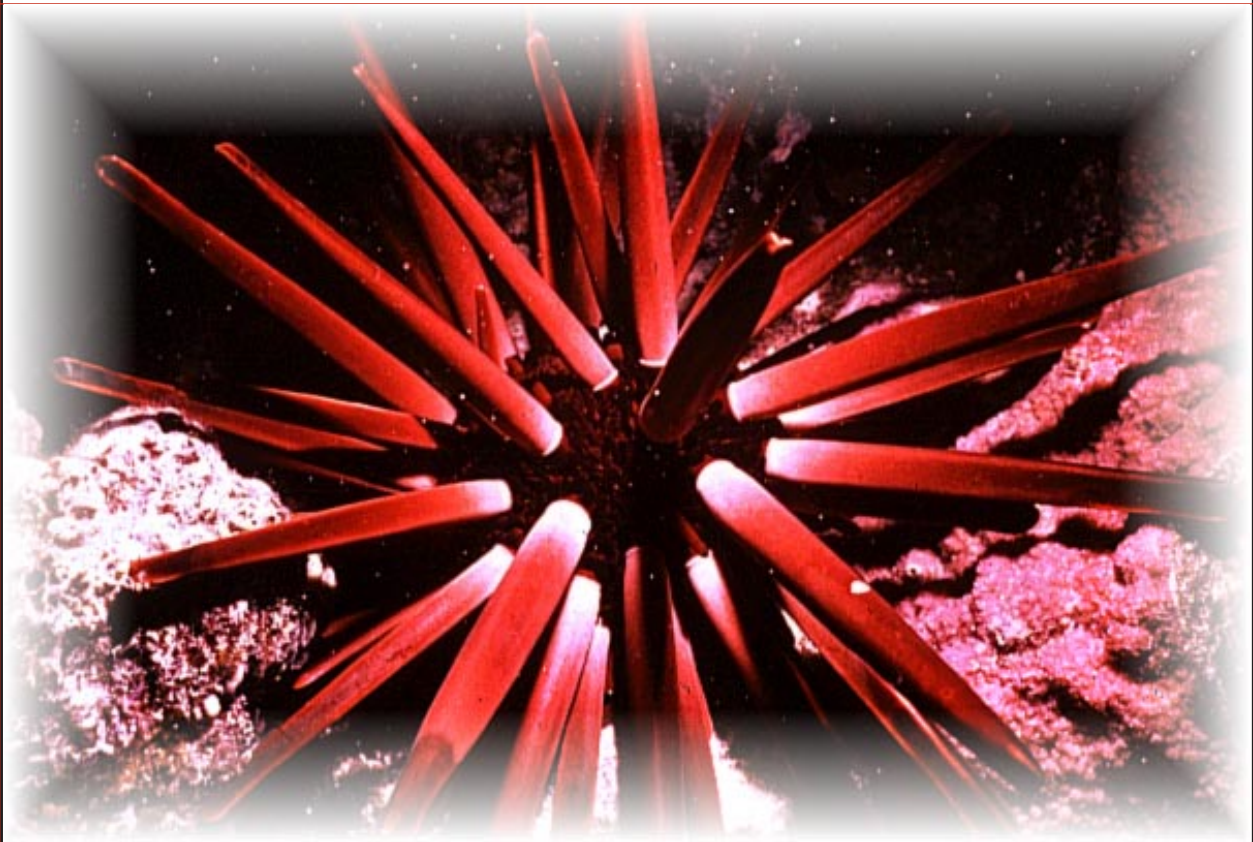


Report
of the
Middle East Seas
Regional Strategy Workshop
for the
International Coral Reef Initiative



*Aqaba, Jordan
21-25 September 1997*



Acknowledgments

The Office of Ocean and Coastal Resources Management (OCRM), National Oceanic and Atmospheric Administration, in the United States Department of Commerce was pleased to serve as the Coordinator of the Middle East Seas Regional Strategy Workshop held in the setting of the lovely City of Aqaba, Jordan. Working with the Aqaba Region Authority, our workshop host, we were grateful many outstanding scientists, resource managers, and other interested parties from the area could attend and contribute so much to the discussions and findings which advance the International Coral Reef Initiative (ICRI) agenda. This report is a summary of our workshop and supplements the Workshop Handbook. The workshop is only the beginning of a dialogue which will continue as mounting pressures of development so near fringing reefs will require the best efforts in managing the coral reef ecosystems. This was made abundantly clear as we made our historic boat excursion trip through three borders. ICRI's "Call to Action" to improve in the areas of integrated coastal zone management, research and monitoring, capacity building and periodic reviews will hopefully lead to the proper mix of actions at the local, national, regional, and international level to ensure the survivability and sustainable use of these fragile resources.

Special thanks go to Professor Fayez E. Khasawneh, President of the Aqaba Region Authority at the time of the September 1997 workshop and now President of Yarmouk University. His support to host the workshop and provide the dedicated efforts of staff from the Aqaba Region Authority were indispensable and his opening remarks set the tone of the workshop. Engr. Amer Al-Homoud spent many hours in making arrangements for travel, hotel rooms, boat trips and the exciting night at Wadi Rum which made the workshop not only productive but pleasurable. Dr. Carl Dutto was also a great help in assisting Mr. Al-Homoud in these activities. The management staff of the Aqaba Gulf Hotel did a marvelous job in making our stay one to remember with lots of excellent food and amenities.

We are especially grateful to Messrs. Richard Kenchington, John Baldwin, and Ahmed Shehata, without whom we would not have had a successful workshop. Their knowledge, skills and abilities to guide our energies to be the most productive in so short a time were instrumental in accomplishing more than otherwise would have been accomplished. We hope that Richard and John, the current ICRI Coordinator and ICRI Secretariat feel some sense of accomplishment in achieving ICRI's goal of holding six regional workshops around the world. The Middle East was the last region to hold a workshop but we are encouraged that there will be follow-up and even more extensive workshops in the region as the participants felt the need to ensure the entire geographic area shares the same message of urgency to work on coral reef issues - both individually and collectively.

OCRM would also like to thank Dr. Peter Thomas, the former ICRI Secretariat for his continuous encouragement over an extended period to bring off the workshop. He made things easier for OCRM to support the workshop. Likewise, we acknowledge the financial support of the USAID Middle East Regional Cooperation Program. OCRM also owes a debt of gratitude to Mr. Steve Morrison (NOAA) and Dr. Judith Barry (American Association for the Advancement of Science Fellow) for their note taking and the preparation of this report.

Last, we would like to thank one of our workshop participants who helped represent the dive industry at our workshop, Mr. Mohammed A. Momany, for the lovely coral reef pictures used throughout this report. A veteran of 30 years underwater with more than 12,000 registered dives, he brings us pictures of why we need to work collectively and with all diligence to protect the fragile coral reef ecosystems. Other pictures were taken by myself.

Ben Mieremet
Workshop Coordinator

CONTENTS

1.	Welcoming Remarks	5
	Dr. Fayez E. Khasawneh	5
	Dr. Peter Thomas	8
	Mr. Richard Kenchington	9
	Dr. Michael Crosby	10
	Mr. John Baldwin	11
2.	Background to the International Coral Reef Initiative	13
3.	Purpose of This Strategy	14
4.	The Middle East Seas Region	15
	4.1 Coral Reefs and Related Ecosystems	15
	4.2 Capacity to Manage	16
	4.3 Economic Considerations	16
	4.4 Threats to the Reefs	16
5.	Summary of Country, World Bank, and NGO Reports	18
	5.1 Egypt	18
	5.2 Yemen	18
	5.3 Oman	18
	5.4 Jordan	19
	5.5 Israel	19
	5.6 Djibouti	20
	5.7 World Bank	20
	5.8 EcoPeace	21
	5.9 Winrock International Environmental Alliance	22
6.	The Middle East Seas Regional Strategy	22
	(Report of Working Group Sessions)	
	6.1 Integrated Coastal Zone Management	22
	6.2 Capacity Building	25
	6.3 Research and Monitoring	27
	6.4 Coordination and Review	28
7.	Proposal for a Year One Program	28
Appendix		
I.	Workshop Agenda	A-1
II.	Participant List	A-5
III.	Results of Individual Working Groups	A-13
	Working Group 1	A-14
	Working Group 2	A-17
	Working Group 3	A-21
IV.	State of the World's Reefs - Dr. Michael Crosby	A-23
V.	Country, World Bank and NGO Reports	A-31



MIDDLE EAST SEAS REGIONAL STRATEGY IN SUPPORT OF THE INTERNATIONAL CORAL REEF INITIATIVE

1. *Welcoming Remarks*

Welcome Remarks
Dr. Fayez Khasawneh
President of the Aqaba Region Authority

Bism Allah Al Rahman Al Raheem

It gives me great pleasure to welcome this distinguished gathering from neighboring and friendly countries, as well as international and Jordanian organizations, which proves that the coral reef subject is very important.

