

19. SPONSORING ORGANISATIONS, CORAL REEF PROGRAMS AND MONITORING NETWORKS

AGRRA – ATLANTIC AND GULF RAPID REEF ASSESSMENT

International scientists and managers collaborate via AGRRA to determine the regional condition of reefs in the Caribbean and Gulf of Mexico using a rapid assessment protocol. AGRRA seeks to provide baseline data on coral reef health by visual assessments of coral cover, coral mortality, coral recruitment, macroalgal index, sea urchin density, abundance and size of key fish families. Consistency between observers is ensured through training workshops. AGRRA assessments have been on 500 reefs throughout the Caribbean (including Bahamas, Belize, Bonaire, Cayman Ids, Costa Rica, Cuba, Curacao, Honduras, Jamaica, Mexico, Puerto Rico, St. Vincent, Turks and Caicos, US Virgin Islands, US Florida Keys and Flower Gardens, and Venezuela) since 1998. There are extensive regional databases on Caribbean coral reef condition and the information will soon be available on the Internet. Regional comparisons can be made by examining many reefs, but cause and effect relationships are pending further analysis. Contact: Robert Ginsburg or Phil Kramer, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Rickenbacker Cswy, Miami, USA; agrra@rsmas.miami.edu or rginsburg@rsmas.miami.edu; www.coral.noaa.gov/agrra/

AIMS – AUSTRALIAN INSTITUTE OF MARINE SCIENCE

AIMS is one of Australia's key research agencies and particularly committed marine research in the tropics. AIMS undertakes research and development to generate new knowledge in marine science and technology, and to promote its application in industry, government and environmental management. The research program involves medium- to long-term research that is geared towards improved understanding of marine systems and the development of a capability to predict the behaviour of complex tropical marine systems. In the past 25 years, the Institute has established a sound reputation for high quality research on coral reef and mangrove ecosystems, and on the water circulation around our coasts and continental shelf. Researchers have not only published extensively in scientific journals but have also written field guides, books and monographs for regional use. A major theme is developing and applying monitoring methods to assist in the sustainable management of tropical marine resources. AIMS supports a wide range of studies for effective coral reef management. Contact: AIMS, PMB #3, Townsville 4810 Australia; www.aims.gov.au

CARICOMP – CARIBBEAN COASTAL MARINE PRODUCTIVITY PROGRAM

This is a regional network of 25 marine laboratories, parks, and reserves established by IOC-UNESCO in 1986 that has been monitoring long-term variation in ecosystem structure and functioning in coral reefs, seagrasses, and mangroves according to standardised protocols in relatively undisturbed sites. The network also responds to regional events such as coral bleaching events and hurricanes. The Caribbean Coastal Data Centre at the University of the West Indies in Kingston, Jamaica archives the data and makes it available. CARICOMP contributes data to ReefBase and has initiated the GCRMN in the Caribbean. In 2000, CARICOMP designed and initiated several sub-regional research projects, including studies of larval linkages and coral diseases, related to long-term management and restoration of Caribbean coastal ecosystems. These projects are being expanded. The CARICOMP program networks institutions in 18 countries: Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Haiti, Jamaica, Mexico, Netherlands Antilles, Panama, Puerto Rico, Trinidad and Tobago, USA, and Venezuela. More details: www.uwimona.edu.jm/centres/cms/caricomp/ ; contacts John Ogden, jogden@seas.marine.usf.edu; Dulcie Linton, Caribbean Coastal Data Centre, Jamaica, dmlinton@uwimona.edu.jm

CI – CONSERVATION INTERNATIONAL

CI is a global, field-based environmental organisation that promotes the protection of biological diversity. Working in more than 30 countries over 4 continents, CI applies innovations in science, economics, policy and community participation to protect the Earth's richest regions of plant and animal diversity. The Marine Rapid Assessment Program (RAP) of the Center for Applied Biodiversity Science at CI organizes scientific expeditions to document marine biodiversity as well as freshwater and terrestrial biodiversity hotspots, and tropical wilderness areas. Their conservation status and diversity are recorded using indicator groups (molluscs, corals and fish), and the results are combined with social, environmental and other ecosystem information to produce recommendations for protective measures to local communities and decision-makers. The main focus of Marine RAP surveys has been the 'coral triangle' in Southeast Asia, which contains the richest coastal and marine biodiversity in the world. Contact: Sheila McKenna, Conservation International, 1919 M St. NW, Washington, DC 20036 USA; www.biodiversityscience.org and www.conservation.org, s.mckenna@conservation.org

CORAL – THE CORAL REEF ALLIANCE

CORAL is a member-supported, non-profit organisation based in California that works with the dive community, coral park managers and others to promote coral reef conservation around the world. CORAL provides tools, resources and training to dive operators and resource managers to help them build capacity to sustainably manage their reefs. CORAL supports community-based organisations by providing financial and technical support for coral reef conservation in communities throughout the world. In addition, CORAL builds public awareness about coral reefs through various outreach programs, including the International Coral Reef Information Network (ICRIN). CORAL's mission is to keep coral reefs alive. E-mail: info@coral.org; www.coral.org

