Annexes

Annex I
List of contributing authors and organisations involved

Name	Institutional affiliation	Country	Field of work
Dr. Achmad Abdullah (deceased)	Past Director for Conservation and Marine National Parks, Ministry of Marine Affairs and Fisheries, Jakarta	Indonesia	Natural resources management and protected areas policy
Ms. Heni Augustina	Directorate for Marine and Coastal Degradation Control, Environment Impact Management Agency, (BAPEDAL), Jakarta	Indonesia	Coastal and marine pollution, health and EIA policy
Dr. Angel Alcala	SUAKCREM Marine Laboratory, Dumaguete City	Philippines	Coral reef ecosystems, fisheries assessment and management
Dr. Porfirio Alino	Marine Science Institute, University of the Philippines, Diliman, Quezon City	Philippines	Coral reef ecosystems -assessment and management, global change
Dr. Imam Bachtiar	Biology Dept., FKIP, Mataram University	Indonesia	Coral reef ecosystems, global change and fisheries
Mr. Ronald Bonifacio	Coastal Management Center, Manila	Philippines	Natural resources management
Dr. Annadel Cabanban	Borneo Marine Research Unit, University Malaysia, Sabah	Malaysia	Tropical coastal and marine ecosystems assessment and management
Ms. Catherine Cheung	International Conservation Union, Hanoi, Vietnam	Australia	Terrestrial and marine protected areas - assessment, planning, management and policy
Dr Laura David	World Fish Center (ICLARM), Penang, Malaysia	Philippines	Tropical coastal and marine ecosystems – connectivity, management
Dr. Lyndon DeVantier	International Marine Projects Activities Centre and CRC Reef Research Centre, Townsville, Qld	Australia	Coral reef ecosystems and marine protected areas
Ms. Rili Djohani	The Nature Conservancy Coastal and Marine Program Indonesia, Denpasar	Indonesia	Marine protected areas and fisheries - assessment, planning, management and policy
Dr. Mark Erdmann	Conservation International, Denpasar, Bali, Indonesia	Indonesia	Marine protected areas and coral reef biodiversity - assessment, planning, management and policy
Dr. Miguel Fortes	Marine Science Institute, University of the Philippines, Diliman, Quezon City	Philippines	Tropical coastal and marine ecosystems - assessment and management
Dr. Ed Gomez	Marine Science Institute, University of the Philippines, Diliman, Quezon City	Philippines	Tropical coastal and marine ecosystems - assessment and management
Dr. Kevin Hiew	National Programme Director, WWF Malaysia, Petaling Jaya Selangor	Malaysia	Tropical ecosystems policy and management
Dr. Jose Ingles	Sulu-Sulawesi Marine Ecoregion Program (SSME), WWF Quezon City	Philippines	Coral reef fisheries assessment and management
Dr. Gil Jacinto	Marine Science Institute, University of the Philippines, Diliman, Quezon City	Philippines	Tropical coastal and marine ecosystems - assessment and management
Dr. Roger Juliano	Coastal Management Center, Manila	Philippines	Coastal and marine environmental policy
Dr. Teng Seh Keng	Coastal Management Center, Manila	Philippines	Coastal and marine environmental policy
Mr. Maarten Kuijper	IOC/WESPAC Secretariat, Bangkok	Thailand	Coastal and marine environmental policy
Dr. David Lawrence	International Marine Projects Activities Centre, Townsville, Qld	Australia	Anthropology, socio-economics
Dr. Al Licuanan	Marine Science Institute, University of the Philippines, Diliman, Quezon City	Philippines	Coastal and marine environmental policy
Dr. Medel Limsuan	Department of Environment and Natural Resources, Quezon City	Philippines	Coastal and marine environmental policy
Ms. Evangeline Miclat	SSME Program, WWF, Quezon City	Philippines	Coastal and marine environmental policy

Dr. Peter Mous	The Nature Conservancy Coastal and Marine Program Indonesia, Denpasar, Bali, Indonesia	Indonesia	Tropical marine resources management and protected areas
Assoc. Prof. Cleto Nanola	University of the Philippines, Mindanao	Philippines	Coral reefs - assessment and management
Dr. Jos S. Pet	Program Manager, Southeast Asia Center for Marine Protected Areas, The Nature Conservancy	Indonesia	Tropical natural resources management, fisheries and protected areas
Dr. Lida Pet-Soede	Fisheries Program Manager, WWF Indonesia - Wallacea Program	Indonesia	Fisheries, tropical natural resources management and protected areas
Dr. Nicolas Pilcher	Technical Advisor, Community Conservation Network	Republic of Palau	Tropical coastal and marine ecosystems, Marine Turtles – assessment and management
Dr. Srihartiningsih Purnomohadi	Assistant Deputy Minister, The State Ministry for Environment, Jakarta	Indonesia	Coastal and marine environmental policy – socio-economics
Dr Ketut Sarjana Putra	Formerly of WWF Indonesia-Wallacea Bioregion Programme, Denpasar	Philippines	Coastal and marine environmental management
Prof. Robin South	International Ocean Institute Regional Centre for Australia, Townsville, Qld	Australia	Tropical coastal and marine ecosystems policy and management
Dr. Posa Skelton	International Ocean Institute Regional Centre for Australia, Townsville, Qld	Australia	Coral reef ecosystems – algal taxonomy and ecology
Dr. Jan Steffan	UNESCO, Jakarta, Indonesia	Indonesia	Tropical natural resources management, planning and policy
Dr. Chua Thia-Eng	GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Quezon City	Philippines	Coastal and marine environmental management – planning, socio-economics and policy
Dr. Romeo Trono	Formerly WWF-Philippines and SSME Program, WWF, Quezon City	Philippines	Tropical natural resources management, planning and policy
Dr. Clive Wilkinson	International Marine Projects Activities Centre and CRC Reef Research Centre, Townsville, Qld	Australia	Tropical coastal and marine ecosystems – assessment, monitoring, management and policy

Annex II
Detailed scoring tables

I: Freshwater shortage

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
1. Modification of stream flow	2	N/a	Freshwater shortage	2
2. Pollution of existing supplies	2	N/a		
3. Changes in the water table	2	N/a		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small – Very large 0 1 2 3	2	N/a
Degree of impact (cost, output changes etc.)	Minimum – Severe 0 1 2 3	2	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	2	N/a
Weight average score for Economic impacts		**2**	
Criteria for Health impacts	**Raw score**	**Score**	**Weight %**
Number of people affected	Very small – Very large 0 1 2 3	1	N/a
Degree of severity	Minimum – Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	1	N/a
Weight average score for Health impacts		**1**	
Criteria for Other social and community impacts	**Raw score**	**Score**	**Weight %**
Number and/or size of community affected	Very small – Very large 0 1 2 3	1	N/a
Degree of severity	Minimum – Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	1	N/a
Weight average score for Other social and community impacts		**1**	

Note: N/a = Not applied

II: Pollution

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
4. Microbiological	1	N/a	Pollution	2
5. Eutrophication	2	N/a		
6. Chemical	1	N/a		
7. Suspended solids	3	N/a		
8. Solid wastes	2	N/a		
9. Thermal	1	N/a		
10. Radionuclide	0	N/a		
11. Spills	1	N/a		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small – Very large 0 1 2 3	2	N/a
Degree of impact (cost, output changes etc.)	Minimum – Severe 0 1 2 3	2	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	2	N/a
Weight average score for Economic impacts		**2**	
Criteria for Health impacts	**Raw score**	**Score**	**Weight %**
Number of people affected	Very small – Very large 0 1 2 3	2	N/a
Degree of severity	Minimum – Severe 0 1 2 3	2	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	2	N/a
Weight average score for Health impacts		**2**	
Criteria for Other social and community impacts	**Raw score**	**Score**	**Weight %**
Number and/or size of community affected	Very small – Very large 0 1 2 3	2	N/a
Degree of severity	Minimum – Severe 0 1 2 3	2	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	2	N/a
Weight average score for Other social and community impacts		**2**	

Note: N/a = Not applied

III: Habitat and community modification

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
12. Loss of ecosystems	3	N/a	Habitat and community modification	3
13.Modification of ecosystems or ecotones, including community structure and/or species composition	3	N/a		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small – Very large 0 1 2 3	3	N/a
Degree of impact (cost, output changes etc.)	Minimum – Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	3	N/a
Weight average score for Economic impacts		**3**	
Criteria for Health impacts	**Raw score**	**Score**	**Weight %**
Number of people affected	Very small – Very large 0 1 2 3	2	N/a
Degree of severity	Minimum – Severe 0 1 2 3	2	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	2	N/a
Weight average score for Health impacts		**2**	
Criteria for Other social and community impacts	**Raw score**	**Score**	**Weight %**
Number and/or size of community affected	Very small – Very large 0 1 2 3	3	N/a
Degree of severity	Minimum – Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	3	N/a
Weight average score for Other social and community impacts		**3**	

Note: N/a = Not applied

IV: Unsustainable exploitation of fish and other living resources

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
14. Overexploitation	3	N/a	Unsustainable exploitation of fish	3
15. Excessive by-catch and discards	3	N/a		
16. Destructive fishing practices	3	N/a		
17. Decreased viability of stock through pollution and disease	1	N/a		
18. Impact on biological and genetic diversity	3	N/a		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small – Very large 0 1 2 3	3	N/a
Degree of impact (cost, output changes etc.)	Minimum – Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	3	N/a
Weight average score for Economic impacts		**3**	
Criteria for Health impacts	**Raw score**	**Score**	**Weight %**
Number of people affected	Very small – Very large 0 1 2 3	3	N/a
Degree of severity	Minimum – Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	3	N/a
Weight average score for Health impacts		**3**	
Criteria for Other social and community impacts	**Raw score**	**Score**	**Weight %**
Number and/or size of community affected	Very small – Very large 0 1 2 3	3	N/a
Degree of severity	Minimum – Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	3	N/a
Weight average score for Other social and community impacts		**3**	

Note: N/a = Not applied

V: Global change

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
19. Changes in the hydrological cycle	1	N/a	Global change	1
20. Sea level change	1	N/a		
21. Increased UV-B radiation as a result of ozone depletion	0	N/a		
22. Changes in ocean CO_2 source/sink function	0	N/a		
23. Increase in sea surface temperature	1	N/a		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small – Very large 0 1 2 3	1	N/a
Degree of impact (cost, output changes etc.)	Minimum – Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	1	N/a
Weight average score for Economic impacts		**1**	
Criteria for Health impacts	**Raw score**	**Score**	**Weight %**
Number of people affected	Very small – Very large 0 1 2 3	1	N/a
Degree of severity	Minimum – Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	1	N/a
Weight average score for Health impacts		**1**	
Criteria for Other social and community impacts	**Raw score**	**Score**	**Weight %**
Number and/or size of community affected	Very small – Very large 0 1 2 3	1	N/a
Degree of severity	Minimum – Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short – Continuous 0 1 2 3	1	N/a
Weight average score for Other social and community impacts		**1**	

Note: N/a = Not applied

Comparative environmental and socio-economic impacts of each GIWA concern

Concern	Types of impacts								Overall score	Rank
	Environmental score		Economic score		Human health score		Social and community score			
	Present (a)	Future (b)	Present (c)	Future (d)	Present (e)	Future (f)	Present (g)	Future (h)		
Freshwater shortage	2	3	2	2	1	2	1	2	**1.9**	**4**
Pollution	2	3	2	3	2	3	2	3	**2.5**	**3**
Habitat and community modification	3	3	3	3	2	3	3	3	**2.9**	**2**
Unsustainable exploitation of fish and other living resources	3	3	3	3	3	3	3	3	**3.0**	**1**
Global change	1	1	1	2	1	1	1	1	**1.1**	**5**

Annex III
List of important water-related programmes and assessments

Major inter-governmental agreements and actors

UN Economic and Social Commission for Asia and the Pacific (ESCAP)

Within the Water Resources Programme under its Environment and Natural Resources Development Division, the UN ESCAP organises seminars and workshops on various issues relating to water resources, including: Water resources assessment; integrated water resources development and management; protection of water resources, water quality and aquatic ecosystems; river basin development and management; promotion of infrastructure development and investment for drinking water supply and sanitation; water pricing and promotion of private investment in the water sector; water demand management, water saving and economic use of water; and mitigation of water-related natural disasters, particularly flood loss reduction.