The Aqaba Region Authority of the Hashimite Kingdom of Jordan is pleased to host this Regional International Coral Reef Initiative (ICRI) workshop in Aqaba, Jordan, from September 21-25, 1997, as a series of worldwide ICRI regional workshops, designed to bring together experts on coral reef management and related sciences to identify issues and activities that are relevant to this region.

We all know that 100 nations of the world community have the fortune of enjoying coral reef ecosystems along their shorelines. These important ecosystems are being increasingly recognized for their multiple uses, their high biodiversity value, their protection of life and property from storm surges and their overall alluring beauty. Not only do the coral reefs provide significant benefits to coastal nations and their inhabitants, but they have also become a magnet attracting visitors from around the world longing to behold their beauty, thereby providing even greater potential for long-term economic value.

Because of the significant amount of degradation which has occurred and is projected to occur in the absence of concerted action, ICRI was launched

in 1994 as a partnership among governments, non governmental and international organizations, multilateral development banks and private sector interests aimed towards conservation, sustainable use and effective management of coral reefs and related ecosystems.

The first global workshop sponsored by the initiative was held in Dumaguete City, The Philippines, 29 May-2 June 1995.

The last decade of the 20th century offers a unique opportunity for the world community to make the transition to sustainable living for all. The end of the Cold War, the world wide thrust for democracy, and other recent political events have created an enabling environment which can generate the means and political will that can make possible the fundamental changes needed for the transition to sustainable development and utilization of world resources.

Chapter 17 in Agenda 21, addresses the Ocean and Coastal Environment, since the world's oceans play a dominant and decisive role in the biochemical processes of the planet on local, regional and global scale. The global energy budget, climate and weather, the hydrological and carbon cycles, and atmospheric and physical processes are all critically influenced by the properties of oceanic processes.

The root cause of coastal management problems lies in the growth of human populations and their economic activities. The rapid development of coastal settlements, expansion of recreational areas and centers of maritime transport and concentration of industrial development along coasts all resulted in accelerated loading coastal areas.

The growth of the tourism industry can be a two-edged sword which cuts both ways. On the one hand, tourism is becoming the number one industry in many areas and countries. However, the fast



pace of growth often overwhelms existing infrastructure and management regime capacity and can lead to reef degradation.

Problems in the coastal zones of developing countries are generally complex and multifaceted. Solutions require interdisciplinary analyses and planning in the framework of integrated coastal zone management.

The last few decade have witnessed increasing coastal pollution, accelerated destruction of coastal



marine habitats and, in many areas, a declining catch of marine fish species through marine pollution.

The prescribed corrective activities put particular emphasis on global cooperation as a way of increasing our understanding of these phenomena, as well as on the need for internationally binding agreements to protect these atmospheric and oceanic resources in a *SHARED WORLD*.

Developing countries, including Jordan, are becoming aware that environmental reform must go hand in hand with economic reform. Therefore, we recognize the need to create environmental strategic plans that link and balance economic development with environmental preservation.

Over the past years Aqaba Authority played a major role in protecting the environment in Aqaba Region and in pioneering, not only on the national

level, but among the Middle East countries, in formulating the Gulf of Aqaba Environmental Action plan, tackling environmental protection and setting draft guidelines for environmental impact assessment and environmental auditing, and designating the marine park on the south coast of Aqaba.

In addition, ARA is playing a major role in the establishment and promotion of public awareness, and is building contacts and bridges of cooperation with all national bodies interested in the Environment.

In addition to Agenda 21, there are several other international agreements dealing with biodiversity, global climate change and marine pollution (including land - based sources), for example, the Regional Seas Program under the auspices of the United Nations Environmental program focuses on improved coastal zone management of coral reef ecosystems as one component of a large program. Likewise, the Intergovernmental Oceanographic commission (IOC) has for a number of years promoted the need to set up a global monitoring system for coral reefs and mangroves, as part of a Global Ocean Observing System. However, given numerous constraints, it is often difficult to focus the attention and resources needed for specific issues. It is under these circumstances that an international initiative like this one could play a key role galvanizing the many interested parties in working together to bring the needed visibility to address the local, national, regional and global issues related to the sustainable use of, and benefits derived from these national resources.

For decades, the vast majority of coral reef scientists ignored what was happening to reefs so that managers, what few there were of them, had to manage alone. But now, though we have the best of intentions, we are in danger of doing the reverse. One of the greatest opportunities and challenges for ICRI will be bring the research and management communities together to make policy and to continually challenge all that we do to make it better.



This is indeed one of the great challenges to facilitate the dialogue and collaboration between the scientific/research community at all levels with the management community. Many management issues need the support of research and monitoring results if necessary policy and enforcement measures are to be developed and implemented.

However, it shall be emphasized that the political will is the most important aspect for better environmental management. Adopting several policies and strategies are needed to achieve sustainable development. If any initiative of this type were to get very far, it would need the support of the highest levels of government as well as broad-based support from many different interest groups or stakeholders (science community, NGOs, international organizations, lending institutions, tourism and private development interests). Additionally, there would need to be an information/education element to get the word out.

To encourage wise and sustainable use of coral reef resources for current and future generations, partnerships will have to assist countries and regions to be better prepared to manage coral reef environments effectively through capacity building measures, leveraging and channeling resources among all sectors, and assisting in coordination of activities.

ICRI is based on such a regional partnership. ICRI focuses attention on the need to begin or improve integrated coastal management capabilities of coral reef states; to support capacity building measures such as training in resource management, education, monitoring techniques, etc.; and research and monitoring related to the health of coral reef ecosystems. Once again, these measures echo the familiar lead items of Chapter 17 in Agenda 21.

The ICRI workshop is hoped to produce a lot of useful information through plenaries and breakout sessions, that will help in the wise management and sustainable use of this important resource.

It is hoped that this workshop will provide new

information on the biological diversity of the Red Sea, and especially of the Gulf of Aqaba. It is apparent that the Gulfs atypical oceanographic characteristics have resulted in both an increase in diversity and in the number of endemic species among the coral reef communities. Existing information indicates that coral biodiversity is greater in the Gulf of Aqaba(48 general and 27 species) than in the central Red Sea (40 genera and 116 species). Species diversity increases from the central Red Sea to the Gulf of Aqaba, but colony size decreases.



Coral reef communities are an important component of the Gulf of Aqaba's marine ecosystem. The marine coastal ecosystems include sand and mud areas (some of which support substantial sea grass beds) rocky outcrops, coastal lagoons, fringing coral reefs, and scattered coral heads. Together these habitats constitute a delicately balanced, interdependent and productive biological system which includes and sustains both coastal and pelagic fisheries.

Pollution resulting from development along the coast of the Gulf of Aqaba is threatening the balance of this marine ecosystem. Biological and economic value of unique coral systems maybe lost as a result of poorly planned or managed coastal developments which are established without due regard for environmental consequences.

With the rapid expansion of hotel rooms and



related tourist accommodations along the coast-line, the numbers of tourists swimming, diving, snorkeling and boating in the coastal waters are certain to increase in the years ahead.

The likely impacts of pollution, commercial, recreational, fishing and collecting activities on coral reefs are well known since Coral reef ecosystems are very sensitive to changes in the physiochemical environment..



Appropriately managed and protected, the marine and terrestrial ecosystem of Aqaba could ensure the preservation of both biological and tourist attributes of the Gulf's reef systems.