CORDIO – CORAL REEF DEGRADATION IN THE INDIAN OCEAN

CORDIO is a regional, multi-disciplinary program developed to investigate the ecological and socio-economic consequences of the mass coral bleaching in 1998 and subsequent degradation of coral reefs in the Indian Ocean. CORDIO is an operational unit within ICRI. The objectives are to determine the: biophysical impacts of the bleaching and mortality of corals and long term prospects for recovery; socio-economic impacts of the coral mortality and options for mitigating these through management and development of alternative livelihoods for peoples dependent on coral reefs; and prospects for restoration and rehabilitation of reefs to accelerate their ecological and economic recovery. CORDIO assists and coordinates with the GCRMN in the Indian Ocean with monitoring and running the Node in East Africa. The participating countries are: Kenya, Tanzania, Mozambique, Madagascar, Seychelles, India, Maldives, Sri Lanka, Reunion, Comores, Mauritius and Chagos. Program co-ordination contacts: Olof Lindén, Dept. of Zoology, University of Kalmar, Sweden, olof@timmermon.se; In South Asia: Dan Wilhelmsson, c/o SACEP, 10 Anderson Road, Colombo 5, Sri Lanka; E-mail: dan.wilhelmsson@cordio.org; In East Africa: David Obura, WIOMSA, P.O. Box 10135, Bamburi, Kenya, E-mail: dobura@africaonline.co.ke; In Island States: Jean Pascal Qoud, CloeCoop, Cellule Locale pour l'Environment, 16, rue Jean Chatel, 97400 Saint Denis, Reunion, cloecoop@runtel.fr

CRC REEF – COOPERATIVE RESEARCH CENTRE FOR THE GREAT BARRIER REEF

The CRC Reef Research Centre is a knowledge-based partnership of coral reef managers, researchers and industry, which provides research solutions to protect, conserve and restore the world's coral reefs by ensuring industries and management are sustainable and ecosystem quality is maintained. The needs of end-users are incorporated into the design, instigation and progress of research. The CRC Reef Research Centre is in Townsville, Australia and its partners have internationally-recognised expertise in coral reef science, technology and management, and provide education and training to tourism and fisheries industries, and coral reef managers. It is a collaborative venture with researchers (Australian Institute of Marine Science; James Cook University, Queensland Department of Primary Industries), the tourism industry (Association of Marine Park Tourism Operators), the commercial and recreational fishing industry (Sunfish Queensland, Queensland Seafood industry Association), managers (Great Barrier Reef Marine Park Authority), and non-government organisations (Great Barrier Reef Research Foundation). Contact: Russell Reichelt, CRC Reef Research Centre, PO Box 772, Townsville 4810 Australia; E-mail: info@crcreef.com; or www.reef.crc.org.au

GBRRF – GREAT BARRIER REEF RESEARCH FOUNDATION

The Foundation was established to build on world-class science and encourage the application of research to ensure the sustainability, conservation, protection and responsible use and management of the world's coral reefs. The GBRRF is a non-government, not-for-profit body that is independent of research providers and focussed on funding research that supports long-term practical solutions to the threats facing coral reefs. The GBRRF raises funds for research and ensures that the information is disseminated widely to assist in policy formulation for environmental conservation and community benefit. The Foundation aims to strengthen understanding of the human threats of coral reefs, mechanisms of reef restoration, developing alternative livelihoods

and building partnerships in education, research and knowledge for the benefit of reefs worldwide. The GBRRF is advised by an International Scientific Advisory Committee. Contact: David Windsor, GBRRF, 320 Adelaide St. Brisbane 4000 Australia, david.windsor@barrierreef.org, www.barrierreef.org

GCRMN – GLOBAL CORAL REEF MONITORING NETWORK

The GCRMN was formed in 1995 as an operational unit of ICRI. The GCRMN is in partnership with ReefBase and Reef Check, which constitute the central direction. The GCRMN is sponsored by IOC-UNESCO, UNEP, IUCN, CBD, the World Bank, AIMS, WorldFish Center and the ICRI Secretariat and central coordination is supported by the U.S. Department of State and the National Oceanic and Atmospheric Administration through contributions to IOC-UNESCO and UNEP. IUCN currently Chairs the Management Group of the GCRMN, and the Global Coordinator is hosted at AIMS. The GCRMN seeks to encourage and coordinate three overlapping levels of monitoring:

Community - monitoring by communities, fishers, schools, colleges, tourist operators and tourists over broad areas with less detail, to provide information on the reef status and causes of damage using Reef Check methodology and approaches;

Management - monitoring by predominantly tertiary trained personnel in Government environment or fisheries departments, and universities for moderate coverage of reefs at higher resolution and detail using methods developed in Southeast Asia or comparable methods;

Research - high resolution monitoring over small scales by scientists and institutes currently monitoring reefs for research.