Association of Southeast Asian Nations (ASEAN)

ASEAN was established in 1967 and has 10 member countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. The ASEAN Declaration states that the aims and purposes of the Association are: to accelerate the economic growth, social progress and cultural development in the region through joint endeavours in the spirit of equality and partnership in order to strengthen the foundation for a prosperous and peaceful community of Southeast Asian nations, and to promote regional peace and stability through abiding respect for justice and the rule of law in the relationship among countries in the region and adherence to the principles of the United Nations Charter. In 1995, the ASEAN Heads of States and Government re-affirmed that "Cooperative peace and shared prosperity shall be the fundamental goals of ASEAN." See also ASEAN work on water conservation (incl. ANWRA) and seas and marine environment; ASEAN Network of Water Resources Agencies (ANWRA); the Strategic Plan of Action for the Environment (see below), adopted by the ASEAN Ministers of Environment; and ASEAN 1997 Jakarta Declaration on Environment and Development.

UNEP Regional Office for Asia and the Pacific (ROAP)

Working closely with the Division of Regional Co-operation and Representation in UNEP's Nairobi-based headquarters, the Regional Office for Asia and the Pacific (ROAP) looks to adopt global environmental policy to regional priorities and needs. It acts as a catalyst, coordinator, facilitator and mobiliser of resources. It puts particular emphasis on building partnerships with regional and regional inter-governmental fora, other UN agencies, national governments, NGOs, the private sector, academic and research institutions, civil society, and the media.

East Asian Seas Regional Coordinating Unit

Information on the UNEP East Asian Seas Programme can be found on the web site of the Coordinating Unit, which is located with ROAP. The Unit is the coordinating body for the East Asian Seas Action Plan (see below).

Financial institutions

Asian Development Bank (ADB)

The Asian Development Bank, a multilateral development finance institution, was founded in 1966 by 31 member governments to promote the social and economic progress of the Asia-Pacific region. It now has 58 member countries, 42 from within the region and 16 non-regional. ADB gives special attention to the needs of the smaller or less-developed countries, and to regional, sub-regional, and national projects and programmes. Promoting sustainable development and environmental protection is a key strategic development objective of the Bank. To fulfil this objective, the Bank: (i) reviews the environmental impacts of its projects, programmes and policies; (ii) encourages DMC governments and executing agencies to incorporate environmental protection measures in their project design and implementation procedures, and provides technical assistance for this purpose; (iii) promotes projects and programmes that will protect, rehabilitate, and enhance the environment and the quality of life; and (iv) trains Bank and DMC staff in, and provides documentation on, environmental aspects of economic development. The Asian Development Fund (ADF) is the concessional lending window of the Bank.

Action programmes, strategies and research

ASEAN Strategic Plan of Action on the Environment

The Strategic Plan of Action on the Environment for 1994-1998 has the following five objectives:

- To respond to specific recommendations of Agenda 21 requiring priority action in ASEAN;
- To introduce policy measures and promote institutional development that encourage the integration of environmental factors in all developmental processes both at the national and regional levels;
- To establish long-term goals on environmental quality and work towards harmonised environmental quality standards for the ASEAN region;
- To harmonise policy directions and enhance operational and technical cooperation on environmental matters, and undertake joint actions to address common environmental problems;

- To study the implications of AFTA on the environment and take steps to integrate sound trade policies with sound environmental policies.

Despite the impacts of the recent economic crisis on the natural resources and environmental conditions, the ASEAN Environment Ministers at their Fifth Informal Meeting in April 2000 discussed the importance of keeping their commitment to environmental protection and sustainable development. Hence, to move forward towards the future goals and directions that the ASEAN leaders expressed in ASEAN Vision 2020 and the Hanoi Plan of Action (adopted in 1997 and 1998 respectively) the Ministers adopted the ASEAN Strategic Plan of Action on the Environment (SPAE) for 1999-2004. It consists of the key activities to be implemented by ASOEN (ASEAN Senior Officials on the Environment) and its subsidiary bodies over the next five years, including the areas of coastal and marine environment, nature conservation and biodiversity, multilateral environmental agreements, management of land and forest fires and haze, and other environmental activities.

Partnership in Environmental Management for the Seas of East Asia (PEMSEA)

A GEF project, focusing on "building partnerships within and among governments of the region, as well as across public and private sectors of the economy. The goal is to reduce or remove barriers to effective environmental management, including inadequate or inappropriate policies, disparate institutional and technical capabilities and limited investment in environmental facilities and services". PEMSEA is based on two management frameworks developed and tested in an earlier GEF Project: integrated coastal management, addressing land-water interactions and the impacts of human activity in coastal areas; and risk assessment/risk management, applying to sub-regional sea areas and the impacts of human activities on marine ecosystems. PEMSEA web resources include Virtual ICM, a Legal Information Database Reference Catalogue, and a Directory of Research and Management Institutions in Southeast Asia, and a database of Good Practices. See also the PEMSEA Updates, a free online newsletter.

UNEP Regional Seas Programme

The Regional Seas Programme was initiated in 1974 as a global programme implemented through regional components. The Regional Seas Programme is UNEP's main framework in the field of the coastal and marine environment. It includes 14 regions and three partner seas, involves more than 140 coastal states, and focuses on sustainable development of coastal and marine areas. Each regional action plan is formulated according to the needs and priorities of the region as perceived by the Governments concerned. Regional conventions are in place for several areas.

East Asian Seas Action Plan

On the initiative of the five states of the East Asian region; Indonesia, Malaysia, Philippines, Singapore and Thailand, the Governing Council of 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 action plan in East Asia. An Action Plan for the Protection and Sustainable Development of the Marine Environment and Coastal Areas of the East Asian Region was adopted in 1981, with a decision making body, the Coordinating Body on the Seas of East Asia (COBSEA). A revised Action Plan and a Long-term Strategy for the COBSEA for the 1994-2000 period were developed in 1994 and Australia, Cambodia, China, Korea and Vietnam joined the Action Plan. A new East Asian Seas Action Plan "Leading the EAS Action Plan to the 21st Century" has been elaborated for the period 2000-2009.

State of the regional environment

GEO 2000 State of the Environment: Asia and the Pacific

Global Environment Outlook (GEO) is a global environmental assessment process, the GEO Process, that is cross-sectoral and participatory. It incorporates regional views and perceptions, and builds consensus on priority issues and actions through dialogue among policy-makers and scientists at regional and global levels. GEO outputs, in printed and electronic formats, including the GEO Report series. This series makes periodic reviews of the state of the world's environment, and provides guidance for decision-making processes such as the formulation of environmental policies, action planning and resource allocation. Other outputs include technical reports, a web site and a publication for young people.

GEF Projects in the region

Projects under implementation/UNDP - GEF - International waters:

Building Partnerships for the Environmental Protection and Management of the East Asian Seas

The objective of the project is to assist the riparian countries of the East Asian Seas to collectively protect and manage their heavily stressed coastal and marine environments through inter-governmental and inter-sectoral partnerships. These countries include the Republic of Korea which for the first time is a GEF recipient. Building upon the methodologies, approaches, typologies, networks and lessons learned from the pilot phase, the project would enhance and complement national and international efforts by removing or lowering critical barriers regarding policy, investment, capacity, which are having negative effects on the management of the coastal/marine environment in the region. Together with several water body-based projects in the area, these projects constitute GEF's programmatic

approach to these coastal and marine waters with globally significant ecosystems that are experiencing severe degradation.

Prevention and Management of Marine Pollution in the East Asian Seas

Development of policies and plans to control marine pollution from land-based and sea-based sources, upgrading of national and regional infrastructures and technical skills, and establishment of financing instruments for project sustainability. Project will include selection of demonstration sites, establishment of regional monitoring and information network, and involvement of regional association of marine legal experts to improve capacity to implement relevant conventions.

World Bank - GEF - Biodiversity:

Coastal and Marine Biodiversity Conservation in Mindanao, Philippines

In this project, the GEF would aim to finance the incremental costs of promoting coastal and marine biodiversity conservation and sustainable use in the coastal waters of Mindanao, Philippines. Mindanao has received little attention to date with regard to conservation of its marine biodiversity resources. The GEF-assisted Coastal and Marine and Biodiversity Conservation Component (CMBC) of the proposed Mindanao Rural Development Project (MRDP) will remove the barriers to mainstreaming marine and coastal biodiversity conservation in coastal zone development by: (a) establishing community-based management of marine sanctuaries; (b) strengthening local capacity to address marine ecosystem management issues; (c) enhancing the knowledge base for sound ecosystem management and decision-making, including monitoring and evaluation for sustainable long-term marine ecosystem management; and (d) developing policy and action plans for marine biodiversity conservation and mainstreaming it into coastal development plans.

The concept is based on the precept and the experiences that show that good marine management can simultaneously conserve and protect biodiversity and increase fisheries productivity. These activities would have considerable replication potential in Mindanao as part of the MRDP that would be an Adaptable Lending Program of 10-12 year duration. The lessons learned during the first three-year phase would be applied to subsequent phases when additional coastal provinces would be included under the MRDP with the cumulative experience strengthening implementation of the CMBC. These lessons would also have applicability in other regions of the Philippines and other tropical countries.

Project concepts in the pipeline / UNDP - GEF - Biodiversity:

Conservation of the Ecological Balance of the Sulu-Sulawesi Marine Ecosystems

The overall objective of the project is to ensure that the shared marine resources and key biological features and processes are conserved in the long-term. The PDF-B phase will focus on four components: (i) establish coordination and consultation mechanisms; (ii) undertake a preliminary diagnostic analysis of transboundary problems; (iii) prepare a full project brief and project document; and (iv) secure co-financing for the full project.

Other actors, initiatives and resources

WorldFish Center (formely ICLARM)

An international research organisation "devoted to improving the productivity, management and conservation of aquatic resources for the benefit of users and consumers in developing countries". ICLARM is one of the research centres of CGIAR, Consultative Group on International Agricultural Research. ICLARM, in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and other partners, and with support from the European Commission, has developed FishBase, a global information system on fishes for research scientists, fisheries managers, zoologists and many more. FishBase contains full information on 23 500 species. ICLARM has also developed similar systems on coral reefs and their resources (ReefBase) and management of fish stocks in Asia (TrawlBase).

International Coral Reef Initiative (ICRI)

An environmental partnership that brings stakeholders together with the objective of sustainable use and conservation of coral reefs for future generations. ICRI is an informal mechanism that allows representatives of over 80 developing countries with coral reefs to sit in equal partnership with major donor countries and development banks, international environmental and development agencies, scientific associations, the private sector and NGOs to decide on the best strategies to conserve the world's coral reef resources.

Coral Health and Monitoring Programme

The mission of the NOOA Coral Health and Monitoring Program is to provide services to help improve and sustain coral reef health throughout the world.

Long-term goals:

- Establish an international network of coral reef researchers for the purpose of sharing knowledge and information on coral health and monitoring.
- Provide near real-time data products derived from satellite images and monitoring stations at coral reef areas.

- Provide a data repository for historical data collected from coral reef areas.
- Add to the general fund of coral reef knowledge.

See also Global Coral Reef Monitoring Network (GCRMN).

The Sulu-Celebes Sea Large Marine Ecosystem

A Large Marine Ecosystem, LME, is a region of ocean space encompassing coastal areas from river basins and estuaries to the seaward boundary of continental shelves and the seaward margins of coastal current systems. It is a relatively large region characterised by distinct bathymetry, hydrography, productivity, and trophically dependent populations. See also Rhode Island University map of LMEs.