Governments of the region must recognize the need for effective environmental management and pollution control to protect the Gulf of Aqaba's natural resources, especially its corals, while facilitating sustainable development of the region's trade, industry and tourism. Jordan's commitment to pursuing a regional approach to Gulf of Aqaba environmental protection was further advanced by the signing of most of the conventions related to environmental protection including biodiversity, and marine life in general and the coral reef in particular in order to enable Jordan to take the lead in establishing a regional collaborative framework for sustainable management and protection of the Gulf of Aqaba and the conservation of its unique coral reefs.

ARA is strongly committed to rigorous measures of wise management, to public education, to a thorough patrolling of heavily visited reef areas, and to enforcing prohibitions against coral-damaging activities.

It is hoped that this commitment will be matched by similar commitments on a regional scale. When that happens, the result of this workshop would have truly come to fruition.

Welcome Remarks

Dr. Peter Thomas, U.S. State Department and Former ICRI Secretariat

The International Coral Reef Initiative was formed out of the global recognition of the declining state of coral reefs. In 1995, ICRI formally adopted its Call to Action and Framework for Action, which have served to guide member nations, non-governmental organizations, and private partners in its goal to monitor and address the threats facing coral reef ecosystems. While ICRI is a global initiative, action first must be undertaken on the local, national and regional levels.

The Middle East Seas Regional Workshop is the sixth and final in the first series of regional ICRI workshops. These regional meetings seek to identify priorities and potential solutions to the challenges that face managers of coral reef ecosystems. Participants of this workshop should come away with a clearer picture of the state of regional reef systems, and how to address threats to reefs. Participants will also gain a better understanding of resources to draw on both within the region and externally. Also, and perhaps most importantly, participants will have the opportunity to form better communications with colleagues within the region and can strengthen ties to work together in solving problems that traverse political boundaries. The workshop will also provide a forum to develop a common understanding for priorities in coastal zone management on a regional level. This is crucially important for improving the state of reefs national, regionally and globally.

ICRI does not intend to supersede any ongoing activities or projects within the region. ICRI recognizes the importance of such activities and will attempt to involve as many relevant partners as possible.



Opening Remarks

Mr. Richard Kenchington, ICRI Secretariat (1996-present) and Workshop Facilitator
Deputy Chief Executive Officer
Great Barrier Reef Marine Park Authority

Scientists have known for the past 30 years that coral reefs were deteriorating, yet this knowledge had no effect because the decision makers thought that it was sufficient for scientists to simply collect more data. ICRI is a global partnership that addresses this problem. The core documents of ICRI are the Call to Action and the Framework for Action, where the key word is “action”. The purpose is to enable entities on all levels—communities, regionally, nationally and internationally—to address the problems faced by coral reefs, seagrass beds and mangroves, and take the actions necessary to prevent their decline.

In simple economic terms, the case for preserving coral reefs and associated ecosystems is compelling: 1 km² of healthy coral reef can sustain 80 families forever, yet a 30% decline in the health of the reef decreases the amount of food that reef can provide by more than half. In areas where people depend on coral reefs, which is the case for most if not all developing countries that have reefs, the economic consequences of reef damage and loss are serious. The long-term issues of coral reef protection are usually seen as secondary to the need for economic growth. The purpose of this workshop is to think carefully about actions that will enable decision makers to balance the needs of economics and conservation and so assure long-term economic sustainable development of reefs.

The action related components of ICRI are: integrated coastal zone management; capacity building of decision makers, researchers, and communities (the people who use and depend on reefs); and research and monitoring, which feeds into management. The fourth component of ICRI is one of the most important: review. In management terms, the purpose of

review is to look at actions decided upon and determine whether the actions were taken and whether they are achieving their objectives. The review component of ICRI plays the same role, feeding into evaluation and programming at all levels. At the international level, an important ICRI role is to try to focus multinational development banks, NGOs, international organizations, and governments on action rather than blame.

In this workshop we will seek to develop a Middle East Action Strategy for coral reefs and related ecosystems. This will provide the basis for later review of whether we have achieved the goals of ICRI, regionally, nationally and internationally. The first such review at a global scale will be held in Townsville, Australia in November 1998. There progress from all six Regional Action Strategies will be reviewed. Meanwhile, I note that at the Pacific Regional Workshop, a central theme was the “Pacific way”, which says that “I will take care of what needs doing locally”, and these actions will feed into the next level up, and so on up to the national and international level. Perhaps in this workshop we will find that the Pacific way applies in the Middle East as well, or perhaps a unique “Middle East way” will emerge.



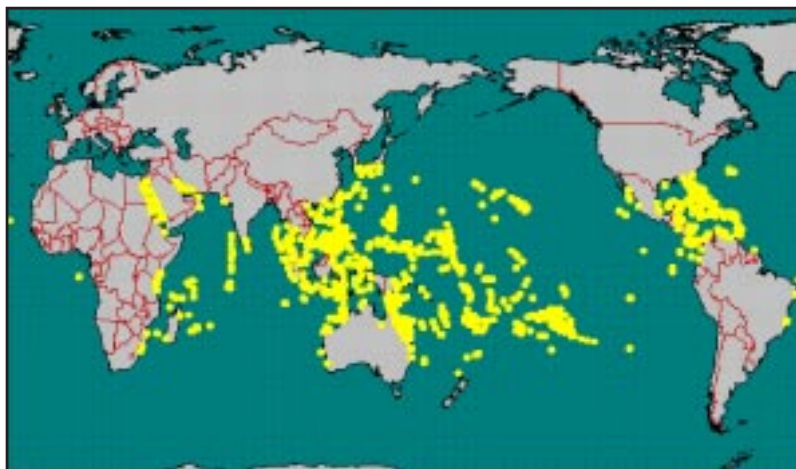
The State of the Worlds Reefs-A Summary
Dr. Michael Crosby
NOAA National Research Coordinator

(see Appendix IV for a copy of this presentation)

Coral reefs are facing serious decline throughout the world's tropical seas. Currently 10% of the world's reefs seriously degraded and a greater percentage are threatened. If these current trends continue, it would lead to a loss of most these reefs. While there is some debate within the scientific community about the specific numbers of coral reefs that are threatened, the 10% figure is widely

Placing a monetary figure on reefs is difficult, however a recent settlement in Egypt assessed a value of US\$1,765 on a square meter of coral reef. In a similar settlement in the United States, a court assigned the value of a square meter of reef at US\$2,833.

Global degradation of reefs is caused by both natural and human-induced stresses. Natural stresses include: the crown-of-thorns starfish; tropical storm damage, earthquakes, wave action, flooding and freshwater runoff, disease, and warmer ocean temperatures which result in coral bleaching. Human stresses include: population increases, migration and intensified uses; overfishing and destructive methods (dynamite, poisons); sewage and industrial effluent; ship-based pollution; sedimentation; coral and sand mining, etc.



Global distribution of coral reefs

agreed on. The biological and ecological importance of coral reefs in the global environment is paramount. Of the 33 phyla that exist in marine habitats, 30 are found in coral reefs. In terms of coral reef building corals, 50 genera exist in the Middle East Seas region alone. The extremely high diversity of coral reefs have many recreational, cultural/social, productivity, and aesthetic values including:

- naturally create, support and repair islands
- protect coastlines from shoreline erosion
- subsistence and commercial fisheries harvest
- accretion and erosion maintains beaches
- provides habitat for seagrasses and mangroves
- recreational resources for locals and tourists
- channels provide safe navigation and harbors
- medical and biotechnological

While there is little managers can do to control the natural stresses against reefs, global and regional action should concentrate on integrated coastal management (ICM), capacity building and improved scientific understanding of coral reef ecosystems, with effective transfer of this information to managers and policy-makers, to allay the many human stresses that threaten reef health. Nations should

place immediate priority on the development and implementation of ICM strategies. These should address public education, community development, economic incentives, institutional restructuring, regulation and enforcement of reef resource exploitation, etc. One of the most critical aspects of ICM to provide for the long-term conservation and sustainable use of coral reefs, is the development of Marine and Coastal Protected Areas (MACPA). The creation of MACPAs can provide nations a focal point for developing governance, education and training, and research and monitoring in marine and coastal ecosystems. In addition to ICM practices, governments should enhance the capacity to design and implement informed, effective integrated management systems; expand conservation education and outreach programs for local



populations and tourists; and develop effective hazardous material response programs and spill response capacities. Another crucial element in protecting coral reefs is increasing scientific understanding of their processes through enhanced mapping and assessment, management-oriented research and the establishment of the Global Coral Reef Monitoring Network. Properly trained volunteer efforts, with appropriate quality control, can be extremely valuable in not only providing sorely needed data on status and trends in coral reefs, but can also serve as education and outreach projects for local communities.