Equal emphasis is placed on monitoring to gather ecological and socio-economic data, with manuals available for both. A major objective is to produce 2 yearly national, regional and global Status of Coral Reefs Report, such as those that form the basis for this report. The GCRMN functions as a network of independent Regional Nodes that coordinate training, monitoring and databases within participating countries and institutes in regions based on the UNEP Regional Seas Programme:

Middle East – Nodes are assisted by the Regional Organisation for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) and the Regional Organisation for the Protection of the Marine Environment (ROPME), Contact: Abdullah Alsuhaibany, abdullah.alsuhaibany@persga.org; or Hassan Mohammadi, ropme@qualitynet.net

Eastern Africa – assisting Kenya, Mozambique, South Africa and Tanzania operating through the CORDIO network in Mombasa, in association with the Kenya Wildlife Service. Contact: David Obura in Mombasa, dobura@africaonline.co.ke; and Nyawira Muthiga, nmuthiga@AfricaOnline.Co.Ke

South-west Indian Ocean Island States - coordinating Comoros, Madagascar, Mauritius, Reunion and Seychelles with assistance from the Global Environment Facility and Indian Ocean Commission. Contact: Lionel Bigot, ARVAM La Reunion, lbigot.arvam@wanadoo.fr

South Asia - for India, Maldives and Sri Lanka with support from the UK Department for International Development (DFID) and coordination through IOC-UNESCO. Contact: the Regional Coordinator in Colombo, Ben Cattermoul, reefmonitor@eureka.lk

South East Asia - for the ASEAN countries with assistance from the WorldFish Center, Penang Malaysia. Contact: Jamie Oliver, j.oliver@cgiar.org or Chou Loke Ming, National

University of Singapore, dbscml@nus.edu.sg

East and North Asia - Japan is assisting these countries via the Ishigaki International Coral Reef Research and Monitoring Center in Japan. Contact: Kei Osada, KEI_OSADA@env.go.jp, Tadashi Kimura, BXQ02107@nifty.ne.jp

Southwest Pacific and Melanesia, for Fiji, Nauru, New Caledonia, Samoa, Solomon Islands, Tuvalu and Vanuatu coordinated through the Institute of Marine Resources, University of the South Pacific and support from Canada. Contacts: Cameron Hay, hay_c@usp.ac.fj, or Reuben Sulu sulu_r@usp.ac.fj, Ed Lovell for Reef Check (lovell@suva.is.com.fj);

Southeast and Central Pacific, the 'Polynesia Mana Node' for the Cook Islands, French Polynesia, Kiribati, Niue, Tokelau, Tonga and Wallis and Futuna coordinated in French Polynesia from the CRIOBE-EPHE Research Station on Moorea. Contact: Bernard Salvat (bsalvat@uni-perp.fr);

Northwest Pacific and Micronesia, the 'MAREPAC Node' for American Samoa, the Marshall Islands, the Federated States of Micronesia (FSM), the Northern Mariana Islands (CNMI), Guam and Palau. Contact: the Palau International Coral Reef Center, Carol Emaurois, emaurois2000@yahoo.com

Hawaiian Islands – for US islands in the Pacific. Contact: Ruth Kelty, Ruth.Kelty@noaa.gov, or Mark Monaco, mark.monaco@noaa.gov

U.S. Caribbean – for U.S. territories and states of Florida, Flower Garden Banks, Navassa, Puerto Rico, and U.S. Virgin Islands. Contact Ruth Kelty, Ruth.Kelty@noaa.gov, or Mark Monaco, mark.monaco@noaa.gov or www.coralreef.gov/

Northern Caribbean and Atlantic region coordinated through the Caribbean Coastal Data Centre, Centre for Marine Sciences, Jamaica for the Greater Antilles to Bermuda. Contact: Dulcie Linton, dmlinton@uwimona.edu.jm; George Warner, gfwarnar@uwimona.edu.jm

Mesoamerican Barrier Reef System for Mexico, Belize, Guatemala, Honduras. Contact: Patricia Almada-Villela MBRS Project office, Belize, palmadav@mbrs.org.bz; Melanie WWF Mesoamerican Reef Program, mcfield@bt.net

Eastern Caribbean, for the Organisation of Eastern Caribbean States (OECS), Trinidad and Tobago, Barbados, and French and Netherlands Caribbean Islands, coordinated by CANARI, with support from UNEP-CAR/RCU from St Lucia. Contact: Allan Smith, ahsmith@candw.lc; Claude Bouchon, claud.bouchon@univ-ag.fr; Paul Hoetjes, milvomil@cura.net

Southern Tropical America Node for Costa Rica, Panama, Colombia, Venezuela and Brazil via the 'Instituto de Investigaciones Marinas y Costeras' (INVEMAR) with support from UNEP-CAR/RCU. Contact: Jaime Garzón-Ferreira (jgarzon@invemar.org.co) and Alberto Rodríguez-Ramírez (betorod@invemar.org.co).

Central Coordination contact: Clive Wilkinson Global Coordinator at the Australian Institute of Marine Science, in Townsville (c.wilkinson@aims.gov.au); or Jamie Oliver at WorldFish Center in Penang Malaysia (j.oliver@cgiar.org); or Gregor Hodgson, University of California, Los Angeles, rcheck@ucla.edu, home page: www.gcrmn.org

ICRAN – INTERNATIONAL CORAL REEF ACTION NETWORK

ICRAN is a public/private partnership response to the International Coral Reef Initiative's (ICRI). Call to Action to protect coral reefs worldwide. Initiated with generous support from the United Nations Foundation, ICRAN's strategic alliance approach has been developed to ensure the future of coral reefs and related ecosystems and the future of the communities they sustain. This strategy includes alternative livelihoods, training, capacity-building, and the exchange and application of current scientific, economic and social information. The ICRAN partners are: CORAL, GCRMN, ICLARM, ICRI, Reef Check, SPREP, UNEP, UNEP-WCMC, UNF, WRI and WWF.