Recent International meetings relevant to Marine Conservation and Integrated Coastal Management in Indonesia and the region

(information courtesy of Stacey A. Tighe, Senior Technical Advisor Proyek Pesisir)

- World Commission on Protected Areas (Bangkok, May 9-11, 2002),
- Coastal Zone Asia-Pacific (Bangkok, May 12-16, 2002)
- National Coastal Conference (KONAS III) (Bali, May 20-24, 2002)
- World Summit on Sustainable Development Prep Commission (Bali, May 27-June 7, 2002)

The Nature Conservancy (TNC), the World Wildlife Fund (WWF), and the U.S. Agency for International Development (through its Natural Resources Management Project and Proyek Pesisir) are collaborating and joining their efforts with their Indonesian partners to maximise the benefits and impacts for marine conservation derived from the conferences above. Indonesia has an excellent opportunity to make major advances in its strategic planning and capabilities in marine conservation and integrated coastal management by using the synergy and momentum of these four international conferences to focus attention on and support for evolving Indonesia's policies on these issues.

World Commission on Protected Areas

The objective of this meeting was to discuss the design and coordination of a regional network of marine protected areas (defined here as any officially designated marine area in which resource use is limited by specific regulations) for Southeast Asia. Experts from the region will share information on the economics, ecology, management, design and enforcement of MPAs and develop recommendations for a regional MPA network.

In support of MPAs in Indonesia:

- TNC will be supporting an environmental policy expert to participate and to then present the outcomes of the state-of-the-art of MPA design at a Pre-KONAS III Symposium on MPAs, as well as the presence of their staff who chairs the WPCA/Asia team;
- WWF is supporting the writing of a technical paper to summarise the most current knowledge on the economics of MPAs;
- NRM/EPIQ Program is supporting their coral reef expert to attend, present the economic paper and work with the Indonesian team;
- Proyek Pesisir is supporting an Indonesian marine resource economist from IPB to attend the meeting, learn the newest information on economics, and report back at the Pre-KONAS III Symposium. In addition, they are supporting two of their technical experts and four technical experts from the Ministry of Marine Affairs and Fisheries (DKP) to participate in the conference for Indonesia.

Coastal Zone Asia-Pacific

The objective of this first regional coastal meeting was to share information and to develop research and policy priorities for the regional scale issues. Approximately 250 coastal professionals from the region will attend. In support of Indonesia's new marine ministry, approximately 15 technical experts from DPK, including the Minister will be supported by Proyek Pesisir to attend. The DKP and Proyek Pesisir team of 4 staff and 3 regional counterparts will work with a facilitator to capture the information presented and its relevance to DKP and Indonesia's programmes. Five presentations from the Task team will be made at CZAP.

National Coastal Conference (KONAS III) and Pre-Conference Symposiums

The objective of the KONAS 4-day Conference is to share information on new developments in coastal zone management. All of the partners (CI, TNC, WWF, NRM/EPIQ Project and Proyek Pesisir) will be supporting several of their counterparts to attend and present papers at KONAS III. In addition, just prior to the Conference, there will be two half-day symposiums for national and regional decision-makers attending the Conference: one on Marine Protected Areas Science and Strategies, and the second on the new Coastal Zone Law under development. The objective of this half-day MPA symposium will be: to present the latest information on the science, economics and policies of MPAs to the audience of coastal decision-makers; to present a request from the WCPA for Indonesia to participate in a regional MPA network; and to present a Call to Action by the government lead agencies (Forestry, DKP) to expand and revise the national MPA strategy. Proyek Pesisir will be providing the venue for both Symposiums, WWF and NRM will be

moderating the meeting, TNC and Proyek Pesisir will be supporting speakers as a joint co-hosting. An output from the MPA Symposium will be a briefing document based on the presentations and discussions developed by the Task team. An additional event at KONAS will be the selection and announcement of Indonesia's new ICM logo, developed by an inter-agency and NGO team with support from Proyek Pesisir.

World Summit on Sustainable Development- Prep Commission

This event was a preparatory meeting for the World Summit on Sustainable Development (WSSD or Rio Plus 10) held in South Africa in September 2002. Environmental Ministers from around the world will be attending to discuss the text and policies to be finalised at Rio Plus 10. For this event, TNC will be supporting two initiatives that will be announced by DKP, a National Marine Whale Sanctuary proposal and the String of Pearls MPA programme. The MPA briefing document from the Pre-KONAS Symposium will be available for distribution, and the ICM Logo and Campaign can be presented and launched as well. WWF and ICRAN are presenting a coral reef exhibit in connection with the WSSD. Minister Rokhmin Dahuri of the Ministry of Marine Affairs and Fisheries will be hosting an event at their exhibit.

Annex IV
List of conventions and specific laws that affect water use

Key international conventions and treaties [1]

The Philippines, Indonesia and Malaysia are signatory to several international conventions and have enacted various national laws and regulations that are relevant to water-related issues in the region. For example, the three nations have ratified:

- Conservation on Biological Diversity (CBD);
- Convention on International Trade in Endangered Species (CITES);
- Ramsar Wetlands Convention;
- United Nations Framework Convention on Climate Change (UNFCCC);
- World Heritage Convention.

The Philippines and Malaysia have also ratified the UN Convention on the Law of the Sea. The three nations have sovereign rights to the 12 nautical mile limit and have also declared 200-mile Exclusive Economic Zones. The Philippines and Indonesia unilaterally use the 'Archipelagic Doctrine' to define their territorial waters. Several government sectors concerned with use of natural resources have proposed policies or legislation relevant to obligations under the various International Conventions. However, it is apparent that despite the ratifications, there has been little progress to date in implementation and the resolution of related problems. This has been attributed to the lack of action by the various governments in addressing their obligations under the Conventions. A recently developed 'Environmental Strategy for the Seas of East Asia' provides many pertinent recommendations and solutions to these problems

Key national legislation [2]

Environmental legislation in the Philippines

- 1964: National Water and Air Pollution Control Commission Act
- 1974: Revised Coast Guard Law
- 1976: Marine Pollution Decree
- 1976: National Pollution Control Commission
- 1978: The Water Code of the Philippines
- 1979: Environmental Impact Statement System
- 1980: Regulations for the Conservation of Marine Turtles
- 1981: The Coral Resources Development and Conservation Decree
- 1984: Environmental Impact Statement System-Areas/Types of Projects
- 1988: Small Scale Mining Law
- 1990: Philippine Environment Code
- 1991: Local Government Code
- 1992: National Integrated Protected Areas System
- 1992: Toxic Substances and Hazardous and Nuclear Wastes Control Act
- 1992: Strategic Environment Plan for Palawan Act
- 1995: Guidelines on Biological and Genetic Resources
- 1995: Philippine Mining Act
- 1995: The Water Crisis Act
- 1996: Preferential Treatment of Small Fisher folks
- 1997: Agriculture and Fisheries Modernization Act
- 1997: Philippine Environment Policy
- 1998: Philippine Fisheries Code
- 1999: Philippine Clean Air Act
- 2001: Wildlife Resources Conservation and Protection Act

Environmental legislation in Indonesia

- 1932 & 1941: Colonial Nature Protection Ordinances
- 1945: Constitution
- 1949: Independence
- 1971: Establishment of the Directorate of Nature Conservation and Wildlife
- 1980: Trawling Ban (Sardjono 1980)
- 1982: Basic Environmental Law
- 1985: Directorate General for Fisheries Law No. 9
- 1990: Conservation of Living Natural Resources and their Ecosystems Act
- 1992: (Act No. 24) Spatial Planning Act
- 1997: (Act No. 23) The Management of the Living Environment
- 1999: (Act No. 22) Decentralisation of authority from central government to provincial and district governments
- 1999: Creation of the Ministry of Marine Affairs and Fisheries

Environmental legislation in Malaysia and Sabah

- 1954: (Act 134, revised 1974) Aboriginal Peoples Act
- 1959: (Act 298, revised 1983) Protected Areas and Protected Places Act
- 1963: (Act 210, amended 1985 by Act 317) Fisheries Act
- 1972: (Act 76, revised 1976 and 1991) Protection of Wildlife Act
- 1974: (Act 127, amended 1985 by Act A636 and 1996 by Act A953) Environmental Quality Act
- 1976: (Act 171) Local Government Act
- 1980: (Act 226 amended in 1983) National Parks Act
- 1984: (Act 313) National Forestry Act

Environmental legislation in Sabah

- 1962: (amended 1996) National Parks Ordinance replaced by the National Parks Enactment (1977) and by Parks Enactment (1984)
- 1963: (amended 1979) Fauna Conservation Ordinance
- 1968: (amended 1984) Forests Enactment (Classified forests - Class V mangrove forest)
- 1997: Wildlife Conservation Enactment

[1] *Cheung et al. 2002* [2] *Chua Thia-Eng, PEMSEA pers. comm.*

Annex V
Sulu-Celebes Sea Large Marine Ecosystem

(Excerpted from: http://www.edc.uri.edu/lme/text/sulu-celebes-sea.htm)

The GEF/UNDP has funded a PDF-A for development of a Transboundary Diagnostic Analysis and preliminary framework of a Strategic Action Programme for the Sulu-Celebes Large Marine Ecosystem.

Brief description

The Sulu-Celebes Sea Large Marine Ecosystem is a semi-enclosed sea bounded by northern Borneo (Malaysia), the southwest coast of the Philippines, and Sulawesi Island (northern coast of Indonesia). It has an area of about 900 000 km^2, and is comprised of the Sulu Sea and the Celebes Sea (sometimes referred to as the Sulawesi Sea). Much of the LME has a depth greater than 3 000 m. The LME is oceanographically well defined, by the Palawan trough to the north, and by a promontory from Sulawesi Island to the south. There is a deeper area, and a chain of islands known as the Sulu Archipelago, separating the two seas. The Sulu Sea's surface currents come from the south in the summer, whereas the winter currents follow a counterclockwise gyre. The Celebes' strong currents, its deep sea trenches, seamounts and active volcanic islands result in a complex oceanography.

Productivity

The Sulu-Celebes Seas LME is considered a Class III, low productivity (<150 gC/m2/year), ecosystem based on SeaWiFS global primary productivity estimates. There are 1 800 species of fish, 400 species of algae, 5 species of sea turtles, 22 species of marine mammals and over 450 types of coral. There are orcas, whales, dolphins, and pelagic species such as tuna and marlin. In the Sulu Sea, Apo Reef and Tubbataha Reef have been shown to be at the centre of a system of currents distributing fish and lobster larvae throughout the area. For detailed information on the importance of coral reefs in this LME, see data collected by the University of British Columbia Fisheries Center. The warm clear waters of the Celebes Sea, its active underwater volcanoes, its seamounts, trenches, corals and inter-island passages, its currents and upwellings, constitute an exceptionally rich marine life hot spot. It is home to whales, sharks, dolphins, sea turtles, manta rays, marlin and other pelagic fish.

Fish and fisheries

Coastal trawling for prawn supplies a major marine export industry, while a variety of artisanal fishing methods are used to catch fish for local consumption, constituting a primary food resource for the region. The species fished include whale sharks, manta rays, billfish, prawns, yellowfin tuna, grouper and clams. Most of the fishing occurs in coastal areas, while the offshore waters are largely unexploited. Coastal trawling is aimed at prawn, a major export. Most of the landings in Indonesia and in the Philippines are from small-scale artisanal fisheries, using a variety of artisanal fishing methods to catch mostly finfish. This is a primary food resource for the region. Traditional fishing techniques include spider web fishing. Many fishing techniques are highly destructive: there is dynamite and cyanide fishing on the reefs of the Philippines, with fishermen coming from nearby Taiwan and Hong Kong. The number of illegal fishermen exploiting the resources of the reef is steadily increasing. Few countries in the region have implemented fisheries management plans. The University Of British Columbia Fisheries Center has detailed fish catch statistics for this LME.

