calls for a listing of conspicuous associated organisms. This should prove useful if properly evaluated, since certain species of fish and algae are considererd reliable indicators of state of health of a reef. A good description of the coral communities, especially with regard to colony size and numbers, should provide an idea of the prevailing physical and chemical conditions for larval recruitment, settlement, and viability. These factors are crucial in the maintenance or recovery of a stressed reef and should therefore be taken into account.

For the study of the responses of individual corals, selection of suitable species is limited to those known to be extremely sensitive, or to respond readily to, environmental conditions (e.g., members of the genus Acropora). Fluctuations in environmental parameters are readily reflected in the growth of these corals which is easily measured by linear measurement techniques. Rates of regeneration are usually measured similarly. Survival and mortality rates are also useful. The general appearance of a coral colony is frequently indicative of its physical condition, whether healthy, stressed, or near death.

2. Fish and other related resources

The most useful index of the status or condition of a fishery resource is its productivity. An essential first step is to obtain catch statistics from local government records and from the fishermen themselves. This is to be done periodically by interviews and by actual observation and assessment of the catch on a systematic basis. For an accurate assessment of productivity, care must be taken to incorporate the corresponding fishing methods and types of gear used, and the frequency of the harvest.

The above observations may be supplemented by actual sampling of standing stock. A number of methods are available, such as visual censusing and collection with the use of rotenone or explosives. Some of these are discussed in the UNESCO monograph on Coral Reefs: Research Methods edited by Stoddart and Johannes.

Levels of particular pollutants in selected species may be assessed using the methodologies developed in EAS 3.2.

III. Socio-economic studies

If properly carried out, concurrent studies of the socio-economic profiles of local populations living in proximity to coral reefs should yield insights on the human causes of reef degradation; in particular, their origins, reasons for coming into being, and how they may be curtailed. Such studies should also include the existing exploitative practices, as well as conservation schemes (if any), and their resulting impacts on the ecosystem.

This component of the project should in part serve as an offshoot of that developed in Part I. It may prove helpful to augment it by conducting case studies of specific localities that are known to be important by virtue of their productivity, or their role as focal points in the interaction of coastal and inland populations. These would better elucidate the role of power politics, in addition to the economic, social, and cultural fabric of a coastal community, in bringing about the conditions prevailing in the resources in question.

3.3 Institutional Framework

States	National Institutions
Indonesia	(1)
	(2)
	(3)
Malaysia	(1)
	(2)
	(3)

Philippines	(1)	Marine Sciences Center, Univ. of Philippines
	(2)	Natural Resources Management Center
	(3)	Bureau of Fisheries and Aquatic Resources
Singapore	(1)	
	(2)	
	(3)	
Thailand	(1)	
	(2)	
	(3)	

Additional institutional participation is to be determined by the national focal point responsible for co-ordinating the project.

3.4 Workplan and Timetable

Activities	Starting and ending
Site selection	July - September
Workshop (see Part 1*)	July
Initial surveys and experiments on diversity, abundance, distribution, growth and cover measurements, productivity and field data	August - December
Quarterly monitoring, including data analysis	September - December
Data analysis and report preparation	November - December

IV. Expected Output
(for the first six months)

1. Identification of pollutants and destructive factors to be studied

2. Determination of sites to be studied

3. Preliminary results of monitoring

* The proposed workshop is intended to be a joint UNESCO/UNEP activity. It is anticipated that UNESCO/ROSTSCO will allocate $10,000 towards this workshop.

ANNEX IX

PROJECT PROPOSAL ON INFORMATION AND DATA EXCHANGE

NOTE: (i) This project proposal was prepared by the focal point of Indonesia. It corresponds to the draft project EAS 7 in UNEP/WG.31/3 "Programme Document for the East Asian Seas Action Plan."

(ii) Paragraph 27 of UNEP/IG.37/10 "Report of the First Meeting of the Co-ordinating Body on the Seas of East Asia (COBSEA)" should be taken into account in the implementation of this project.