E-mail: Kristian Teleki, kteleki@icran.org; www.icran.org

ICRI – INTERNATIONAL CORAL REEF INITIATIVE

ICRI was developed to reverse the declining status of the world's coral reefs. It is a partnership of countries, international organisations, NGOs and regional seas programmes created in 1994 following calls at the 1992 UNCED Rio Earth Summit and by the Small Island Developing States. ICRI was initiated by Australia, France, Jamaica, Japan, Philippines, Sweden, UK and USA, along with CORAL, IOC-UNESCO, IUCN, UNDP, UNEP, and the World Bank. ICRI seeks to mobilise global support for coral reefs and catalyse sustainable management through representation in diplomatic and international fora, such as UNEP and IOC governing councils, Conventions on Sustainable Development, Biological Diversity, Climate Change; Global Meetings of Regional Seas Conventions and Action Plans, Global Plan of Action to Protect the Marine Environment from Land-based Activities, Global Conference on Sustainable Development in Small Island Developing States and CITES. The first ICRI international workshop in Dumaguete City, Philippines in 1995 developed the ICRI Call to Action and a Framework for Action. These were refined into the ICRI Renewed Call to Action at the International Tropical Marine Ecosystems Management Symposium (ITMEMS) in Townsville, Australia in 1998. The ICRI Coordination and Planning Committee makes decisions by consensus. The Secretariat, which seeks to implement the ICRI agenda, has been hosted in rotation since 1995 by the Governments of USA, Australia, France and presently by Sweden and the Philippines. The GCRMN was the first operational unit of ICRI, followed by the establishment of ICRIN - the Information Network; and ICRAN - the Action Network. Contacts: Robert Jara (secretariat@icriforum.org, icri_secretariat@hotmail.com) and Olof Linden (olof@timmermon.se) / Dan Wilhelmsson (dan.wilhelmsson@telia.com); www.icriforum.org

ICRIN – INTERNATIONAL CORAL REEF INFORMATION NETWORK

ICRIN is a coral reef outreach and awareness building program, which provides tools and resources to non-profit community groups, educators and coral park managers to support their local and regional outreach initiatives. ICRIN also provides general coral reef information to the public and policy makers via the Internet, targeted presentations and materials, and sponsoring local events and activities. ICRIN is the outreach component of ICRAN and ICRI. Contact: icrin@coral.org; or www.coralreef.org

IOC – UNESCO

The Intergovernmental Oceanographic Commission (IOC) in Paris has promoted marine scientific investigations and related ocean services for more than 30 years, with a view to learning more about ocean resources, their nature and sustainability. IOC, with UNEP, IUCN and the World Meteorological Organization formed the Global Task Team on Coral Reefs in 1991 to select methods and develop plans to monitor the world's coral reefs. This Task Team was the immediate precursor to the GCRMN, and after the ICRI Dumaguete meeting in 1995, the IOC, UNEP and IUCN were invited to co-sponsor the GCRMN, with the World Bank and the CBD joining later. The GCRMN was coordinated and administered through the IOC as part of the Global Ocean Observing System, to which it contributes data on coral reef health and resources. Contact: Ole Vestergaard, o.vestergaard@unesco.org; www.ioc.unesco.org

IUCN – THE WORLD CONSERVATION UNION

IUCN was founded in 1948 to bring together States, government agencies and NGOs in a unique world partnership. As a Union of 980 members across 140 countries, the IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. The IUCN represents the views of members on the world stage and provides the strategies, services, scientific knowledge and technical support to achieve their goals. IUCN has 6 Commissions with 10,000 experts in project teams and action groups, focused on particular species, biodiversity conservation and the management of habitats and natural resources. IUCN assists countries prepare National Conservation Strategies, and leads or assists in field projects. Operations are decentralised to regional and country offices, mostly in developing countries. IUCN is built on its members' strengths, networks and partners to enhance capacity and support global alliances to safeguard natural resources at local, regional and global levels. IUCN is a founding member of GCRMN and currently chairs the Management Group. Contact for the Global Marine Program: Carl Gustaf Lundin, IUCN - The World Conservation Union, Rue Mauverney 28, CH-1196 Gland, Switzerland, Marine@iucn.org

ISRS – INTERNATIONAL SOCIETY FOR REEF STUDIES

ISRS (founded in 1980) is the leading organisation for professional scientists and students of coral reef studies, with a membership of over 1000 from 60 countries. The Society promotes the production and dissemination of scientific knowledge and understanding of coral reefs, both living and fossil. It prints and distributes the journal *Coral Reefs* and the magazine *Reef Encounter*, and offers major research awards and travel support for students and assists institutions in developing countries to develop their library resources. It grants the prestigious Darwin Medal for major contributions to coral reef studies, and coordinates and assists host countries with the four yearly International Coral Reef Symposia. E-mail: Peter Mumby, p.j.mumby@exeter.ac.uk; Web site: www.uncwil.edu/isrs/