Pollution and ecosystem health

Years of dynamite and cyanide fishing have taken their toll on the coral reefs of the Philippines. The country's marine resources are overstretched, as evidenced by the recent decline in tuna exports. The export and domestic markets continue to take no account of the ecological limits of the ecosystem. Damage to coral communities is caused by careless divers and by boat anchors. Illegal tours by collectors see the marine environment picked of turtle eggs, giant clams and seashells. The Tubbataha Reefs are not free from intrusion and destruction. Both Tubbataha Reef and Turtle Island have fallen prey to the destructive practices of people selling turtle eggs, thereby endangering the continuing existence of these turtles. Local extinction, according to the World Wildlife Fund, is imminent. In 1995, the Philippines Department of Environment and Natural Resources (DENR) revealed that coral cover and fish density in the reef are "decreasing at an alarming rate" despite the site's official status as a protected National Marine Park.

Socio-economics

For more than 10 000 years, the indigenous population of this area has harvested the sea's seemingly unlimited supply of marine life. But today the LME is under threat. The Tubbataha Reef and other coastal areas of the Sulu-Celebes Sea, while serving as important spawning grounds for the entire region, also provide a livelihood for the fishing communities crowding its shores. Short-term gain in the guise of uncontrolled exploitation is wrecking a habitat. At the same time, it is asking a lot to close these areas to fishing when communities need to fish in order to survive. Population pressure in the local fishing communities, poverty, and a lack of economic alternatives all contribute to the problem. The resources of the LME are a source of hard currency for the debt-

burdened government. Other economic activities are oil and gas production from offshore areas and tourism. Tourism increases every year and contributes both to the local and to the national economy.

Governance

There is a pressing need for improved management and cooperation between countries in conserving and protecting the Sulu-Celebes Sea Large Marine Ecosystem. Enforcement, education and research are necessary measures, as are efforts to curb illegal fishing. In 1988, Tubbataha Reef was declared as the first National Marine Park in the Philippines. In 1993, the United Nations Educational Scientific and Cultural Organization (UNESCO) declared the reef a World Heritage Site. Turtle Island has also been declared a protected area. These declarations indicate the government's commitment to conserve the areas and have increased international awareness and support for their protection. When the government ran out of funds to carry out an action plan, international agencies such as the World Wildlife Fund (WWF) and GEF initiated some projects. It is clear that engaging the public is necessary, as well as developing livelihood alternatives for those communities that are affected. WWF's plan is to raise the communities' awareness level of the existing laws on fisheries and environmental protection. Other international groups that have committed to projects in the area are ASEAN and Conservation International. In 1996 an agreement was signed by Malaysia and the Philippines to protect two endangered turtle species, the Hawksbill and the Green turtle. Although the Malaysian-Philippine agreement is a vital first step, all three governments in the region need to enforce sustainable ways of earning a living from the sea. Several species of whales are endangered. The GEF/UNDP has funded a PDF-A for development of a Transboundary Diagnostic Analysis and preliminary framework of a Strategic Action Programme for the Sulu-Celebes Large Marine Ecosystem.

Annex VI
Criteria for scoring environmental impacts

Issue 23: Changes in ocean surface temperature	
This refers to the impact on populations, species, and communities from changes in Sea Surface Temperature as a result of global change.	
Score 0 = No known impact	No measurable or assessed effects of SST increase.
Score 1 = Slight	Slight impact is determined when one or more of the following criteria are met or exceeded: Measured assessed effects of SST are causing a behavioral change in some species without affecting the viability of the population
Score 2 = Moderate	Moderate impact is determined when one or more of the following criteria are met or exceeded: Community structure is measurably altered as a consequence of changes in SST. Populations are declining.
Score 3 = Severe	Severe impact is determined when one or more of the following criteria are met or exceeded: Measured/assessed effects of changed SST are leading to massive loss of communities or a change in biological diversity.

Annex VII
Marine protected areas and benefits to the fishery

(Excerpted from a compilation provided by GIWA Task team members Dr. Jos Pet and Dr. Peter J. Mous .The Nature Conservancy, Indonesia Coastal and Marine Program)

Our relative inexperience in using marine reserves to manage living resources should not serve as an argument against their use. Rather, it argues that implementation of reserves should be incremental and adaptive, through the design of areas that will not only conserve marine resources, but also will help us learn how to manage marine species more effectively. The dual realities that the Earth's resources are limited and that demands made on marine resources are increasing, will require some compromise among users to secure greater benefits for the community as a whole. Properly designed and managed marine reserves and protected areas offer the potential for minimising short-term sacrifice by current users of the sea and maximising the long-term health and productivity of the marine environment. Based on evidence from existing marine area closures in both temperate and tropical regions, marine reserves and protected areas will be effective tools for addressing conservation needs as part of integrated coastal and marine area management (Committee on the Evaluation, Design, and Monitoring of Marine Reserves and Protected Areas in the United States, National Research Council 2001).

Even at a global level, it seems that fishery statistics should be interpreted with extreme care. It is shown that misreporting by countries with large fisheries, combined with the large and widely fluctuating catch of species such as the Peruvian Anchoveta, can cause globally spurious trends. Such trends influence unwise investment decisions by firms in the fishing sector and by banks, and prevent the effective global management of international fisheries (Watson & Pauly 2001).

Given the uncertainty in fishery statistics and the status of fish stocks, MPAs may provide a last line of defence against overfishing. It is important to consider the FAO code of conduct for responsible fisheries in this light. States and sub-regional and regional fisheries management organisations should apply a precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment, taking account of the best scientific evidence available. The absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species and non-target species and their environment (FAO 1995).

In principle, the objectives, policies and activities of the (Indonesian) Ministry of Marine Affairs and Fisheries are compatible with the development of a network of Marine Protected Areas.

Objectives are:

- Optimisation of the catch to increase welfare of the Indonesian people;
- Conservation of fishery resources.

Policies are:

- Control of fishing activities,
- Development of aquaculture,
- Improvement of quality.

Control of fishing activities is to take place through re-registration of fishing licenses and development of surveillance and law-enforcement capabilities (Undated leaflet from Ministry of Marine Affairs and Fisheries).

A recent report to the Indonesian Ministry of Marine Affairs and Fisheries says the following on Marine Protected Areas: It is definitively in the country's economic and environmental interests to set aside at least 10% of its 81 000 km coastline and 5.8 million km^2 marine territory as marine sanctuary or marine protected area and marine park to conserve and protect its remaining rich marine bio-diversity. There are clear benefits to be gained from investment in identifying, declaring and establishing more marine protected areas in Indonesian waters, not only as a tool to manage and conserve the fisheries and its rich genetic resources but also equally for aquaculture, in particular mariculture or sea farming as a source of seed and broodstock (Pacific Consultants International 2001).

Marine reserves and protected areas have received inadequate attention from fisheries managers in the region, at least they do not feature clearly in formal arrangements (Msiska et al. 2001).

According to Roberts and Hawkins (2000) Fully protected reserves: (i) enhance the production of offspring which can restock fishing grounds; (ii) allow spill-over of adults and juveniles into fishing grounds; (iii) provide a refuge for vulnerable species; (iv) reserves prevent habitat damage; (v) promote development of natural biological communities which are different from communities in fishing grounds; and (vi) facilitate recovery from catastrophic human and natural disturbances.

There is compelling, irrefutable evidence that protecting areas from fishing leads to rapid increases in abundance, average body size, and biomass of exploited species. It also leads to increased diversity of species and recovery of habitats from fishing disturbance. Reserves are often portrayed as working only on coral reefs. In fact, they have been successful in a wide range of habitats in environments ranging from tropical to cool temperate zones. Reserves are a valuable tool globally (Roberts & Hawkins 2000).

There is now compelling scientific evidence that marine reserves conserve both biodiversity and fisheries, and could help to replenish the seas, says a scientific consensus statement signed by 150 of the world's leading marine scientists (AAAS 2001).

"It's asking a lot to close areas to fishing when communities need to fish to survive, but it may be the only hope we have to replenish reefs that have been overfished for so many years." Commercial fisherman, Philippines (WWF N.d).

Major recommendation (Dight et al.1999): marine protected areas (MPAs) have the potential to play a much bigger role in the successful management and sustainable use of fisheries resources on coral reefs and associated ecosystems. In particular, participatory development of no-take zones and protection of essential fisheries habitat in the context of an ecosystem management approach should be encouraged, where appropriate, at both the community level and for larger areas.

The designation of no-take marine reserves may be necessary for sustaining fishery yields over the long-term, due to their ability to preserve genetic variation in the expression of fish size and growth rates (Conover & Munch 2002). This is because in exploited situations, the fishery selectively removes larger individuals, giving smaller, less fertile individuals a selective advantage. Marine protected areas are most effective when they are established where vulnerable species usually live, breed, or feed. Creating these areas has quickly restored populations of fish, snails, and crabs, reduced pollution, and provided habitats for other marine organisms in some regions, including the Florida Keys, the Philippine Islands, and the coast of Japan. Less than a quarter of 1% of coastal sea areas are designated as marine protected areas. To ensure the greatest benefit to depleted fish stocks, many more protected areas should be set aside that are or once were active, productive fishing areas. Moreover, fishermen should be involved in planning and designating protected areas (The National Academies 1998).

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Annex VIII
Coral reef initiatives in the Philippines

(Source: The President of the Philippines at the Second International Tropical Marine Ecosystem Management Symposium 2003)

The Government of the Philippines, with assistance from the Government of Sweden and other sources, has responded to the plight of coral reefs outlined since the United Nations Conference on Environment and Development in 1992, and reiterated in Johannesburg at the World Summit on Sustainable Development in 2002. The Philippines and Sweden have combined to guide the Secretariat of the International Coral Reef Initiative (ICRI) in 2001 and 2002 with the goal of bringing developing and developed countries together to conserve coral reefs.

Coral reefs are being damaged by both natural and human pressures and unless we act now, it is predicted that over half of the world's coral reefs could be destroyed within a generation. Coral reefs can recover from natural threats, but recovery is slow from the direct and indirect damage that people do to reefs. Often that damage is inadvertent as people seek food or cultural items from the reefs, but unfortunately some of the damage is deliberate through constructing airports, ports and dredging channels. Damage is caused indirectly through poor land use practices that result in sediments and excess nutrients pouring over the reefs and through the release of sewage and industrial wastes that cause eutrophication. Even our excessive use of plastic bags ends up damaging coral reefs. The responses to these alarm calls have been the establishment of ICRI, the Global Coral Reef Monitoring Network, CORDIO (Coral Degradation in the Indian Ocean), Reef Check, ReefBase and the World Resources Institute Reefs at Risk project, to mention just some.

All people in the world are 'stakeholders' in coral reefs as we have inherited their wealth of biodiversity and natural beauty, therefore we all share the responsibility for conserving them. We now understand what damages coral reefs and the critical measures that users, local and national governments, international agencies and NGOs have to do in partnership to conserve reefs. There are many global and local initiatives being implemented to arrest and conserve coral reefs and establish more protected areas. One example is Apo Island, in the Philippines where the local university and the community have worked together to conserve their resources for the benefit of all. Another initiative is to ensure that the trade in live fish for restaurants and the aquarium trade is ecologically sustainable, and not damaging the reefs of Southeast Asia and the Pacific.

The Government of the Philippines, one of the founding countries of ICRI, hosted the first ICRI international workshop in Dumaguete City, Philippines in 1995, which outlined the pioneering global strategy for coral reefs through the ICRI Call to Action and Framework for Action. In March 2003, the Philippines hosted the 2nd International Tropical Marine Ecosystem Management Symposium (ITMEMS2) in Manila, another milestone conference to identify strategies on coral reef and associated ecosystems management when strong resolve is needed to respond to the WSSD Plan of Implementation. Then and now, the Philippines continues to be instrumental in bringing forth strategies and actions for implementation at global and national levels.