EAS 7 INFORMATION AND DATA EXCHANGE

1. Project Identification

1.1 Project title: Development and/or strengthening of national co-ordinating mechanisms for the management of relevant information and data, leading to the subsequent establishment of a regional exchange system

1.2 Project implementation: Indonesia

1.3 Duration of project: July 1982 - December 1983

1.4 Cost of project (in US dollars):

Total project cost:	$16,000
funded through UNEP:	$ 8,000
funded through the EAS trust fund:	$ 8,000

2. Objectives

2.1 Long-term objectives

The acquisition of relevant information on the marine environment is imperative in the formulation of practical and applicable strategies, and in decision-making relating to marine environmental management and development. Such information should be made available at all times to decision-makers, planners and others requiring it. Hence, there is a need to promote the systematic exchange of information on the marine environment at the national and regional levels through a network of information centres, with UNEP playing a catalytic and co-ordinating role. This same network would facilitate the flow of information between the region and other parts of the world. The above objectives would be achieved by strengthening national capabilities in monitoring and co-ordination of marine environmental information, with the ultimate view of establishing the most appropriate system for permanent and viable data collection and exchange in the region.

2.2 Immediate objectives

- To strengthen existing national mechanisms for the acquisition, storage, processing and retrieval of marine environmental information, and to establish new mechanisms where the need for these arises;

- To facilitate the co-ordination among these mechanisms in each participating country;

- To increase the effectiveness of data collection, collation and exchange on a regional level;

- To develop standard and unified formats and procedures for cataloguing, indexing and storing of data for more efficient and effective information exchange.

There is, at present a tremendous expansion and diversification of activities with regard to the marine environment. This is especially true in view of the several projects included in the East Asian programme that will be implemented by national institutes and research agencies throughout the region. It will be necessary to establish a national co-ordinating mechanism in each country to liaise with the regional co-ordinating unit of the programme as well as to monitor the work of national institutes. This will be one step towards the development of a system of collection and handling of marine environmental data which centres on a network of information processing and exchange on a regional and world-wide basis. While the national co-ordinating mechanism may serve as a repository of data acquired by the various research institutes, it could also function as a focal point for co-ordination among the different information agencies in each country. Worldwide information networks such as ASFIS, INFOTERRA and MEDI have established bases of operation in several countries and offer vital contributions to the information exchange effort of the East Asian Seas Programme. ASFIS (Aquatic Sciences and Fisheries Information System) is an international information system for the science and technology of marine and freshwater environments. It is being developed by the Food and Agricultural Organization of the United Nations (FAO) and the Intergovernmental Oceanographic Commission (IOC) in collaboration with national centres in an increasing number of countries. The co-ordinating centre is in FAO's Department of Fisheries. The system has received substantial support during the initial development phase from UNEP. INFOTERRA, UNEP's International Environmental Network, operates as a decentralized network incorporating existing national and international information services and systems. It comprises a co-ordinating office at the UNEP Headquarters in Nairobi, Kenya, and an international grid of government-designated national focal points. International agencies and non-governmental organizations are also included in the East Asian region. INFOTERRA national focal points are found in Indonesia, Malaysia, the Philippines and Thailand.

MEDI (Marine Environmental Data Information Referral System) is designed to provide the marine community with referrals concerning the availability and location of the many inter-disciplinary as well as traditional marine science data collections held by marine-orientated organizations and centres. The MEDI network is comprised of the following organizational participants: IOC, FAO, IAEA, UNEP, WHO, ICES, IHC and EUROCEAN. The IOC-operated MEDI Co-ordination Centre is located in the UNESCO Headquarters in Paris. It also acts as a sectoral focal point for marine sciences within UNEP's Environmental Information Referral System, INFOTERRA.

3.2 Project activities

The preliminary phase of the project will be devoted to a review of the present state of the art in the collection and handling of information

on the marine environment. The nature and type of information system and data files existing in each country will be identified. This task may be carried out by working groups formed by each participating country, with technical assistance provided by outside experts upon request by the regional co-ordinating unit. The resulting evaluation will highlight the strengths and problem areas of the present system, to be followed by recommendations on necessary measures to be taken to improve it.