MAC – MARINE AQUARIUM COUNCIL

This is an international, multi-stakeholder, not-for-profit, NGO created to ensure the global trade in marine aquarium organisms is sustainable by creating standards and certification for those engaged in the collection and care of ornamental marine life from reef to aquarium. MAC brings together the aquarium industry, hobbyists, conservation organisations, government agencies, public aquariums, international organisations and others to ensure the health and sustainability of the organisms, their habitat and the marine ornamental trade. MAC certification creates market incentives that encourage and support responsible and sustainable practices by encouraging consumer demand and confidence for certified organisms, practices and industry participants. This results in reef conservation and management by requiring certified reef areas to be managed, including fish reserves, and by ensuring certified aquarium fishers use non-destructive methods. The certified marine aquarium trade also supports sustainable livelihoods, poverty alleviation and other community benefits by ensuring healthy reefs support a sustainable fishery and by ensuring fishers earn a good return and subscribe to occupational health standards. MAC launched the Certification in November 2001 with 3 Standards covering the 'reef to retail' supply chain: Ecosystem and Fishery Management Standard; Collection, Fishing and Holding Standard; Handling, Husbandry and Transport Standard. Collectors and exporters in the Philippines and elsewhere, and importers and retailers in the USA and Europe are being certified in late 2002. MAC has offices in Hawaii, Washington D.C., the Philippines, Solomon Islands, and Indonesia. Contact: Paul Holthus, Marine Aquarium Council, 923 Nu'uauu Ave, Honolulu, HI 96816, USA; www.aquariumcouncil.org, info@aquariumcouncil.org

PACKARD FOUNDATION

The David and Lucile Packard Foundation is a private Foundation based in California that established the Western Pacific Conservation Program in 1998. The goals are the long-term conservation and responsible stewardship of critical coastal marine habitats and resources, especially coral reefs and seagrasses in 8 countries in the Western Pacific: Palau; Federated States of Micronesia; the Philippines; Papua New Guinea; Solomon Islands; Fiji; and eastern Indonesia and Malaysia. The Program's funding strategy focuses on: improving individual technical skills for effective conservation and resource management; supporting a network of site-specific marine protected areas; and developing a range of targeted, applied research and analysis initiatives to get useful information e.g. on new technologies, small business development opportunities, policy reform, into the hands of practitioners, policy-makers and local community members. Contact: www.packard.org

REEF CHECK

Reef Check is a university-based environmental organisation established to facilitate community monitoring and management of coral reefs on a global scale. Reef Check is active in over 60 countries and territories throughout the tropics where it seeks to: *educate* the public about the coral reef crisis and how to stop it; *create* a global network of volunteer teams which regularly monitor and report on reef health under the supervision of scientists; scientifically *investigate* coral reef processes; *facilitate* collaboration among academia, NGOs, governments and the private sector to solve coral reef problems; and

stimulate community action to protect remaining pristine reefs and rehabilitate damaged reefs worldwide using ecologically sound and economically sustainable solutions. Under the ICRI framework, Reef Check is a primary GCRMN partner and presently coordinates training for the GCRMN. Training programs in ecological and socio-economic monitoring and coral reef management are regularly offered throughout the world. Contact: Kelly McGee, Institute of the Environment, Mailcode 149607, University of California at Los Angeles, CA 90095 USA; rcheck@ucla.edu, www.ReefCheck.org

UNEP – UNITED NATIONS ENVIRONMENT PROGRAMME

The mission of UNEP is to provide leadership and encourage partnerships in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. UNEP makes a particular effort to nurture partnerships and enhance the participation of civil society – the private sector, scientific community, NGOs and youth – in working towards sustainable utilisation of natural resources. The challenge before UNEP is to implement an environmental agenda that is integrated strategically with the goals of economic development and social well-being; an agenda for sustainable development. Contacts: PO Box 30552, Nairobi Kenya; cpiino@unep.org; www.unep.org

UNEP – CORAL REEF UNIT

UNEP is implementing a comprehensive work program on coral reefs, aiming to prevent further degradation while involving all stakeholders and addressing their social and economic needs. Coral reef activities of the Unit are carried out through UNEP divisions, the UNEP World Conservation Monitoring Center, Regional Seas Programmes, and in collaboration with multilateral environmental agreements such as the Convention on Biological Diversity and the International Coral Reef Initiative of which UNEP has been a member since 1994. ICRI and its operational networks, in particular the International Coral Reef Action Network (ICRAN), where UNEP is a partner, and the GCRMN, which is co-sponsored by UNEP, are at the centre of a global effort to protect coral reefs and form partnerships for sustainable development. Coral reef conservation has a firm commitment from UNEP. Contact: Agneta Nilsson, Agneta.Nilsson@unep.org