ICRI and the International Year of the Reef
Mr. John Baldwin
ICRI Secretariat

ICRI was formed as a global partnership to conserve and manage coral reefs and their related ecosystems. Its origins can be traced to the 1992 UN Conference on Environment and Development, held in Rio de Janeiro. This conference produced Agenda 21, which highlighted the need to protect valuable coral reef ecosystems. This global recognition by coral reef researchers and managers, led to the announcement of the ICRI concept in 1994. In 1995, at the initial global ICRI meeting at Dumaguete City, the Philippines, ICRI identified its goals and means for achieving those goals by producing a Call to Action and Framework for Action.

The Call to Action recognized the degradation of coral reefs as a global problem citing that 10% of the world's reefs have been seriously degraded and many more are currently threatened. The Call also identified the threats to coastal ecosystems that have brought about such decline in reef health which include pressure from population increases, destructive fishing techniques, solid nutrient pollution, etc. The Call amplified the incredible significance coral reefs play in the global community noting that many nations throughout



the tropics rely on them economically, socially and culturally. The Call to Action is not simply a report on reef health. As its name implies, the Call is a document intended to generate action from communities, nations, regions and the international community.

In turn, the Framework for Action was intended to provide a blueprint for implementing the Call to Action. The Framework document was driven by ICRI members and provides all ICRI partners a basis for mobilization to protect coral reefs. The focus is on “action” and not on the development of bureaucratic structure. As with the Call, the Framework for Action reflects the principals that were outlined under “Agenda 21.”

To achieve its goals, ICRI requires the full participation and cooperation of all users of coral reefs. The over-riding priority is to support actions that will have ‘real’ effects on coral reefs and those that depend on them. ICRI’s principles include encouraging governments to develop and adopt **integrated coastal management** measures; **capacity building** in nations to establish and strengthen human resource and institutional capabilities for coastal management, science, training and education; develop and strengthen **research and monitoring** programs to assess the status of coral reefs, evaluate the success of management and conservation actions and develop more effective management practices; and provide a basis for the **review** of the state of coral reefs and the actions taken to implement the ICRI framework.



The six regional associations that comprise ICRI are:

- Western Indian Ocean
- East Asian Seas
- Middle East Seas
- South Asia
- Caribbean
- Pacific

The world's coral reef community adopted 1997 as the International Year of the Reef (IYOR) with the goal of raising awareness on the importance of coral reef ecosystems and their threats and actions to protect them. IYOR focuses on grass roots strategies such as awareness programs, training, education programs in schools and coral reefs on the internet's world-wide-web in innovative means to educate the global community on the state of reefs.

The Global Coral Reef Monitoring Network

(GCRMN) is another example of ICRI in action. It's mission is to provide data on coral reefs that is useful to management. It consists of regional organizational linkages in a global system, providing a consistent approach to monitoring world-wide. The network is a means of communication taking 'data' and turning into 'information', and distributing this on local, regional and global scales.

To further examine these and other ICRI programs, visit the following internet sites:

ICRI: <http://www.mbnet.mb.ca/vps/icri>
<http://www.nos.noaa.gov/aa/ia/cri.html>

IYOR: <http://www.coral.org/IYOR>

GCRMN: <http://coral.aoml.noaa.gov/gcrmn/gcrmn.html>

ICRI email: icri@gbrmpa.gov.au



2. *Background to the International Coral Reef Initiative*

The International Coral Reef Initiative (ICRI) aims to increase the capacity of countries and local groups to effectively conserve and sustainably use coral reefs and their related ecosystems, including mangrove forests, seagrass beds and beaches. The key to its success will be global cooperation, effective use of existing resources and identifying effective mechanisms for implementation. The Initiative was established out of concern for serious coral reef decline in many parts of the world.

The ICRI Framework for Action recognizes the following principles:

- Achieving ICRI's purpose requires the full participation and commitment of governments, local communities, donors, NGOs, the private sector, resource users and scientists; therefore true partnerships, cooperation and collaboration exemplify ICRI activities.
- The over-riding priority is to support actions that will have tangible, positive and measurable effects on coral reefs and related ecosystems and on the well-being of the communities which depend upon them.
- Human activities are the major cause of coral reef degradation, therefore managing coral reefs means managing those human activities.
- Individuals whose decisions and actions affect coral reefs – from board rooms to beaches – need to become aware of and committed to the conservation and sustainable use of coral reefs and related ecosystems.
- The diversity of cultures, traditions and governance within nations and regions should be recognized and built upon in all ICRI activities.
- Integrated coastal management, with special emphasis on community participation and benefit, provides a framework for effective coral reef and related ecosystem management.
- Developing national capacity to conserve and sustainably use coral reefs and related ecosystems requires a long term (decadal)

commitment. Improvement of coral reef management requires a permanent commitment and an adaptive approach.

- Strategic research and monitoring programs should be an integral part of ICRI because management of coral reefs and related ecosystems should be based on the most relevant scientific information.
- Actions promoted under this framework should take account of, and fully use, the extensive body of international agreements and organizations that address issues related to coral reefs and related ecosystems. The ICRI will facilitate the leveraging and channeling of existing resources among all sectors for the benefit of coral reefs and related ecosystems.



3. Purpose Of This Strategy

The ICRI Middle East Seas Regional Strategy was developed and agreed to by the participants of the ICRI Middle East Seas Regional Workshop held in Aqaba, Jordan from 21 to 25 September, 1997. The geographic scope of the Strategy represents those parts of the Red Sea, Gulf of Aden and Arabian Sea associated with those countries represented at the Workshop:

- Djibouti
- Egypt
- Israel
- Jordan
- Oman
- Yemen

The strategy builds upon and aims to assist in the implementation of the ICRI Call to Action and Framework for Action in the Middle East Seas region, and should be considered jointly with those documents.

The two underlying themes of the Strategy are that:

1. sustainable management of coral reefs and related ecosystems within the Middle East Seas region requires the adoption of appropriate Integrated Coastal Management; and
2. effective implementation of Integrated Coastal Management will depend upon the awareness, support and full involvement of all stakeholders.

The Strategy has been developed to highlight the specific issues and priorities of the Middle East Seas region for conservation, management and sustainable development of coral reefs and related ecosystems. Detailed actions to address many of

the relevant issues are identified. It is not intended to reproduce a high level of detail in this document. The objectives and actions are intended to broadly identify how actions should be carried out in a manner which is appropriate to the region.

Each country or territory in the region has its own set of issues and priorities. This Strategy cannot address these in detail but rather seeks to identify common unifying themes and concerns within the region. It is most appropriate to determine specific courses of action at the country and local levels where they need to be applied, taking into consideration the particular circumstances and priorities that exist.

It is also recognized that there are already many programs and processes currently in existence that address the issues. This Strategy is designed to support current actions to promote cooperation, coordination and effective use of resources. It also serves to promote new opportunities for cooperation and collaboration, some unique to the region, for coral reef conservation and management.



4. The Middle East Seas Region

4.1 Coral Reefs and Related Ecosystems

Coral reef ecosystems in the seas of the Middle East (the Red Sea and its Gulfs Aqaba, Suez and Aden, the Arabian Sea, the Gulf of Oman and the Arabian (Persian) Gulf) are rich, biodiverse and generally in good condition. Well developed fringing reefs thrive on both coasts of the Red Sea (less in the southern Region). Fringing reefs in the Gulf of Suez are less well developed than those in the Gulf of Aqaba. In the Gulf of Aden, well developed coral reefs exist in restricted areas (e.g., Mukalla and west of Aden). In the Arabian Sea, Gulf of Oman and Arabian Gulf, coral reefs occur mainly as numerous patch reefs and fringing reefs in protected areas of Dhofar (Salalah), the Gulf of Masirah, the Muscat area, Musandam, the Arabian Gulf, and the offshore islands of Oman. Coral cover is usually less than 50%. High and low temperatures, high salinities and elevated nutrient concentration during upwelling (in Oman) affect



coral diversity and many species are living near their maximum tolerances. Coral diversity in the Arabian Gulf and Gulf of Suez is low (57 and 45 species, respectively) compared to the Gulf of Aqaba (130 species), the Gulf of Oman and the Arabian Sea (100 species), and the Red Sea (>200 species). Coral Reefs in the Gulf of Aqaba represent the northern-

most limit for coral reefs in the Indian Ocean. Similarly, the world's northernmost mangroves live along the southern coast of the Gulf of Aqaba (Sinai).