A significant Philippines national strategy is devolving management responsibility to the municipality and 'barangay' level under the Local Government Code passed by Congress in 1991. When communities are given the responsibility of managing their own resources with a little help from government and scientists, the damage to the reefs can be reversed. In addition, the Philippine Government has been proud to declare the large Tubbataha National Marine Park as a World Heritage Site. It is jointly managed by the Palawan Council for Sustainable Development and the WWF Philippines. Even more rewarding is the proof of the genuine concern that the Filipino people have to conserve and manage these reefs. Unfortunately, the same beauty is not seen in other Philippine reef areas that have the same potential. The Philippines Government is increasing sustainable management assistance to people who have a large dependence on these reef resources.

Annex IX
Models for development of a fully integrated PA network for Sulu-Celebes (Sulawesi) Sea

Marine Protected Area case study: Bunaken National Park, North Sulawesi, Indonesia

The continuing development of Bunaken NP provides important lessons for implementation of the recommended policy option in several key areas. For example, improved management capacity is crucial for overall success. Management of Bunaken NP has recently been reviewed and provides several useful case-studies.

Improving the capacity of the management advisory board

(from NRM Headline News 2002)

In late December 2000, the North Sulawesi government passed a Governor's Decree (SK Gubernor No 233/200) mandating the formation of the Bunaken National Park Management Advisory Board (BNPMAB). The main purposes of the board are: to manage the new entrance-fee system of the Bunaken National Park; to assist the Balai Taman Nasional Bunaken in developing, coordinating and funding conservation programmes; to facilitate and encourage community awareness and participation in the park management activities; and to instil sense of ownership by the local communities. The board was created with 15 equal seats, including seven government representatives and eight non-government representatives. This is an innovative system for managing and coordinating activities in a national park in Indonesia and the region. If successful, it will provide a best-practices example for coordinated multi-stakeholder marine park management in Indonesia and South East Asia. The board was granted a two-year trial period.

Long standing management challenges for Bunaken National Park include: cultural conflicts and mistrust amongst local stakeholders and managers; damaging fishing and land use practices; rapid and poorly planned coastal development; unethical business and political practices; corrupt law enforcement systems; and unorganised management strategies. Since the boards inception, management processes have become more transparent and participatory, and management outputs have increased dramatically. Despite the initial successes of the board and the new entrance-fee system, many management challenges remain. The current evaluation of the board will contribute significantly to its capacity and potential for improving management processes, coordinating management and conservation activities in the park and raising stakeholder awareness and participation in management.

Codification of the roles and responsibilities of the Park Management Advisory Board with regard to conservation of Bunaken National Park is an essential Best Practice to effective decentralised co-management. The document, Basic Regulations for the Bunaken National Park Management Advisory Board clarifies this effort. While it guides the day-to-day functioning of the Park Management Advisory Board, it is also of value to others exploring decentralised co-management of protected areas in Indonesia.

As with most Protected Areas in the Sulu-Celebes (Sulawesi) Sea, Bunaken NP is a multiple-use MPA, with different zones allowing and regulating different levels of exploitation and conservation. Initial difficulties in management arose from the initially complex zoning scheme, with a major revision recently undertaken. The rezoning provides useful lessons for policy implementation in the region.

Co-management

(from NRM Headline News 2001)

One of the most important initiatives has been the establishment of the Dewan Pengelolaan Taman Nasional Bunaken/DPTNB (Bunaken National Park Management Board), whose primary functions are to coordinate the policies and activities of all stakeholders with jurisdiction within the park and to plan and finance several conservation programmes at BNP, such as, a patrol system and a trash management system. In order to achieve these functions most effectively, the DPTNB is comprised of representatives from all major stakeholders in the park, including the local community, tourism sector, Balai Taman Nasional Bunaken (BTNB), environmental NGOs, universities, North Sulawesi province, Manado city and Minahasa regency government institutions. The DPTNB is the first of its kind in Indonesia, and is considered a two-year pilot project by the Ministry of Forestry.

Besides the DPTNB, a number of organisations are now helping with management issues in BNP. The Forum Masyarakat Peduli Taman Nasional Bunaken (FMPTNB) was established in October 2000 as a means of connecting and representing the management aspirations of the approximately 30 000 residents of the park. With three districts (north, south and surrounding islands) and representatives in all 21 villages within the park, the FMPTNB is slowly becoming an effective voice for the community in the management of TNB. Additionally, several environmental NGOs, including Yayasan Kelola, Forum Petuan Ketoupan, Yayasan Kendage URuata, WWF, and Yayasan Suara Nurani are working within the park on a range of environmental issues. Within the tourism sector, the North Sulawesi Watersports Association (NSWA) and Himpunan Pengelola Wisata Lokal Bunaken represent dive operators and cottage owners who are concerned about management

of BNP. The increasing cooperation within and between these groups is supporting the concept of a Bunaken National Park big family that supports sustainable natural resources management and utilisation.

Another exciting development for the management of Bunaken has been the introduction of a revolutionary new entrance fee system - the first in Indonesia. Unlike other national park entrance fees in Indonesia (where all money collected goes into the National Treasury), 80% of the Bunaken entrance fees are managed by the DPTNB to fund conservation programmes in the park. Since April 2001, over 8 000 local and international tourists have paid the entrance fee, amounting to over 360 million Rp in income for conservation programmes. The DPTNB has also received grants from WWF-Indonesia and USAID to help finance its conservation programmes. An example of an important programme currently being managed by the DPTNB is a joint patrol system. The patrol system is currently based on Bunaken Island and includes jagawana BTNB (rangers), SATPOLAIRUD, and community members who can be on a 24-hour patrol per day. This patrol system successfully apprehended more than seven groups of cyanide and bomb fishers who were operating illegally in the park. The patrol team also regularly conducts sweeping operations to ensure that all visitors have paid their entrance fees. Until now, much of focus of these programmes has been on Bunaken and the surrounding islands of Manado Tua, Mantehaga, Siladen and Nain. However, the DPTNB realises that it is extremely important to also include the northern and southern mainland sections of the park, including Tiwohu, Tongkeina, Meras, Molas, Teling, Kumu, Poopoh, Pinasingkulan, RapRap, Sondaken, Popareng dan Wowontulap.

Co-management initiative

(from Erdmann et al. 2003)

Since 1998, USAID's Natural Resources Management Program (NRM) has been working actively to implement a co-management initiative in the Bunaken National Park. Prior to this initiative, the management of BNP was centralistic and legally under the authority of the Ministry of Forestry's Bunaken National Park Office (BTNB). Local park users (particularly the fisher folk and the dive tourism industry) were not effectively involved in park management, and local government agencies were highly resentful of the management authority vested in the BTNB. Funding for conservation and management activities in the park was minimal, the enforcement system ineffectual, and the park zonation system was largely misunderstood and ignored by the local populace. In most respects, Bunaken National Park qualified as a "paper park".

Objective of initiative

The goal of the Bunaken National Park co-management initiative is to develop an effective and sustainably-financed Indonesian model of multi-stakeholder co-management of a national marine park which will thereby serve as a marine protected area (MPA) center of excellence for Indonesia and SE Asia. The key to achieving this goal has been a massive socialisation effort to draw the various stakeholders from the park (including 30 000 villagers, an active marine tourism industry, local conservation NGO's, academia, and three tiers of government agencies) into a single "community" with a strong sense of awareness and ownership of the valuable but threatened marine resources in the park.

Components of the co-management initiative

- Participatory zonation revision of BNP. NRM is assisting the BNP Office (BTNB) to work with the two primary park user groups (local villagers and the marine tourism sector) to revise the park's zonation system, realising that a well-designed, easy to understand and thoroughly socialised zonation system is the foundation for effective management of the park.
- Improved villager involvement in BNP management decisions through institutional development of the BNP Concerned Citizen's Forum (FMPTNB). The FMPTNB is now active in all 22 villages in BNP and serves to represent the aspirations of ~30 000 villagers in management decisions, as well as serving to socialise management policy to its constituents.
- Fostering private sector involvement in BNP management. NRM provides technical assistance to the North Sulawesi Watersports Association (NSWA) and actively fosters the involvement of other private sector groups (cottage owners, traditional fishers' association, and charter boat operators) in BNP management.
- Facilitation of multi-stakeholder co-management of BNP via institutional development of the BNP Management Advisory Board (DPTNB). NRM provides development support to the executive secretariat of the DPTNB, which consists of representatives from national, provincial and local government agencies, village stakeholders, the private tourism sector, academia, and environmental NGO's. The "crown jewel" of the Bunaken co-management initiative, the DPTNB represents a drastic departure from the traditional Indonesian model of top-down management of MPAs, and strives to make decentralised, participatory, transparent and accountable MPA management a reality.
- Development of a portfolio of sustainable conservation financing mechanisms for BNP. A ground-breaking decentralised park entrance fee system has now placed the DPTNB on the road to financial self-reliance. Other components in the developing financing portfolio include an international volunteers system to lower management costs, diversified government agency support, in-kind support from the local dive tourism sector, national and international grant support, visitor centre merchandising and a possible endowment fund.

- Development of an effective 24-hour patrol system for BNP. An experimental joint patrol system involving park rangers, water police officers and local villagers has proven highly effective in decreasing destructive fishing practices in the park.
- Institutionalisation of a scientific monitoring programme to monitor effects of management activities on park resources. In conjunction with WWF Wallacea, NRM is supporting park stakeholders in monitoring coral condition (using manta tows and line intercept transects) and reef fish stocks (visual census of select reef species and monitoring of grouper and Napoleon wrasse spawning aggregation sites).

Select accomplishments to date

- Participatory zonation revision completed for Bunaken, Manado Tua, Mantehage and Siladen Islands and ongoing in 14 remaining villages.
- Institutionalisation of the 15 seat multi-stakeholder BNP Management Board (DPTNB) and the 22 village BNP Concerned Citizen's Forum (FMPTNB) and widespread socialisation of these two institutions.
- Strong participation of private sector in management via the NSWA, which has instituted a programme of "three E's" (employment, education and enforcement) within the park
- Development of a decentralised park entrance fee system whereby 80% of the revenues are earmarked for BNP management programmes. The system succeeded in raising 42 000 USD in its first year of operation (2001) and 109 000 USD in 2002, and is eventually targeting up to 250 000 USD per year.
- Implementation of a joint patrol system that includes villagers and that has virtually eradicated blast and cyanide fishing from the park and greatly limited illegal coral mining and mangrove cutting.
- Multimedia park socialisation campaign to instil a sense of BNP community using posters, zonation calendars, town hall meetings, community information billboards, a 30 base station VHF community radio network, local television shows and local, national and international newspaper and magazine articles.
- Sharing of lessons learned from Bunaken with MPA managers from Bali Barat NP, Komodo NP, Wakatobi NP, Cenderawasih NP, Berau Islands and Tomini Bay in Indonesia and Hon Mun Marine Reserve in Vietnam.
- Recorded an 11% increase in live coral cover in a one and a half year period on the reefs which have already completed zonation revision and are protected by patrol system
- Selection as the Asian MPA ecotourism demonstration site for the International Coral Reef Action Network (ICRAN).