UNEP – WORLD CONSERVATION MONITORING CENTRE

UNEP-WCMC has a major coral reef focus, including mapping, a global database on marine protected areas, monitoring trade in corals and marine ornamentals, and the global distribution of threats, including coral disease and bleaching. The World Atlas of Coral Reefs (2001) was a major product. UNEP-WCMC maintains a 'marine ornamentals' database of the global trade in live coral reef species, with the Marine Aquarium Council and members of the industry. This aims to improve understanding of the trade and measure the impacts to foster a regulated and sustainable trade operating via certification schemes. There is also a global database on marine protected areas, with 680 coral reef sites within 3600 listings. UNEP-WCMC is committed to making coral reef information accessible, through its partners (WorldFish Center, WRI, GCRMN) and the Internet. Contact: Ed Green, UNEP-World Conservation Monitoring Centre, 219 Huntingdon Road, Cambridge, CB3 0DL, UK; ed.green@unep-wcmc.org; or www.unep-wcmc.org

WORLD BANK – ENVIRONMENT DEPARTMENT

The World Bank is an international financial institution dedicated to the alleviation of poverty. The Environment plays a crucial role in determining the physical and social well being of people. While poverty is exacerbated by deteriorating conditions in land, water and air quality, economic growth and the well being of communities in much of the developing world, continues to depend on natural wealth and the production of environmental goods and services. As a result, the Bank is committed to integrating environmental sustainability into its programs, across sectors and regions and through its various financial instruments. Reducing vulnerability to environmental risk, improving people's health, and enhancing livelihoods through safeguarding the environment are the hallmarks of the Bank's emerging Environment Strategy. Support for coral reef conservation and sustainable use is consistent with this theme, as it potentially affects millions of people around the world. The challenge for the Bank and its many partners in coral reef conservation, such as ICRI and GCRMN, will be to help communities capture the benefits from the sound management of coral reefs to meet immediate needs, while at the same time ensuring the sustainability of these vital systems for generations to come. For information on the Environment Department, contact: Marea Hatzios, Environment Department, The World Bank, 1818 H St. NW, Washington, DC 20433 USA, Mhatzios@worldbank.org

WORLD FISH CENTER

Formerly known as ICLARM, it is committed to contributing to food security and poverty eradication in developing countries. The efforts focus on benefiting poor people, and conserving aquatic resources and the environment. The organisation aims for poverty eradication; a healthier, better nourished human family; reduced pressure on fragile natural resources; and people-centered policies for sustainable development. WorldFish Center is an autonomous, non-governmental, non-profit organisation, established as an international center in 1977, with new headquarters in Penang, Malaysia and the focus for international efforts to tackle the major aquatic challenges affecting the developing world and to demonstrate solutions to resources managers worldwide. Contact: PO Box 500 GPO, 10670 Penang, Malaysia. Jamie Oliver, l.oliver@cgiar.org; www.cgiar.org/iclarm/

WRI – WORLD RESOURCES INSTITUTE

WRI is implementing a series of regional projects examining threats to coral reefs to provide resource managers with specific information and tools for more effective management. These projects are being implemented in close collaboration with regional partners, and are a more-detailed follow-on to the global *Reefs at Risk* analysis, released in 1998. The first, *Reefs at Risk in Southeast Asia*, was released in February 2002. The current project, *Reefs at Risk in the Caribbean*, is planned for release in February 2004. The projects have these goals: 1) Improve the base of information available on threats to and status, value, and protection of coral reefs within a region, through collecting, improving, and integrating information; 2) Model threats to coral reefs based upon population and development patterns, land use change, and the location and intensity of specific activities known to degrade coral reefs; 3) Develop of a geographic information system (GIS)-based tool for more local-level evaluation of development scenarios and

related implications for coral reef health and economic value; 4) Raise awareness of human threats to coral reefs through wide dissemination of project results. All data (including GIS data sets) are on the Internet at www.wri.org/reefsatrisk Contact: Laretta Burke, World Resources Institute, Washington, DC 20002, USA: lauretta@wri.org

WWF – WORLD WILD FUND FOR NATURE OR WORLD WILDLIFE FUND

WWF is the world's largest and most experienced independent conservation organisation, with over 4.7 million supporters and a global network in 96 countries. WWF is in its 4th decade, with a mission to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by: conserving the world's biological diversity; ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption. The WWF Ocean Rescue initiative is working to conserve coral reefs throughout the world, as well as safeguarding cold water corals. In the next 10 years, WWF has the goal of creating or strengthening management in 100 marine protected areas, and creating networks of MPAs that safeguard the ecological integrity of larger reef systems. WWF will also continue landmark efforts to protect whales and other ocean wildlife, end destructive fishing practices, stop illegal trade in marine species, and reduce pollution on land and sea.

SUGGESTED READING

The following are some useful references in addition to the Chapters above, although most Chapters include source references for material in those chapters:

Birkeland C (1997). *Life and Death of Coral Reefs*. Chapman & Hall, New York, 536pp.

Birkeland C (1997). Symbiosis, fisheries and economic development on coral reefs. *Trends in Ecology and Evolution* 12:364-367.

Brown BE (1997). *Integrated Coastal Management: South Asia*. Department of Marine Sciences and Coastal Management, University of Newcastle, Newcastle upon Tyne, United Kingdom

Bryant D, Burke L, McManus J, Spalding, M (1998). *Reefs at Risk: A Map-Based Indicator of Potential Threats to the World's Coral Reefs*. World Resources Institute, Washington D.C, 56pp.