The extent of mangroves (3 species) in the region has been declining with only 575-709 km² remaining, most of them in the Red Sea. However, they still play an important role in the ecology of the region: their communities include faunal



assemblages of many species of fish (86 species); crustaceans (40), molluscs (83), and smaller numbers of sponges, echinoderms, polychaetes and ascidian species. Eleven seagrass species are known from the region, with diversity greatest in the Red Sea (10 species) and lowest (4) elsewhere. Seagrass beds are abundant in shallow coastal areas and form the basis for many food chains; more than 600 species of plants and animals were recorded. Fishes and seaweeds are diverse with more than 1000 and 300 species respectively. Large wildlife include turtles (5 species), birds (>200) and mammals (>15 species), with the Dugong population in the Arabian Gulf being second in global importance after Australia.

Natural disturbances have been affecting coastal environments for millions of years and have a role in maintaining the diversity of coral reefs and related ecosystems. Biological communities can be considered robust systems that can and have recovered from acute disturbances over ecological time scales. However, the synergistic effects of human-induced chronic disturbances acting in concert with natural disturbances alter the capacity of these ecosystems to recover.

The terrestrial and marine topography and climate





of the Red Sea and Gulf of Aden have created a unique coral reef ecosystem in these areas. There is very little natural runoff from the land of fresh-water or land-based nutrients, and most reefs are fringing reefs. The region is characterized by a high degree of endemism and biodiversity unique in the world. Therefore, destruction or loss of reef ecosystems in this region is of global significance.

4.2 Capacity to Manage

There are great differences within the region in the capacity to manage and understand coral reefs as well as in the awareness of governments and stakeholders as to the importance of coral reefs and the need for an integrated approach to their management.

4.3 Economic Considerations

The coral reefs of the Gulf of Aqaba and the Red Sea provide increasing economic benefits to the inhabitants of the region which, if successfully managed, could be sustainable. Significant tourism development opportunities are available because of the fringing nature of the reefs, but unless carefully managed, tourism can place intense pressure on the reefs.



4.4 Threats to the Reefs

Human activities are the primary cause of coral reef degradation and most of these are chronic threats. Environmental conditions resulting primarily from the effects of tourism and tourism infrastructure, water pollution, resource over-exploitation and direct physical damage are causing reefs to deteriorate at an alarming rate. Increasing social and economic demands are placing new levels of stress on Middle East Seas coral reefs. In the Middle East Seas region the main threats to coral reefs and related

ecosystems include:*

- Tourism/development activities
- Oil production and oil pollution
- Solid waste/sewage pollution;
- Fisheries overfishing and gear damage;
- Other industry impacts
 - Mariculture
 - Construction and urban development
- Population growth

*See Table I for a compilation of the major human threats to coral reef ecosystems in the Red Sea and Gulf of Aden

Table I

Government	Types of Reefs	Threats to Reefs *	No. of Protected Reefs Jameson, et.al./ Maragos, et. al.	MACPA's ** World Bank
Egypt	fringing, community, patch	anchor damage, destructive fishing, hazardous/solid/mining waste, over harvesting and over fishing, tourism and resorts, overuse/trampling, vessel groundings and oil spills	4/2	3
Israel	fringing, patch, community	coastal construction, tourism and recreation, vessel groundings and oil spills	1/1	N/A
Jordan	fringing, patch, community	anchor damage, coastal construction, destructive fishing, industrial pollution, vessel groundings and oil spills	NA/1	0
Saudi Arabia	continental, fringing, atolls, barrier, coral, patch, community	coastal construction, destructive fishing practices, hazardous/solid/mining waste, industrial pollution, over harvesting and over fishing, pollution from nutrients and sewage, poaching or depletion of rare reef species, overuse/trampling, vessel groundings and oil spills, disease, starfish predation	2/0	2
Djibouti	continental, fringing, patch	anchor damage, coastal construction, destructive fishing, poaching or depletion of rare reef species, overuse/trampling, vessel groundings and oil spills	NA/0	2
Yemen	community, fringing, submerged	vessel groundings and oil spills	NA/0	0
Oman	community, patch, fringing	coastal construction, destructive fishing, hazardous/solid waste, over harvesting and over fishing, poaching or depletion of rare reef species, oil pollution, overuse/trampling	2/0	N/A

* Please see individual country reports in Appendix V which further elaborate on potential threats and the management regime in place or contemplated to address the threats.

** MACPA-Marine and Coastal Protected Areas



5. Country, World Bank and NGO Reports

See Appendix V for full reports.

5.1 Egypt Country Report

In 1989 Egypt developed a national park system to protect and manage its coral reefs. It is separated within the three coastal boundaries of Egypt: the Gulf of Aqaba, Gulf of Suez, and the Red Sea Coast. The whole Egyptian portion of the Gulf of Aqaba is now under protection. The government strictly controls development within the Gulf and raises public awareness on the importance of coral reefs and the threats that effect them. Within protected areas in the Gulf, no fishing, landfilling or other development is allowed. The government has also installed mooring buoys for dive boats to anchor to while within the sensitive coral environments. To illustrate the economic importance of coral reefs, the value of one square meter of coral reef, in terms of tourism dollars only, in the Gulf of Aqaba was estimated as \$6,000. The Gulf of Suez is a shallower basin with about 600km of



coastline with a higher concentration of corals in the south. The biggest threat to corals in Suez is oil production, however, commercial fishing is increasing as another impact and is the most heavily fished area off Egypt. The Red Sea coast contains 800km of coastline in which the north and south sections have had different management practices. The southern half of the Red Sea coast has been

very well protected through the establishment of parks while the northern half has come under increased pressure from tourism and its subsequent development. Egypt is

now looking into declaring the whole coastline of Red Sea as a national park.



5.2 Yemen Country Report

Yemen does not have a coastal zone management plan for their coral reefs, mangroves, or seagrass beds either in place or being developed. Studies have not yet been made to identify the causes of reef degradation, although field surveys of reefs were made in 1987, 1994 and 1996/1997. Some of the threats that were noted by these surveys were crown of thorns starfish, solid waste, and thermal stress. However, fishing was determined to be sustainable, as the fisherman respected the health of corals and did not want to damage them.

5.3 Oman Country Report

Human impacts on the coral reefs of Oman include fish traps, anchors, ropes, sinkers, nets, and dredging. Dredging is the most damaging, causing lasting damage and indiscriminate killing of species. Filament nets are also a serious problem, as they become easily entangled with coral, and eventually come to lie flat over the reef. Evidence was shown of a dead reef three years after a net had settled into it.

Implementation of the Oman Coral Reef Management Plan began this year. This plan is essentially a program which enables local communities to become involved in coral reef management, thereby gaining the understanding, cooperation and active participation of the users and beneficiaries



of the reefs. The management measures being implemented are:

1. Pilot management schemes conducted at the Daymaniyat Islands National Nature reserve.
 - A. Integrated community management involving local fishing communities
 - B. Tourism and recreation management (zoning of activities, mooring buoys)
 - C. Reef restoration (monitored removal of seabed debris, reef stabilization)
2. Formulation of detailed management plans for specific areas-Ras Sawadi, Bandar Jissah, Bandar Khayran
3. Designation of two new protected areas - Khawr Kuway, Musandam & Raaha, Dhofar
4. Implementation of successfully trialed management measures to all coral reef areas in the Sultanate of Oman.