Selected lessons learned

Over the past five years, a number of important lessons have been learned in attempts to strengthen decentralised co-management of Bunaken National Park. While it is beyond the scope of this executive summary to discuss these in detail, the most important of these lessons learned in the hopes that they may be of interest to other tropical MPA managers currently utilising or considering a co-management approach are listed below:

- It is necessary to balance ecological values with socio-economic values to generate essential stakeholder political support for conservation of protected areas in regions with population pressures and/or priorities on economic growth and development.
- Building informed participation is a long-term process, requiring extensive capacity building and facilitation. Villagers, government and non-government stakeholders with long-term involvement in conservation management provide more innovative solutions and productive support for conservation management.
- Park managers and the rangers tasked with field management of the park commonly lack the community facilitation skills critical to ensuring broad stakeholder support and understanding of park management objectives. Training in facilitation skills for these park management personnel is an essential capacity-building measure before co-management can be effectively implemented.
- Co-management starts with the development of constituency-based partnerships, and then evolves to true co-management when the constituency-based partnerships then start working with each other. The evolution to co-management results in collaboration among often competing constituencies. Strong constituency partnerships provide a solid foundation for co-management.
- Community conservation campaigns through schools, mosques and churches can build effective local support for and pride in conservation initiatives. People will support conservation of their environment if they take pride in it. Of course, pride alone will not achieve conservation. Also important are economic incentives and enforcement of rules and regulations.
- Decentralisation of conservation management works when roles and responsibilities are clear, and when there is a shared vision of goals and objectives. Decentralisation does not work when there is competition over management authority or significant divergence in goals and objectives. Decentralisation also stimulates stronger grass-roots democracy and principles of good governance.
- Co-management requires active involvement of all relevant stakeholders. This is site-specific in nature. In Bunaken it includes dive operators, communities, different levels of government, universities and NGOs. Co-management must be inclusive, and must provide for reasonably equal voices for relevant stakeholder groups.

- The composition of multi-stakeholder co-management boards is absolutely critical to their success. The optimal ratio of governmental to non-governmental representatives and those advocating different functions of the protected area (economic development, conservation, sustainable resource use) will vary from site to site, but will have profound consequences for the effectiveness of these multi-stakeholder boards. There must be a balance between the competing interests represented, and this will not always entail equal numerical representation; in many cases the stakeholder group(s) that are the most hesitant to advocate strong positions may require a larger allocation of seats on a multi-stakeholder board to achieve truly equal representation.
- Community stakeholders support patrol and enforcement programmes, as they are directly linked to increased livelihoods. Many illegal activities within protected areas come from outsiders. Communities with a stake in conservation management or sustainable utilisation of park resources have a strong and rational interest in seeing rules and regulations enforced so natural resources are sustained.
- "Alternative livelihood programmes" aimed at stakeholders currently involved in destructive activities in the coastal zone are ineffective and largely rejected by local communities. Community conservation/improvement programmes should focus on rewarding those that have chosen sustainable livelihoods, while those that persevere with destructive activities should be dealt with by a strong enforcement system.
- Local self-financing mechanisms are key to providing local stakeholders with the fuel to manage local conservation interventions. Decentralised co-management requires the capacity to generate and then manage finances locally.
- Development-oriented stakeholders, particularly from government, support conservation when it can be linked to regional economic development. Conservation of protected areas is better described within the context or regional economic development than altruism.
- Involvement of the private sector in co-management of MPAs can be highly beneficial. Once potential business competitors focus upon the benefits of cooperating to protect the resources in the MPA upon which their income depends, they become one of the strongest proponents of good management and bring considerable financial and human resources to the table.
- Tourists are willing to pay reasonably high entrance fees as long as they see their money is resulting in visible conservation management. Willingness-to-pay for effective conservation management is high, but can only be sustained when tourists see results from their payments.
- Funding for conservation management needs to be diverse. Reliance on a single source like user fees is dangerous. This is demonstrated by the sudden drop-off in revenues from the Bunaken entrance fee system after September 11 and the Bali Bombing. Long-term sustainability requires significant financial diversification.
- Monitoring and evaluation are key to ensuring on-going success of conservation management interventions. This is important for convincing stakeholders that interventions are working and/or providing guidance on how to adapt interventions if they are not working well. This includes the use of both ecological as well as socio-economic indicators in an integrated management effectiveness monitoring system
- Multiple-use MPA zonation plans are valuable management tools for mitigating conflict among stakeholders and balancing effective conservation with sustainable development in developing country MPAs with large population pressures. These plans are most effective if based upon a combination of scientific/ecological considerations and input from a range of primary user groups who have received facilitation in understanding and accepting compromise.
- Zonation schemes should use a minimal number of zone types, with names that clearly indicate their purpose, explicit rules for allowed and disallowed activities, and clearly demarcated borders that utilise natural or otherwise well-known landmarks whenever possible.
- The use of focal interest group meetings instead of relying only on large village meetings is essential for ensuring broad-based community participation and equitable decision making. This ensures the involvement of many of the more marginalised or traditionally quiet community members.
- Representation of larger groups (villages, the private sector, etc.) in marine resource management decision-making is a new and poorly-understood concept in Indonesia. The individuals chosen to represent larger groups often neglect their responsibility to communicate actively with their constituents, while constituent groups often resent those chosen to represent them. This democratic principle needs continuous facilitation.
- Decentralised co-management supports the principles of good governance. Although it must be carefully managed (and well-designed at the outset in order to prevent dominance by any one stakeholder group), one of the greatest strengths of the co-management approach is in utilising the diverse interests and motivations of various stakeholder groups to prevent corruption, collusion or nepotism.
- Establishment of a sense of pride and ownership of local marine resources is a key step in generating strong support for

conservation measures. Even in the absence of traditional or legal marine tenure systems (where communities directly own resources), ownership of the management of those resources engenders strong conservation support.

- Human resource development and institutional strengthening is best achieved through long-term, learning-by-doing mentoring processes rather than short-term, highly specific technical training programmes. Technical training can meet specific needs, but broad-based capacity building for conservation is best achieved through long-term, medium-input mentoring.

More information on the Bunaken National Park co-management initiative can be found at www.bunaken.or.id and www.bunaken.info

Revised zoning

(from Erdmann & Merrill 2003)

Clearly a balance between inputs from science and stakeholder participation is necessary in producing a functional and enforceable multiple-use zonation plan. One additional element of the Bunaken zonation revision process that is strongly in need of improvement is the involvement of local park managers and/or rangers in the zonation facilitation process. Unfortunately, the participatory zonation process relies strongly upon excellent facilitation skills that are generally lacking in park management staff; training opportunities to acquire these skills are also noticeably absent. It is highly likely that this situation is endemic to developing country MPAs, and conservation and development aid organisations interested in promoting effective MPAs should pay particular notice to this widespread need for better community facilitation skills in park managers.

The actual location of individual zones was based upon a combination of scientific and stakeholder input and a commitment to include at least 20% of each island's reef area in "no-take" zones where fishing is not allowed (in accordance with the US Coral Reef Initiative and a number of other MPA design guidance papers). Both the strict conservation and tourism use zones are "no-take", and were sited to include known reef fish spawning aggregation sites, unique reef features and long-established dive sites. Village fishers were persuaded to agree to these 20% closures using careful explanations of the fisheries enhancing benefits of no-take zones.

In 2002, these revised zonation plans have been extremely successful in terms of compliance and the overarching objective of allowing multiple uses of this highly valuable national asset while preventing stakeholder conflict. The resource base has also shown marked improvements; on Bunaken Island alone, the reefs have shown an incredible 11.3% increase in live coral cover and significant increases in size and abundance of commercially valuable fish species in the two years since the zonation plan was agreed upon (Erdmann, unpub. data). This success has encouraged Indonesia's Department of Nature Conservation to use the Bunaken experience as a basis for their new national technical guidance paper on MPA zonation (PHKA 2002) (see Usher & Merrill 2000).

Lessons learned from the rezoning

(from Ermann & Merrill 2003).

A number of useful lessons learned that may have wider applicability (especially to developing country tropical MPAs) can be drawn from the Bunaken zonation experience. These include:

1. Multiple-use MPA zonation plans are an incredibly valuable management tool for mitigating conflict among stakeholders (e.g., tourism operators and local fishers) and balancing effective conservation with sustainable development in developing country MPAs with large population pressures. These plans are most effective if based upon a combination of scientific/ecological considerations and input from a range of primary user groups who have received facilitation in understanding and accepting compromise.
2. Zonation schemes should use a minimal number of zone types, with names that clearly indicate their purpose, explicit rules for allowed and disallowed activities, and clearly demarcated borders that utilise natural or otherwise well-known landmarks whenever possible.
3. The process of creating a multiple use zonation plan (including wide stakeholder participation, facilitated compromise between groups, and widespread socialisation of the eventual zonation plan) is as important as the actual details of the eventual zonation system in terms of building support for and compliance with the system. However, an adequately participatory process is often long (measured in years) and requires significant financial commitments and excellent facilitation skills on behalf of the implementing agency(s).
4. While stakeholder participation is essential, there is no one single best participatory approach to involving stakeholder groups in zonation plan development. The best participatory approach is one that has been carefully crafted to achieve maximum stakeholder involvement and acceptance based upon knowledge of the social dynamics of the individual user group targeted (which is often best gained from direct feedback from members of that group).
5. Widespread socialisation of zonation schemes using a variety of media is absolutely essential to their success, but is not sufficient to ensure compliance. A strong enforcement system is critical to an effective multiple-use zonation system.
6. A system which utilises relatively large contiguous zones rather than a series of many small zones is both easier to enforce and, in the case of no-take zones, likely provides greater conservation and fishery benefits.

7. The zonation process is best viewed as an iterative process that needs evaluation and revision on a regular basis.

Surveillance and enforcement

(from Erdmann & Toengkagie 2003)

Additional difficulties associated with surveillance and enforcement were addressed in early 2001, when the Bunaken National Park Management Advisory Board (DPTNB) initiated a joint patrol system that placed community members side-by-side with professional enforcement officers, to increase effectiveness of the patrol system.

Forty five villagers, 16 park rangers and 5 water police officers constitute the core of this multi-stakeholder patrol system, which is focused upon 4 primary activities: 24 hour routine water-borne patrols, entrance fee enforcement, socialisation of the park's rules to villagers and visitors, and routine beach cleanups. While the involvement of civilians in patrols has been at times controversial and posed a number of unique challenges, the joint patrol system has proven a tremendous improvement to the previous system and has resulted in a dramatic decrease in destructive resource uses such as blast and cyanide fishing, mangrove cutting and endangered wildlife capture.

The increased patrolling and stepped-up enforcement has led to a significant reduction in illegal fishing activities within the boundaries of the National Park. Live coral cover has increased by more than 11% over 2000 to 2002. Park communities are enjoying community development support from conservation revenues. This success is only possible through the commitment of Park Management Advisory Board members to good governance principles of transparency and accountability.

Lessons learned from a multistakeholder enforcement initiative

While the adaptive management process for the Bunaken joint patrol system is ongoing, already there have been a number of important lessons learned that may prove useful to MPA managers considering the involvement of community members in joint patrol systems. Among the more important are:

1. Involvement of villagers in a joint patrol system has associated costs and benefits, but benefits generally far outweigh the costs.
   Costs include:
   - Village patrol members require significant initial training;
   - Village patrol members have no authority to arrest or carry weapons;
   - Social jealousies can arise from villagers not involved in patrol system;
   - Occasional conflicts of interest arise when violations are committed by friends or family members.