Cesar HSJ (Ed.) (2000). *Collected Essays on the Economics of Coral Reefs*. CORDIO, Kalmar University, Sweden, 244pp.

Bak RPM, Nieuwland G (1995). Long-term change in coral communities along depth gradients over leeward reefs in the Netherlands Antilles. *Bull.Mar.Sc.* 56: 609-619.

Bunce L, Townsley P, Pomeroy R, Pollnac R (2000). *Socioeconomic Manual for Coral Reef Management*. Australian Institute of Marine Science and GCRMN, Townsville 183 pp.

Burke L, Selig E, Spalding, M (2002). *Reefs at Risk in Southeast Asia*. World Resources Institute, Washington D.C, 72pp.

Davidson OG (1998). *The Enchanted Braid: Coming to Terms with Nature on a Coral Reef*. John Wiley New York, USA, 269 pp.

English S, Wilkinson C, Baker V (1997). *Survey Manual for Tropical Marine Resources*. 2nd Edition. Australian Institute of Marine Science, Townsville, 390pp.

Froese R, Pauly D (Eds) (2002). *FishBase*. World Wide Web electronic publication. www.fishbase.org, <http://www.fishbase.org/search.cfm>

Ginsburg RN (ed) (1993). *Global Aspects of Coral Reefs: Health Hazards and History*, 7-11 June 1993. University of Miami, Miami, 420pp. (This volume has a valuable series of papers on problems facing reefs around the world).

Glynn P, Maté JL, Baker AC, Calderón MO (2001). Coral bleaching and mortality in Panamá and Ecuador during the 1997-1998 El Niño-Southern Oscillation event: spatial/temporal patterns and comparisons with the 1982-1983 event. *Bull. Mar. Sci.* 69: 79-109.

Guzmán HM, Cortés J (2001). Changes in reef community structure after fifteen years of natural disturbances in the Eastern Pacific (Costa Rica). *Bull. Mar. Sci.* 69: 133-149.

Hatzioios M, Lundin CG, and Alm A (1996). *Africa: A Framework for Integrated Coastal Zone Management*. World Bank, Washington D.C., 150 pp.

Hatzioios ME, Hooten AJ, and Fodor F (1998). Coral Reefs: Challenges and Opportunities for Sustainable Management. In *Proceedings of an associated event of the fifth annual World Bank Conference on Environmentally and Socially Sustainable Development*. World Bank, Washington D.C., 224pp.

Henrichsen D (1998). *Coastal Waters of the World: Trends, Threats, and Strategies*. Island Press, Washington D.C. 275pp.

IUCN (2002). The IUCN Red List of Threatened Species. World wide Web electronic publication. www.redlist.org/search/search-expert.php

Jiménez C, Cortés J, León A, Ruiz E (2001). Coral bleaching and mortality associated with the 1997-98 El Niño in an upwelling environment in the Eastern Pacific (Gulf of Papagayo, Costa Rica). *Bull. Mar. Sci.* 69: 151-169.

Johannes RE (1981). *Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia*. University of California Press, 320pp.

Johannes RE (1998). The case for data-less marine resource management: examples from tropical nearshore finfisheries. *Trends in Ecology and Evolution* 13:243-246.

Kelleher G (1999). *Guidelines for Marine Protected Areas*. World Conservation Union, Washington D.C., 107pp.

Kelleher G, Bleakley C, Wells S (1995). *The Global Representative System of Marine Protected Areas. Volume II Wider Caribbean, West Africa and South Atlantic*. Great Barrier Reef Marine Park Authority, Townsville ; World Bank, Washington D.C. ; World Conservation Union, Washington D.C., 93pp.

Kelleher G, Bleakley C, Wells S (1995). *The Global Representative System of Marine Protected Areas. Volume III Central Indian Ocean, Arabian Seas, East Africa and East Asia Seas*. Great Barrier Reef Marine Park Authority, Townsville ; World Bank, Washington D.C. ; World Conservation Union, Washington D.C., 147pp.

Kelleher G, Bleakley C, Wells S. (1995). *The Global Representative System of Marine Protected Areas. Volume IV South Pacific, Northeast Pacific, Southeast Pacific and Australia/New Zealand*. Great Barrier Reef Marine Park Authority, Townsville ; World Bank, Washington D.C. ; World Conservation Union, Washington D.C., 212pp.

Knowlton N (1998). Hard decisions and hard science: research needs for coral reef management. In: *Coral Reefs: Challenges and Opportunities for Sustainable Management*. Proceedings of an associated event of the Fifth Annual World Bank Conference on Environmentally and Socially Sustainable Development. October 9-11, 1997)

Laboy-Nieves EN, Klein E, Conde JE, Losada F, Cruz JJ, Bone D (2001). Mass mortality of tropical marine communities in Morocco, Venezuela. *Bull. Mar. Sci.* 68: 163-179.

Lessios HA, Macintyre IE (eds) (1997). *Proceedings of the 8th International Coral Reef Symposium, Panama, June 24-29 1996, Volume 1*. Smithsonian Tropical Research Institute, Balboa, Panama.