5.4 Jordan Country Report

Jordan's 27 km of coastline along the Gulf of Aqaba has faced increased pressure from the rise in population in the last 25 years. In 1974 the population of the city of Aqaba was 12,000 and had grown to 65,000 in 1995. Projections demonstrate that the population will continue to rise. Pressures from shipping and industry have also threatened the marine environment for some time. It wasn't until 1974 that the local government began to focus on the environment and at that time, the link between a healthy environment and economic benefits were not realized. In 1978 a study was undertaken that examined proposals to protect Jordan's marine environment. This report outlined plans to protect the coral reefs while allowing for development



and use of the areas' resources and was put into action in the 1980's. However, there were conflicts

between the development and protection of resources, which led to the establishment of the Aqaba Region Authority (ARA). The ARA has since established a marine park in the Gulf and developed a master plan to accommodate the planned development within Aqaba.

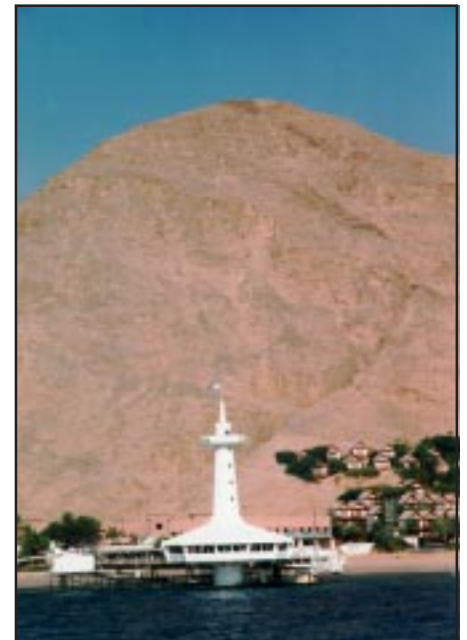
Some of the threats to Jordan's coral reefs include coastal construction, boat traffic and shipping, industries, phosphate mining and transportation, waste, oil spills, sewage discharge, and fishing.

5.5 Israel Country Report

The Gulf of Aqaba coral reef ecosystem is unique and has a very high degree of endemism. The reefs contain many complex symbiotic relationships. A variety of organisms, for example, penetrate into the coral skeleton and reside there. Therefore, if stony corals are damaged, the entire associated ecosystem collapses.

Pollution seriously compromises the ability of coral reefs to recover from damage by both natural and human causes. This point was made dramatically by comparing the recovery of reefs within the Nature Reserve with those at an adjacent, unprotected site outside the reserve, following extensive coral death due to four days of extremely low tides in 1970. Both reefs started with 40% coral cover and were reduced to about 8% by the low tides. The coral in the nature reserve has recolonized, while the reef that has been subjected to human impacts has still far from recovered.

The pressure from tourism is great in both Eliat



and Aqaba. Israel and Jordan have only 14 and 27 km of coastline on the Gulf of Aqaba, respectively, yet Eliat and Aqaba brought in as many as 10,000 and 3,000 tourists per day in 1996. In Israel alone, there are 10,000 newly certified divers per year. Mayors find it difficult to stand up to multinational companies wanting to develop the coastline, and environmentalists have a hard time convincing mayors that uncontrolled development will kill the very attraction that brings most of the tourists.

Collaboration and coordination among countries on the Gulf of Aqaba are required in order to sustainably develop the coastline and preserve the Gulf's coral reefs. Jordan, Israel, Egypt and Saudi Arabia share both the Gulf and the responsibility to preserve it. The Gulf is one ecological unit, a semi-contained system which circulates pollutants all over the Gulf. Since one country cannot enforce another's rules, the four countries must coordinate with one another in this effort.

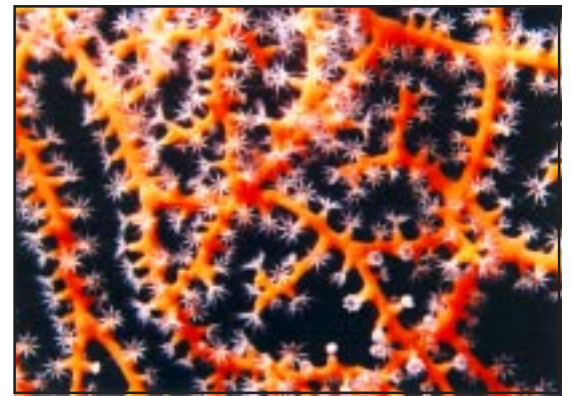
5.6 Djibouti

Port activities, fisheries and tourism (the latter mainly from France) are the most important industries affecting Djibouti's coral reefs, although subsistence fishing is also important locally. A marine reserve was created in 1988, and a park in 1982, but overall little is being done to protect Djibouti's biological resources. The pressure on the reefs is high due to unregulated diving, with damage from anchors and the removal of coral. However, the greatest threat to the reefs is sedimentation caused by poor land use practices. The government has identified three priorities as first steps in addressing these problems. One is training and educating professionals in marine fields. There is currently a serious shortage, in part due to language differences hampering coordination with neighboring countries. Another priority is to establish a central library and documentation center for the effective distribution of knowledge. Lastly, educating the local people is fundamentally important to efforts at coral reef preservation.

5.7 World Bank

Dr. Glineur stressed the importance of this workshop and noted that to protect the precious resources of the Red Sea and Gulf of Aden, a tremendous amount of 'teamwork' is needed—as well as action. The World Bank has funded two projects in the region, through the GEF, that are within ICRI objectives: the Gulf of Aden Environmental Action Plan and the Implementation of Strategic Action Program for the Red Sea and Gulf of Aden. Within Jordan, this program has already produced two major accomplishments. The SAP worked to re-design two separate cable installations that would have caused extensive damage to corals off Jordan's coast. Within Egypt, the speed of development

along the Gulf of Aqaba and Red Sea has been incredible. However, the Egyptian government has made major efforts



to conserve its resources. The Gulf of Aqaba could serve as a model for the rest of the region, in providing an example of best practices for protecting coral reefs.

The Red Sea and Gulf of Aden Strategic Plan (full copy provided in Appendix IV) supports Agenda 21 and contains the following elements:

- Institutional strengthening to facilitate regional cooperation;
- Reduction of navigation risks and maritime pollution;
- Sustainable use and management of living marine resources;
- Development of a Regional Network of Marine Protected Areas (MPA's);
- Support of integrated coastal zone management (ICZM);



- Enhancement of public awareness and participation;
- Monitoring and evaluation of program impacts.

Public awareness will be a crucial point to the success of any programs within the region and major action in public awareness will have to be undertaken by all nations involved. Monitoring and collection of impact

The SAP Areas specifically address coral reef management

5.8 EcoPeace

Eco-Peace is a Middle East environmental partnership program of NGOs, established in December 1994 in Taba, Egypt. It is the only NGO that brings together Arab and Israeli NGOs under one umbrella organization. Eco-Peace advances regional environmental concerns by extending the effectiveness of NGOs beyond borders. It addresses regional issues of renewable energy, water conservation and sustainable societies (such as sustainable tourism), focusing on the shared ecosystems of the Southeast Mediterranean, Gulf of Aqaba, and the Jordan Rift Valley and Dead Sea. One of the main objectives of Eco-Peace is capacity building of its members, through Internet training courses for environmentalists, scholarships, training grants, and a Partnership Project Implementation Program of four types of environmental partnerships: the private sector, public sector, scientific community, and international.

Eco-Peace has an active program on sustainable tourism. Tourism is the most rapidly expanding industry in the region, most of it targeted for coast development. Around the Gulf of Aqaba, for example, over 80,000 new hotel rooms are planned in the near future, with 50,000 planned around the Dead Sea. Sustainable tourism benefits both the environment and the host community because it depends on a clean environment, is often better than alternative industries, and thereby improves



the quality of life for the host community. However, an integral component of Eco-Peace's strategy is to convince the private sector of the many advantages sustainable tourism has for them: reduced consumption, improved efficiency, reduced costs, motivated staff, loyal customers, community benefits, and an increased positive profile which can be marketed.

One strategy of the sustainable tourism effort for the Gulf of Aqaba is to pull together one committee each for Aqaba, Eilat, and South Sinai. Each committee contains representatives from the tourism industry (such as travel agencies, hotels, caterers, and providers of leisure and entertainment activities), the local community (the municipality, schools, clubs and other groups), and environmental NGOs from all levels. Another key strategy is Eco-Peace's voluntary Sustainable Hotels Program. Eco-Peace works from beginning to end with hotels to help them devise and implement a program to mitigate their environmental impact. The process begins with a mission statement, followed by an environmental audit of the hotel's current operation. Then a program is devised and targets set, at which time Eco-Peace carries out the education and research necessary for successful implementation. Then implementation is monitored, with new targets set to improve performance as necessary. As the only organization of its kind to combine the efforts of Arab and Israeli environmentalists, the potential is high that Eco-Peace programs such as these can achieve real progress on regional Middle East environmental problems shared by a number of different nations.