   Benefits include:
   - Villagers are on the scene 24 hours/day, and have a vested interest in protecting "their" reefs for the future use of their children and grandchildren;
   - Village patrol members have intimate knowledge of local reefs and the people exploiting them (both sustainably and in a destructive manner), allowing them to quickly and effectively target those activities/user groups that cause most damage to the reefs, and allowing them to resolve resource use conflicts in a more consensual manner than rangers or police might;
   - Alternative employment for fishers who would otherwise depend on reef resources;
   - Extraordinarily effective socialisation of the conservation and sustainable use goals of the park - village patrol team members "socialise" the park even during their free time when interacting with other villagers on a social basis.
2. Involvement of a range of stakeholders (e.g. rangers, police, and villagers from several villages) in joint patrol teams can greatly decrease the likelihood of corruption, collusion or conflicts of interest in dealing with violations committed by friends and family members.
3. When developing an MPA multi-stakeholder patrol system that involves local community members, equal representation of all villages (and cultures/religions) within the MPA is an important precursor to acceptance and success of the patrols.
4. Most MPA stakeholders (villagers, tourism operators, and others) support rules and regulations as long as they are clear and equitably enforced. Clear rules are easily understood and clearly posted. Equitable enforcement means that all those that break the rules are treated the same way.
5. Community stakeholders support patrol and enforcement programmes, as they are directly linked to increased livelihoods. Many illegal activities within protected areas come from outsiders. Communities with a stake in conservation management or sustainable utilisation of park resources have a strong and rational interest in seeing rules and regulations enforced so natural resources are sustained. The overwhelming majority of villagers in BNP has voiced support for a strong patrol system, and actively assist the system as "reef watchers" using the park-wide VHF radio system.
6. Park managers and the rangers tasked with field management of the park commonly lack the community facilitation skills critical to ensuring broad stakeholder support and understanding of park management objectives. Training in facilitation skills for these park management personnel is an essential capacity-building measure.
7. When building a multi-stakeholder patrol system, it is imperative to appoint a strong leader who respects the other stakeholder groups

but maintains a clear vision for the overall patrol team. This lesson was abundantly clear when comparing the northern and southern patrol teams; the northern patrol team, while receiving the larger amount of funding and facilities, was continuously hampered by poor leadership from the field coordinator - leading to infighting and less than optimal performance. By comparison, the southern team, while operating on a smaller budget in an area with more hardened bomb fishermen, was highly successful, in large part due to an excellent field coordinator from the BTNB who maintained and nurtured the enthusiasm and commitment of the village patrol members.

8. It is extremely important to declare and treat marine resource crimes as serious offences, and to apply enforcement evenly across all levels of society (including villagers, tourists, outside military/police/government officials, etc). Public support for patrols will rapidly decline if powerful individuals are given "special treatment".
9. Indonesian courts typically treat destructive fishing and other marine resource crimes as light offences. Education of all levels of the enforcement/prosecution system is required to provide understanding that marine resource crimes rob future generations of their livelihoods and must be punished severely.
10. Enforcement is a continuous, ongoing need, there will always be individuals ready to engage in illegal (and profitable) activities if enforcement activities are decreased below effective levels.

Since its inception, the joint patrol system has consistently ranked the most expensive programme in the DPTNB annual budget. In 2001, the patrol system recorded 222.16 million Rp (~22 500 USD) in operational costs (including salaries for village patrol members and bonuses for rangers/police, as well as fuel, equipment maintenance, criminal investigation and court costs, and training), plus an additional 9 000 USD in equipment procurement (2 wooden boats with outboard engines). In 2002, with both northern and southern patrols operational for the entire calendar year, overall operational costs totalled 531 million Rp (~59 000 USD), plus an additional 29 000 USD in equipment procurement (VHF radio system, 2 engines and 1 boat). The 2003 DPTNB annual budget includes 673 million Rp (~76 500 USD) for patrol operational costs plus an additional 22 000 USD in equipment procurement (polyethylene hull speedboats with environmentally-friendly four-stroke engines). For all three years, operational costs were funded by entrance fee receipts and two grants from WWF-Wallacea, while equipment procurement was funded by USAID's NRM programme. While it is envisioned that equipment costs should be minimal in the foreseeable future, operational costs are projected to stabilise at the 2003 level. Using this projection, the BNP joint patrol system costs approximately 0.85 USD/ha/year.

It is important to note that while the overall percentage of the DPTNB budget devoted to the patrol system has dropped from over 50% in 2001 to roughly 15% in 2003, the costs have actually risen and there is no indication that these costs will decrease in the future. Unfortunately, even though broad socialisation of park rules has resulted in increased compliance, the economic incentive to illegally extract resources in the park only increases over time (as resources are overexploited outside of the park), necessitating a continuously vigilant patrol system. BNP experienced this firsthand in January 2003, when a temporary work strike by village patrol members resulted in an immediate spike in blasting and cyaniding activities within the park, in the space of two weeks.

Development and results of Bunaken entrance fee system (2001-2002)

(from Erdmann et al. 2003)

Since 2000, USAID's Natural Resources Management Program has been assisting the multi-stakeholder Bunaken National Park Management Advisory Board in developing a model entrance fee system under special "pilot project" status granted by the Indonesian national government. Based upon the highly successful Bonaire Marine Park entrance fee system, the Bunaken system successfully raised nearly 42 000 USD in its first year of operation in 2001. With the strong support of the local tourism sector, the fee for international tourists was doubled in 2002, raising ~110 000 USD from over 8 000 international and 17 000 Indonesian visitors. Revenues from the fee system now fund a park-wide joint ranger/police/villager patrol system, environmental education programmes, and village-level conservation and development programmes.

In its inaugural year, the BNP entrance fee system was quite successful, with total entrance fee receipts of 418 187 500 Rp (~42 000 USD) recorded during the period of 15 March to 31 December 2001. These fees were collected from a total of 15 055 visitors to the park (including 5 183 foreign guests, 8 387 adult Indonesians and 1 485 Indonesian students). Taking into account the late start of the entrance fee system and the effects of the 11 September 2001 terrorist attacks on tourism, the overall visitation for the park for 2001 was projected at the level of 25 000 visitors (15 000 Indonesians and 10 000 foreigners). Although they represented only 34% of visitor numbers, international guests generated almost 95% of the entrance fee receipts. In total, 37 countries were represented in the entrance fee database, with the top country of origin being the UK, followed closely by the USA, Italy, Holland, and Germany. A second tier was comprised of Singapore, Japan, France, Taiwan, Hong Kong, Switzerland, and Spain.

Of the revenue collected, 20% was distributed to the various levels of government as per provincial law. Approximately 50% of the proceeds

were used to fund the joint ranger/police/villager patrol system for BNP, while another 10% was used to purchase and install village information billboards in all 30 settlements within the park. The remaining 20% was set aside for use in the following year's BNPMAB budget.

Based upon the overall success of the fee system in 2001 and broad support from the tourism industry, the annual fee for international visitors was doubled in 2002, becoming 150 000 Rp (~17 USD). It is interesting to note that such a rapid raise in the fee is quite unusual for most MPAs and underlines the importance of working closely with the tourism sector; De Meyer and Simal (these proceedings) report that Bonaire tour operators have resisted a fee raise for over a decade. Additionally, a one-day ticket (50 000 Rp) for international guests was introduced at the request of the local cottage owners (see below). Despite a drastic decrease in international visitors following the Bali bombing incident on 12 October 2002, the BNPMAB managed to record total yearly receipts of 983 750 500 Rp (~110 000 USD). These revenues were generated from a total of 25 697 paying guests, composed of approximately 2/3 local Indonesian guests and 1/3 international visitors. Of the 17 435 Indonesian guests, most were adult guests (14 525), while 2 910 students also were recorded. By contrast, a total of 8 262 international guests were recorded from 48 countries. Most of these international guests (5 294) purchased one-year waterproof entrance tags, while an additional 2 968 visitors purchased single-day entrance tickets. Taiwan, Italy and the United Kingdom were the top three countries of origin for international visitors to BNP during 2002, with 1 431, 1 075, and 793 guests, respectively. The notable predominance of the Taiwanese and the significant drop in American visitors can be attributed to the introduction of direct international flights to Manado from Taiwan in early 2002 and the American reluctance to travel internationally in the wake of the 11 September 2001 terrorist attacks.

As with the 2001 revenues, 20% were allocated to national, provincial and local governments, with an additional 40% of the revenues spent on support for the joint patrol system. New in 2002 was an expenditure of over 30% of total revenues on village-level conservation and development programmes (including a 30-station park-wide VHF radio system, beach cleanups, construction of public toilet and water facilities and paved footpaths, and mangrove rehabilitation programmes). Additional expenditures for 2002 included support for a nascent biological monitoring programme and villager environmental education.

A key factor in the continued success of the BNP entrance fee system has been continuous engagement with all levels of the tourism sector to obtain feedback and adapt the system to any perceived shortcomings. One clear requirement from the tourism community has been the need for continuous socialisation of the fee system and full transparency regarding results. The BNPMAB regularly updates FAQ sheets and posts the results of the entrance fee system (monthly revenues and expenditures, etc) on websites, bulletin boards throughout the park, and via email lists. Brief updates on entrance fee results are also submitted to international dive and nature magazines. Another key area of improvement suggested by the tourism industry (and highlighted by the detailed statistics collected by the entrance fee system) was a new focus on meeting the demands of local Indonesian tourists. During the first year of the entrance fee system, the BNPMAB focused on foreign divers and snorkellers as primary customers, devoting most management efforts towards improving patrols and other activities to maintain and improve the quality of the reefs. However, it soon became evident that local tourists are far more numerous, and that they have quite different demands for a "quality MPA experience": clean beaches and public picnic and toilet facilities, with reef quality being largely irrelevant. More recently, the large increase in day-tripping Taiwanese snorkel tourists has required yet another management paradigm shift; unlike BNP's "normal" clientele of relatively experienced (and environmentally-enlightened) divers, this type of tourist requires specific education and patrol programmes to prevent reef trampling. With both of these situations, close monitoring of entrance fee data combined with continuous engagement with the tourism community has allowed adaptive management changes.

Yet another improvement to the fee system suggested by the tourism sector was the provision for an incentive system for tag sales to further prod uncooperative operators to participate willingly. Under this agreement, a 5% "commission" (7 500 Rp/tag) is offered by the

Table 1 Entrance fee schedule for Bunaken National Park as prescribed by North Sulawesi Provincial Law No. 9/2002.

Fee category	**Indonesian** (Rp)	**International** (Rp)
Visitor		
Yearly tag	No Data	150 000
Daily ticket	2 500	50 000
Student/child	1 000	No Data
Researcher		
1-7 days	45 000	100 000
8-30 days	75 000	200 000
1-6 months	125 000	400 000
.5-1 year	200 000	600 000
>1 year	250 000	800 000
Commercial Filmmaker		
Documentary film	2 000 000	3 000 000
Documentary video	500 000	1 000 000

Researcher and Commercial Filmmaker fees are charged in addition to applicable visitor fee. Residents of the 22 villages in the park and their Indonesian house guests are exempt from paying the visitor fee, while researchers from local provincial universities and institutions are exempt from the researcher fee

BNPMAB on all entrance tag sales. However, to promote institutional strengthening of the tourism sector and better cooperation, this incentive is not paid directly to individual tourism operators, but rather to the trade association of their choice (including the NSWA, the local cottage-owner association, the charter boat association, and the travel agents' association). Moreover, the commission is only paid on yearly entrance tags, in order to encourage operators to sell the tags instead of one-day tickets. This system has also improved compliance and cooperation, and allowed some interesting initiatives to develop; the NSWA uses the proceeds of these commissions to fund a scholarship fund for local high school students from within the park, and the cottage owner association uses their commissions to fund weekly beach cleanups by local villagers.

A final improvement suggested by the tourism community was the introduction of an entrance tag design contest open to all guests visiting the park. For the first two years, the tag design was decided internally within the BNPMAB. While the tag designs were enthusiastically received and the tags have in fact become a collector's item (the BNPMAB received several requests from abroad to purchase tags without visiting the park!), members of NSWA suggested that a tag design contest would only further promote the entrance fee system. The 2003 tag design contest was announced in June 2002, with a deadline of October 2002 to provide ample time to select and print the winning tag design by December 2002. Participants were allowed to submit up to three photographs or graphic designs each for consideration, with the winning prize being a return airfare from Singapore to Manado (donated by Silk Air) and a 5 day all-inclusive diving package at one of 6 participating dive resorts. Importantly, any submitted photos or designs become the non-exclusive property of the BNPMAB for use in printed conservation materials (posters, brochures, and calendars) for the park. The contest has proven very popular and is now in its second year.

Future plans

In the long run, the BNPMAB is targeting up to 250 000 USD per year from the entrance fee system. The projected increase in revenues is assumed to come from a combination of increased visitor numbers and eventual fee raises (both for local and international visitors). At the same time, NRM is now working with the BNPMAB and the tourism sector to set visitor carrying capacity limits and legislate these limits to prevent the onset of mass tourism. Increased user fees will likely be one tool that will be used in the future to limit visitor numbers to a sustainable level.