A national centre or co-ordinating unit will be designated in each country to serve as a focal point in a systematic network of contributory sources of marine environmental information. These co-ordinating units will establish active contact and co-operation with marine environmental information networks already existing in each country, such as ASFIS, INFOTERRA and MEDI.

It is recommended that a regional seminar-workshop be held to develop a systematic and uniform methodology for data collection and processing to ensure the validity and intercomparability of data, as well as to come up with a standard information exchange system. Such a system must be appropriate and acceptable to all countries concerned. Based on the workshop output, each participating country shall revise or reconstruct its national co-ordinating mechanism to adhere to the adopted guidelines. Finally, local expertise will be developed to operate and manage the information centres and co-ordinate information collection exchange at the national and regional levels.

3.3 Institutional framework

States	National Institutions
Indonesia	(1) Information and Documentation Centre on Environmental Problems, Office of the State Minister for Development Supervision and Environment. (2) National Scientific Documentation Centre (PDIN), Indonesian Institute of Sciences (LIPI). (3) Oceanographic Data Centre, National Institute of Oceanology (LON). (4) Data and Information Centre, Indonesia/Oil and Gas Technology Development Centre (LEMIGAS).
Malaysia	(1) (2) (3)
Philippines	(1) (2) (3)
Singapore	(1) (2) (3)
Thailand	(1) (2) (3)

Determination of additional institutional participation will be the responsibility of the focal point co-ordinating the project.

3.4 Workplan and timetable

Activities	Starting and ending (from month 0)
Review state of the art and problem areas; identification of nature and type of existing systems and data files; assessment of capabilities of national co-ordinating mechanisms	0-3
Workshops/seminars to discuss information exchange system; standardization and development of systematic methodology for data handling; training of local expertise	4-12
Establishment and strengthening of national network mechanisms	13-24
Report preparation	22-24

ANNEX X

SUMMARY OF AGREED PROJECT ACTIVITIES
AND BUDGET ALLOCATIONS FOR 1982

	Project	Activities	Budget Allocation (US$)
1.	EAS 1.1 Observation of Maritime Meteorological Phenomena and their Influence on Water Movements (Annex V)	- Workshop on EAS Oceanography and Meteorology - Oceanographic Cruise	
	EAS 1.2 Study of Oceanographic Features with Emphasis on Hydrography, Water Masses, Water Circulation and their Effects upon Pollution Dispersion Patterns (Annex V)	- Equipment and Laboratory Supplies - Personnel	$32,300
2.	EAS 2.1 Survey of Sources and Monitoring of Oil Pollution in the Marine and Coastal Areas (Annex VI)	- Identification of Monitoring Sites - Training Course - Analysis of Samples	$25,300
3.	EAS 2.2 Co-operative Research on Oil and Oil Dispersant Toxicity (Annex VI)	- Co-ordination Meeting - Training Course - Equipment and Laboratory Supplies	$17,700

4.	EAS 3.2 Study of the Concentration Levels and Trends of Non-Oil Pollutants (Annex VII)	- Assessment of Regional Capabilities	
		- Project Consultant	
	EAS 3.3 Study of the Effects of Non-Oil Pollutants on the Marine Environment (Annex VII)	- Co-ordination Workshop	
		- Characterization of Study Sites	
		- Equipment and Laboratory Supplies	
		- Co-ordination and Reporting	$30,600
5.	EAS 4.1 Survey of the State of Coral Resources (Annex VIII)	- Workshop on Methodology	
		- Survey of Coral Resources	
	EAS 4.2 Effects of Pollutants and Destructive Factors on Coral Communities and Related Fisheries (Annex VIII)	- Effects Studies	
		- Equipment and Laboratory Supplies	$27,500
6.	EAS 7 Information and Data Exchange (Annex IX)	- Review of Existing Information and Data Exchange Mechanisms	
		- Project Workshop to formulate information and data exchange system for EAS Action Plan	$16,000