5.9 Winrock International Environmental Alliance

The Environmentally Sustainable Tourism Project is a Gore-Mubareck partnership program funded by the U.S. Agency for International Development (USAID). Now in its third year, the project focuses on the national and cultural resources of the Red Sea area which are the foundation of the region's tourism, particularly the north, central part of the Red Sea region.

One facet of the project is to work directly with the tourism industry to help them develop internal management systems to manage their own facilities in a more environmentally safe manner. Such management development includes environmental health issues, such as solid waste management and food handling. The project is also targeting the construction and operation aspects of coastal development, working with the Tourism Development Authority on their development programming, Environmental Impact Assessments, and monitoring of tourism facilities.

Another area of emphasis for the project is the diving industry and marine protected areas. To prevent anchor damage, they are in the process of installing mooring buoys throughout the dive sites of Egypt, and will be training boat captains on why and how to use them. About one-third of the buoys have been installed, and the second one-third has been purchased. They have also performed a rapid assessment of the dive area to provide information to be used in policy making and for the process of designating protected areas. They plan to update the assessment each year to provide long-term scientific data to inform policy. Another necessary component of the marine park system is park rangers, with Winrock is aiming to have 100 rangers in place.

Winrock has developed a policy framework for the Red Sea which they hope will be adopted by both governmental Ministries and the tourism industry. They are currently designing another USAID project, to run for five years, to continue the work of the Environmentally Sustainable Tourism Project.

6. The Middle East Seas Regional Strategy

The issues and actions presented in this report represent the delegates point of view and each representative nation's contribution to the workshop.

As such:

1. Each nation in the region should consider, adopt, implement, or reject the objectives and actions in the report.
2. Each nation should consider the regional implications of the actions.
3. Each nation will attempt to network regionally to strengthen its own capabilities and capacities according to its wishes.

6.1 Integrated Coastal Zone Management

It has been generally recognized that Integrated Coast Zone Management (ICZM) is the most appropriate way to manage coral reefs and related ecosystems. Therefore there is an urgent need for Middle East Seas countries to develop ICZM programs and strategies appropriate to regional circumstances. Such strategies need to not only be technically appropriate and scientifically sound, but also culturally and socially relevant.

What is important to note about most of the definitions and descriptions is that they refer to ICZM as a "process." There is no one "correct" ICZM methodology, as the process and resultant framework need to be tailored for each country or territory's circumstances.

Issue 1

Rapid tourism development and associated activities, in the absence of appropriate infrastructure and planning, can lead to degradation of coral reef ecosystems.



Objective 1.1

Promote environmentally sustainable coral reef tourism development and activities.

Actions

- 1.1.1 Improve environmental awareness in the tourist industry through communication and marketing.
- 1.1.2 All new coastal developments should include an Environmental Impact Assessment as per national EIA guidelines and regulations.
- 1.1.3 Adopt a regional code system for buoys.
- 1.1.4 Examine the creation of protected areas.
- 1.1.5 Develop integrated plans for land use, coral reef protection and management, and tourism and development in all coral reef ecosystem areas including artificial (man-made) developments.

Issue 2

Healthy fish stocks are an integral part of sustainable coral reef systems.

Objective 2.1

Promote sustainable commercial, recreational and artisanal fisheries

Actions

- 2.1.1 Ban destructive fishing methods (i.e., gill nets, dynamite, cyanide, etc.)
- 2.1.2 Develop and implement comprehensive fisheries management plans at the national and regional level, including stock assessments, zoning, education, and outreach.
- 2.1.3 Regulate harvesting or fishing of lobster,



abalone, shrimp, shark, aquarium fish, and turtles, including banning where appropriate.

2.1.4 Undertake public awareness and education.

Objective 2.2

Promote environmentally sustainable mariculture.

Actions

- 2.2.1. Regulate (set standards, inspection and quality control) the marine mariculture industry to minimize environmental impacts.
- 2.2.2. Reduce nutrient loading by encouraging land-based mariculture or closed systems which minimize negative impacts to marine life.

Issue 3

Oil pollution and oil production activities can threaten the long-term viability of coral reefs.

Objective 3.1

Have both preventative and reactive measures in place to minimize damage to coral reefs by oil.

Actions

- 3.1.1 Establish national and regional oil spill prevention and contingency plans.
- 3.1.2 Establish emergency response headquarters and national oil spill response sites.
- 3.1.3 Establish and enhance communications between nations.
- 3.1.4 Consider the implications of tanker design, safety, navigation and transportation requirements on the potential for oil spills in the region, and the capacity of the region to respond to oil spills.
- 3.1.5 Monitor leaks from marine oil fields, and maintain regional port records.

Issue 4

Land-based pollution affects coral reef health, public safety and amenity.



Objective 4.1

Prevent land-based solid waste pollution on coral reefs.

Actions

- 4.1.1. Public education and awareness; clean-up days.
- 4.1.2. Establish or expand recycling programs.
- 4.1.3. Effective solid waste management (collection and land disposal) to prevent solid waste pollution on the coast.
- 4.1.3. Consider banning plastic bags in coastal areas.

Objective 4.2

Restrict sewage discharge to environmentally acceptable standards or prevent discharge when feasible.

Actions

- 4.2.1 Consider adopting zero discharge policies.
- 4.2.2 Set discharge standards for pathogens and nutrients at levels safe for coral reef ecosystems.
- 4.2.2 Divert sewage treatment plant effluent into land use if practical. (including technically and environmentally sound)
- 4.2.3 Improve the treatment of sewage and the maintenance of sewage treatment plants.
- 4.2.4 Monitor effluent for pathogens and dissolved oxygen.

Issue 5

Minimize damage to coral reefs from ship traffic.

Objective 5.1

Prevent maritime pollution and physical damage from ships.

Actions

- 5.1.1 Encourage the requirement for port waste reception facilities.
- 5.1.2 Increase compliance by patrolling shipping areas and enforcing shipping regulations.
- 5.1.3 Raise education and awareness among Port Authorities and shipping companies.
- 5.1.4 Institute deep water ballast exchange

practices.

5.1.5 Monitor ballast water discharges for introduced organisms if shallow water discharge is allowed.

5.1.6 Clearly identify protected areas.

Objective 5.2

Provide additional, improved, and internationally coordinated navigational aids to prevent ship groundings on and collisions with coral reefs.

Actions

- 5.2.1 Lighthouses, electronic navigational aids, buoys.
- 5.2.2 Establish a regional ship reporting and transit management system.
- 5.2.3 Investigate a compulsory pilot scheme for the region.

Issue 6

The close proximity of industry and urban development to the region's fringing coral reefs is resulting in reef degradation.

Objective 6.1

To have ecologically sustainable coastal development.

Actions

- 6.1.1 Undertake local strategic coastal planning.
- 6.1.2 All new developments should include an Environmental Impact Assessment (EIA).
- 6.1.3 Issue permits only when external EIA (with no discharge) is approved.
- 6.1.4 Develop and implement long-term comprehensive management plans with input from all stakeholders.
- 6.1.5 Build away from the coastline.
- 6.1.6 Adopt appropriate legislation for land-use planning that promotes ecologically sustainable coastal development.
- 6.1.7 Raise awareness in government and the private sector of the need for sustainable development in coastal areas.



Objective 6.2

Take measures which prevent or minimize pollution from mining and shipyard loading activities of bulk materials (such as grains, potash, concrete, and phosphate).

Actions

6.2.1 Institute dust control measures.

6.2.2 Ongoing monitoring.

Objective 6.3

Prevent thermal pollution on coral reefs.

Actions

6.3.1. Install diffusers at coastal power stations.

6.3.2. Monitor water temperature and coral damage.

Objective 6.4

Eliminate collecting and mining of coral in the region.

Action

6.4.1 Introduce legislation to ban removal of coral, including commercial ventures.

6.4.2 Establish alternate options to the use of coral derived from mining.

Objective 6.5

Prevent heavy metal pollution on coral reefs.