At the same time, the BNPMAB is also working to further diversify the BNP funding portfolio to prevent overdependence on the entrance fee system (which is subject to potentially large disturbances to international tourism). Specific targets include an international volunteers system to lower management costs, diversified government agency support, in-kind support from the local dive tourism sector, and national and international grant support. Two additional sources of funding that are currently under development include visitor center merchandising and a possible endowment fund. Finally, BNP has been selected as one of four MPAs to participate in a pilot study to develop business plans for Asian MPAs under the auspices of the World Commission on Protected Areas South East Asia Marine (WCPA SEA Marine) working group. With these initiatives well underway, the BNPMAB is targeting financial sustainability by 2005.

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Annex X
Small versus large protected areas in tropical developing nations

(From NRM Headline News (2001). Natural Resources Program Headline News Issue 35, November 2001, courtesy M. Erdmann, Bunaken National Park).

Considerable recent debate has centred on the relative merits and drawbacks of small (less than 2 ha) community-based MPAs versus large (tens to hundreds of thousands of hectares), often centrally-managed MPAs, the marine equivalent of the well-known SLOSS (Single Large Or Several Small) debate in terrestrial conservation circles. This debate has particular relevance to Indonesia and the region as a whole at this time, when several large institutions appear to be favouring the small community marine reserve approach based upon an apparent belief that large MPAs are much more difficult to manage and often face significant public opposition. A good case study for Indonesia is the Philippines, where there are reportedly almost 100 small municipal MPAs and relatively few larger MPAs (with Tubbataha being a notable example). Indeed, the increasing prevalence of Philippines fish poachers in Indonesian waters suggests that the Philippines MPA strategy has not been altogether effective.

Several Philippines representatives at the UNEP-sponsored Workshop on Networking of MPAs in the East Asian Seas held in Kota Kinabalu, Malaysia from 8-12 October 2001 argued strongly for the small community reserve approach, citing the strong community support that is often achieved and the resulting efficacy of management. On the other hand, many marine scientists present at the meeting pointed out that current ecological theory on reef organism life histories and recruitment dynamics suggest that such small reserves, even if relatively high in number, cannot maintain viable populations of many important reef species. While small community reserves are an excellent MPA marketing tool to increase village awareness and participation in marine conservation and possibly to increase local fish catches, networks of large reserves (on the scale of tens of thousands of hectares) are critical for the survival of rare, widely-spaced or highly mobile reef species. A commonly-cited example are groupers (fish), which can travel up to 10 km or more to spawn in large aggregation sites. Without large reserves that include the entire home range of such groupers (including the spawning aggregation sites), there can be no effective protection of grouper stocks

It would seem appropriate that the debate raised at the Kota Kinabalu workshop should be revisited in Indonesia for the purpose of formulating this country's future MPA network strategy. The current focus on small community reserves is certainly important and should continue to be encouraged - but not to the exclusion of large reserves. These large MPAs, while often presenting a much more complex management situation, are an essential component of Indonesia's marine conservation efforts.

Annex XI
Managing overfishing in Indonesia

(Excerpted from Pet & Mous (1999), with direct quotes from their cited sources in normal font and the article conclusions in italics)

Already in the mid-nineties, there was a call for a change in the objective in fishery management: The major conclusion of this study is that a shift of objectives of fisheries management should occur. To assure that maximum benefits accrue from the fisheries, the objectives must change from increasing landings to assuring sustainable exploitation (Gillett 1996).

The tragedy is that Indonesian government officials misinterpret the conclusions from fishery scientists on the maximum sustainable yield. Whereas fishery scientists state that the current state of the fishery is at 60% of the maximum sustainable yield because the fishing effort is too high, many policy makers think that the fishery can be further optimised by increasing the effort. (Undated leaflet from the Indoensian Research Centre of Marine Technology, Ministry of Marine Affairs and Fisheries).

Whereas the concept of maximum sustainable yield is widely used in Indonesia, even a basic understanding of the rationale behind the concept is lacking with policy makers. Fishery scientists fall short in explaining the uncertainties, applicability and the take-home message in their reports. The following are excerpts from the recommendations in a recent FAO report: A major problem is the working concept that the difference between present fish catches and the potential yield represents a surplus which is available for harvesting by additional fishing effort. Although the concept of maximum sustainable yield (MSY) is widely used in Indonesia, as the fisheries develop and effort increases, the MSY concept becomes less relevant and information from the fishery assumes a greater importance in determining any remaining potential. Those individuals that make the resource estimates should also take on the responsibility of conveying to the users of the information an idea of how accurate the information is (Gillett 2000).

The Indonesia/FAO/DANIDA Workshop (Venema 1996) and the DGF/FAO Workshop on Strengthening Marine Resource Management (Gillett 1996) found that the system which is presently used to calculate the optimum effort in terms of numbers of licences (= number of active vessels per year) is incorrect and the expected effects are alarming to say the least.

A challenge for effective fishery management is that policy makers still perceive Illegal Unreported and Unregulated Fishing (there is even an acronym for this, IUUF) as the main concern, rather than overexploitation by 'legal' fishers. There is a strong focus within the Ministry of Marine Affairs and Fisheries to deal with this problem, whereas the establishment of Marine Protected Areas is not on the political agenda. For example, the Ministry did not even propose a single project in support of marine protected areas in its project portfolio presented at PrepCom IV. Hence, there is a niche for a conservation alliance to carry the concept of marine protected areas forward (Ministry of Marine Affairs and Fisheries 2002).

Although overfishing is mentioned as a real problem in general terms, one does get the impression that the main agenda remains to expand the fishery, in combination with curbing illegal fishing and making the domestic fishery more capital-intensive. It is also noteworthy that the Government of Indonesia formulates clear benchmarks for development of the fishery, whereas there is nothing concrete on conservation and how sustainability is being ensured. The following is an excerpt from a speech by the Minister of Marine Affairs and Fisheries: Indonesia's contribution of the fisheries sector to the national GDP is only about 2%, although the total length of the coastal line in South Korea and Japan is only 2 731 and 34 386 km respectively, the contribution of the fisheries sector to the national GDP already fetch 37% and 54% respectively. Likewise, although the total length of the coastal line in Thailand is only about 2 600 km, they manage to tap more then 5 billion USD of foreign-exchange earnings from fisheries export annually. For these obvious reasons, the Indonesian Government has decided to launch an integrated fisheries management programme to optimise the use of fisheries resources on a sustainable basis. Under this scheme, the contribution of fisheries export to the foreign-exchange earnings is projected to reach 5 billion USD and the share of the fisheries sector to the national GDP is expected to reach 5%. One of the main constraints to achieve the above objectives is the fact that artisanal fishermen, characterised as small-scale, low capital and labour intensive in nature, mostly dominate the Indonesian fisheries.

The widespread increase of Ilegal, Unreported and Unregulated fishing has also been incriminated for the severe damage of fisheries resources in the Indonesian waters as well as excessive loss of revenue. We need to work together to strengthen our capacity building and technical know-how. I would like to take this opportunity to seek the indulgence and cooperation of all stakeholders to assist Indonesia to overcome and gradually minimise illegal unreported and unregulated fishing. In this juncture, I would like to re-emphasise our desire to strengthen our capability and policy instruments and law enforcement against IUU fishing. (Official transcript of the keynote speech by the Minister for Marine Affairs and Fisheries at the International Seminar on Sustainable

Development in the EEZ and the EEZ as an Institutional for Cooperation or Conflict. Denpasar, Bali, June 4, 2002).

A recent address by the President of Indonesia shows that the Government of Indonesia seeks to expand the fishery in Indonesia's seas: President Megawati Soekarnoputri, while expressing concern about the environment, called on local businessmen to make more of Eastern Indonesia's waters, home to an abundance of fish and other marine life. "Most businessmen have been reluctant to open new ventures in this unexplored and rich marine resource area because they consider it technically and economically unfeasible," said the President. Participating in the conference and expo were delegates and fishing companies from 22 foreign countries, including Australia, the United States, Germany and France. "We now have to start thinking about how to wisely explore our rich and diverse marine resources, as well as to boost agriculture," she said (Widiadana 2002).

In a recent report to the Ministry of Marine Affairs and Fisheries, the need for better management rather than further expansion was noted again. More investments are needed to produce more fish. But such investments must not expand fishing capacity but to complement and supplement effort to manage the remaining fisheries resources (Pacific Consultants International 2001).

A recent report to the Ministry of Marine Affairs and Fisheries listed the following policy recommendation: Create, build and arouse awareness to change the perception and mindset of the people to stop romanticising that the country's seas have over-abundant or overflowing resources, in particular fisheries resources (Pacific Consultants International 2001).

It is not clear how the Government of Indonesia translates the advice offered through costly consultancies into management action, given the ubiquitous call for reduction of the fishery among experts and the equally ubiquitous call for intensification of the fishery among policy makers. Even consultants seem to have concerns about this issue, see the appeal at the end of the following excerpt from a recent three volume report commissioned by the Ministry of Marine Affairs and Fisheries to Pacific Consultants International: The former Directorate General of Fisheries, now restructured into the Directorate General of Capture Fisheries and Directorate General of Culture Fisheries, had tasked a project, Study on Fisheries Development Policy Formulation, as an integral part of the Jakarta Fishing Port/ Market Development Policy Formulation, as an integral part of the Jakarta Fishing Port/Market Development Project Phase IV under the Japan Bank for International Cooperation (JBIC Loan No. IP-403) to evolve and formulate a new and bold policy for Indonesian fisheries and aquaculture based on the principles of equity and sustainability, taking into account the needs of the vulnerable poor as well as to implement the Precautionary Approach to Management and the Code of Conduct for Responsible Fisheries, to which the country subscribes.

Today, management of Indonesian fisheries is no longer a matter of choice. There is no choice. Management is inevitable if the remaining fisheries are to be sustained for the present and future generations. With fisheries facing certain depletion and imminent collapse, not only in Indonesia but also throughout the world, a continuing emphasis on uncontrolled or unmanaged development and expanded production as had been pursued in the country over the last 30 years is clearly ill advised. To check further uncontrolled expansion and reverse overfishing, a different set of fresh policies and strategies is needed.

The country and its policy-makers and planners, as also its fisheries managers and fishers must rid themselves of their mental trap that every available resource in the country is still underutilised and huge potentials remain for its expanded exploitation and production. In a country as vast as Indonesia is and with over 200 million people and with a structurally-centralised governance system concentrated in Jakarta and Java, it cannot be that its natural resources are still underutilised. For Indonesian fisheries and its future sustainable development, we would like that our Study be on the list of `must read' reports for as many Indonesians as possible, especially those responsible for making policies, which provide the broad thrusts and direction, goals, signals, incentives, nuances and its wherewithals on how these remaining resources are used for nation building (Pacific Consultants International 2001).

In a report prepared by the Food and Agricultural Organization of the United Nations, the danger of the government focusing on increasing production is highlighted: Both individuals and the private sector can and do carry out action leading to increased production from fisheries resources. However, in many respects only the government can serve as a guardian of the fisheries resources to prevent overexploitation. If the staff of DGF (Indonesian Directorate General of Fisheries) are largely preoccupied with increasing fisheries production, there appears to be no government agency which has as its major concern the protection of fisheries resources (Gillett R. 2000).

To restore fish populations and protect ecosystems, fishery managers should develop policies aimed toward substantially reducing fishing, says Sustaining Marine Fisheries, a new report by a committee of the National Research Council. Management plans should include not only commercial fishing but also recreational and subsistence fishing. More coastal and ocean areas should be designated as protected,

where fishing would not be permitted. In addition, managers should consider taking action such as assigning exclusive fishing rights to individuals or communities, to discourage overfishing (The National Academies 1998).

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