Actions

6.5.1. Monitor incorporation of heavy metals into corals via coral skeleton sampling.

6.5.2. Monitor industrial effluents entering marine waters or through groundwater discharge.

Objective 6.6

Prevent sedimentation on coral reefs.

Actions

6.6.1. Flood control measures.

6.6.2. Land use management, including beach front protection and bans on beach sand imports.

6.2 Capacity Building

There is wide variability among the countries of the region in their capacity to effectively manage coral reefs and related ecosystems through the implementation of Integrated Coastal Zone Management.

Developing national capacity to conserve and sustainably use coral reefs and related ecosystems requires a long-term commitment to support regional and national programs. In contrast, many of the pressures on governments are dealt with by short-term initiatives and priorities. Longer-term commitments are required if capacity development is to successfully address the coastal zone management issues and priorities of the Middle East Seas Region.

The success of this Strategy will depend on broad support from all levels of government and the community. Acceptance and understanding that the economic well-being of coastal communities is inevitably linked to the health of natural systems is fundamental.

Issue 1

Lack of trained Marine Protected Area (MPA) managers in the region, and coordination among managers in the region.

Objective 1.1

Increase the number of qualified MPA managers in the region.

Actions

1.1.1. Bring academically trained professionals together to exchange expertise, carry out professional collaborations, and acquire complementary training pertinent to managing marine protected areas in the region.

1.1.2. Hold regular regional meetings and workshops of MPA managers and staff for the purpose of transforming their expertise into viable coastal zone management actions. Some of these meetings should also include the spectrum of stakeholders involved, such as fishermen and hotel and dive operators.



1.1.3. Develop the applications of Geographic Information Systems for management planning and training.

Objective 1.2

Coordinate all countries in the region to decide upon a location for training on a regional level.

Actions

- 1.2.1. Identify and develop national capacities for regional training centers.
- 1.2.2. Either choose one single regional training center for MPA managers, or rotate such a center among countries in the region.

Objective 1.3

Improve the ability of national regulatory and management authorities to respond in a coordinated fashion to threats to coral reefs.

Action

- 1.3.1. Develop and provide training for implementation of national and regional contingency plans

Issue 2

Inadequate capacity at all levels (government, private sector, NGOs, and the public) to respond to coral reef degradation.

Objective 2.1

Develop capacity building related to coastal zone management both nationally and regionally by drawing upon and enhancing existing capabilities and information.

Actions

- 2.1.1. Identify the training needs within each country in the region at all levels.
- 2.1.2. Identify where capabilities and training exist within the region and other parts of the world, and make this information available to countries within the region.
- 2.1.3. Improve the capacity of NGOs in the region to promote effective integrated coastal zone management.

Objective 2.2

Build capacity at all levels to effectively manage and preserve coral reef areas in the region.

Actions

- 2.2.1. Provide training for patrolling and enforcement in managed areas.
- 2.2.2. Train providers of tourism services (such as dive operators and the hotel industry) in sustainable use of coral reefs.
- 2.2.3. Supply NGOs, the media, and school teachers with relevant information for public education and awareness of ways the public can change their behavior to help preserve coral reef ecosystems.
- 2.2.4. Train those who implement national legislation and international environmental agreements.
- 2.2.5. Seek regional and international opportunities to heighten government level awareness of the economic value of coral reefs and the importance of their sustainable use to the well-being of the country.
- 2.2.6. Survey the public's level of environmental awareness and their knowledge relating to the preservation and sustainable use of coral reef ecosystems.

Issue 3

Capacity building and training, including associated facilities requires adequate resources.

Objective 3.1

Identify sources of revenue to build capacity for management of coral reef ecosystems.

Action

- 3.1.1. Identify and share information on a regional and national level of current and potential donors.

Issue 4

Inadequate capacity to sustainably manage fisheries.

Objective 4.1

Increase the capacity nationally and regionally to achieve sustainable fisheries.



Actions

- 4.1.1. Increase public awareness of the need for fisheries to be sustainable.
- 4.1.2. Create a regional fisheries management body.
- 4.1.3. Provide fishermen with training in new fishing technologies off of reefs (offshore and deep sea), traditional techniques, environmentally safe mariculture, and new vocations.
- 4.1.4. Incorporate remote sensing technologies in fisheries management.

6.3 Research and Monitoring

Research and monitoring practices are seen as vital tools for achieving sustainable use of coral reefs and related ecosystems. Research and monitoring play key roles in evaluating the success of management, funding solutions to current and future management issues, and to increasing the understanding of the role of human impacts on marine ecosystems.

Emphasis needs to be placed on quantifying the cultural, social and economic impacts of habitat conservation and destruction. Managers, including those from non-government organizations and the private sector, need to be involved with scientists in identifying research and management priorities, developing research and monitoring programs, and in interpreting and applying their results. Identification and development of future research and monitoring programs needs to be closely tied to solving key management questions within the framework of Integrated Coastal Zone Management. These efforts should be supported by the interpretation and dissemination of information pertinent to management.

Issue 1

Coral reef degradation needs detection at the earliest possible stage in the process so that mitigating actions can be taken before more serious degradation occurs.

Objective 1.1

Develop monitoring methods which detect the early stages of coral response to the environment.

Action

- 1.1.1 In coordination with the Global Coral Reef Monitoring Network, perform basic research into new methods of monitoring the early responses of corals to changes in their environment.
- 1.1.2 Undertake monitoring of regional reefs using existing GCRMN methodologies.

Issue 2

A unique set of circumstances exists for the Middle East Seas which requires approaches specific to the region.

Objective 2.1

Develop a regional approach to research and monitoring which addresses the unique features of coral reefs in the Middle East Seas: their desert surroundings and semi-closed marine ecosystems shared by multiple nations.

Actions

- 2.1.1. Develop a mechanism to share among regional countries research and monitoring data on the open waters of the semi-closed systems in the region (such as currents).
- 2.1.2. Develop and adopt a set of standardized methods and indicators perhaps in accordance with the Global Coral Reef Monitoring Network for monitoring the degradation of coral reef ecosystems, which all countries in the region (or each sub-region) would use.
- 2.1.3. Monitor, on a national level, nutrient inputs from land and share the data among countries in the region.

Issue 3

The need to coordinate research and monitoring on coral reef ecosystems in the region.



Objective 3.1

Improve the effectiveness of research and monitoring of coral reefs in the Middle East Seas by promoting regional coordination and collaboration.

Actions

3.1.1. Build a network of communication to coordinate regional research and monitoring, including the establishment of Global Coral Reef Monitoring Network node(s) in the region.

3.1.1. Create an acceptable regional database which can support national efforts and assist regional monitoring needs.

3.2.3. Develop national and regional fisheries databases.

6.4 Coordination and Review

The strength of ICRI lies in the fact that it is a global partnership of nations, organizations and people whose cooperative and individual actions aim to achieve a common goal: the conservation and sustainable use of coral reefs and related ecosystems. To succeed in making maximum use of the resources available to achieve this goal, ICRI activities must be coordinated and reviewed. For the Middle East Seas, as in other regions, coordination and review must occur at the international, regional, and country levels, and involve government, non-governmental organizations, and other institutions and organizations. Coordination and review will aid efforts to implement this Strategy:

- at the international level, by benefiting from and contributing to similar actions in other regions;
- at the regional level, by making more efficient use of resources and expertise available within the region; and
- at the country level, by providing feedback relevant to effective implementation of the Strategy.

7. Proposal for Year 1 Program

The workshop resolved to adopt the following as immediate actions for the twelve month period following the workshop.

A. Identify and establish Middle East ICRI Secretariat - Jordan and Oman proposed Make funding available for staff plus basic equipment and reporting

B. Identify national focal points

C. Prepare Secretariat Agenda and Terms of Reference, including meeting of focal points

D. Prepare ICRI 2 - proposed location Oman and realize meeting

E. Prepare regional report after ICRI 2 for ITMEMS

F. Prepare directory of protected areas (existing and planned)

G. Compile a Red Data Book (IUCN) of Threatened and Endangered Species - Middle East Seas Region draft

H. Compile a directory of managers/rangers, institutions, programs, etc.

I. Develop an internet home page plus newsletter