Maragos JE, Crosby MP, McManus JW (1996) Coral reefs and biodiversity: a critical and threatened relationship. *Oceanography* 9:83-99.

McClanahan TR, Sheppard CR, Obura DO (eds) 2000. *Coral reefs of the Indian Ocean: Their ecology and conservation*. Oxford University Press, N.Y.

Norse EA (1993). *Global Marine Biological Diversity: a strategy for building conservation into decision making*. Island Press, Washington D.C. 383pp.

Obura D (ed) (2002). *Proceedings of the International Coral Reef Initiative (ICRI) Regional Workshop for the Indian Ocean, 2001*. ICRI/UNEP/ICRAN/CORDIO.

Richmond, MD (1997). *A Guide to the Seashores of Eastern Africa*. SIDA Department for Research Cooperation, Stockholm, Sweden, 448 pp.

Salm RV, Clark JR, Siirila E (2000). *Marine and Coastal Protected Areas: A Guide for Planners and Managers*. IUCN Washington DC 371 pp.

Salvat B (2001). *Status of Coral Reefs of the World 2000 in the Southeast and Central Pacific 'Polynesia Mana' Network*. Fondation Naturalia Polynesia, Moorea, French Polynesia. 217 pp.

Salvat B, Haapkyla J, Schrimm M (2002). *Title : Coral Reef Protected Areas in international instruments: World Heritage Convention, World Network of Biosphere Reserves, Ramsar Convention*. Criobe-EPHE, Moorea, French Polynesia. 210 pp.

Sapp J (1999). *What is Natural? Coral Reef Crisis*. Oxford University Press, New York USA, 275 pp.

Sheppard CRC, Sheppard ALS (1991). *Corals and Coral Communities of Arabia*. Fauna of Saudi Arabia 12.

Spalding M, Ravilious C, Green E (2001). *World Atlas of Coral Reefs*. UNEP World Conservation Monitoring Centre and University of California Press, Berkeley USA 424 pp.

Talbot F, Wilkinson C (2001). *Coral Reefs, Mangroves and Seagrasses: A Sourcebook for Managers*. Global Coral Reef Monitoring Network & Australian Institute of Marine Science, Townsville, 193 pp.

Turgeon DD, Asch RG, Causey BD, Dodge RE, Jaap W, Banks K, Delaney J, Keller BD, Speiler R, Matos, CA, Garcia JR, Diaz, E, Catanzano, D, Rogers, CS, Hillis-Starr Z, Nemeth R, Taylor M, Schmahl GP, Miller MW, Gulko DA, Maragos JE, Friedlander AM, Hunter CL, Brainard RS, Craig P, Richmond, RH, Davis G, Starmer J, Trianni M, Houk P, Birkeland CE, Edward A, Golbuu Y, Gutierrez J, Idechong N, Paulay G, Tafleichig A, Vander Velde N (2002). The State of Coral Reef Ecosystems of the United States and the Pacific Freely Associated States: 2002. National Oceanic and Atmospheric Administration/ National Ocean Service/ National Centers for Coastal and Ocean Science, Silver Spring, MD. 265 pp.

Vargas-Angel B, Zapata FA, Hernández H, Jiménez JM (2001). Coral and coral reef responses to the 1997-98 El Niño event on the Pacific coast of Colombia. *Bull. Mar. Sci.* 69: 111-132.

Veron JEN, Stafford-Smith M (2000). *Corals of the World*. Australian Institute of Marine Science, Townsville, Australia 363pp. Volume 1 463 pp., Volume 2 429 pp., Volume 3 490 pp.

Wallace C. (1999). *Staghorn Corals of the World*. CSIRO Publishing, Collingwood Australia 421 pp.

Wells S, Hanna N (1992). *The Greenpeace Book of Coral Reefs*. Sterling Publishing Co., New York, 160pp.

Wells SM (ed) (1988). *Coral Reefs of the World. Volume 1: Atlantic and Eastern Pacific*. UNEP, Nairobi ; International Union for Conservation of Nature and Natural Resources, Switzerland.

Wells SM (ed) (1988). *Coral Reefs of the World. Volume 2: Indian Ocean, Red Sea, and Gulf*. UNEP, Nairobi ; International Union for Conservation of Nature and Natural Resources, Switzerland.

Wells SM (ed) (1988). *Coral Reefs of the World. Volume 3: Central and western Pacific*. UNEP, Nairobi; International Union for Conservation of Nature and Natural Resources, Switzerland.

Wilkinson CR (1998). *Status of Coral Reefs of the World: 1998*. Global Coral Reef Monitoring Network and Australian Institute of Marine Science, Townsville, Australia 184pp.

Wilkinson CR (2000). *Status of Coral Reefs of the World: 2000*. Global Coral Reef Monitoring Network and Australian Institute of Marine Science, Townsville, Australia 363pp.

Wilkinson CR, Buddemeier RW (1994). *Global Climate Change and Coral Reefs: Implications for People and Reefs*. Report of the UNEP-IOC-ASPEI-IUCN Global Task Team on Coral Reefs. IUCN, Gland, 124pp.

LIST OF ACRONYMS

AGRRA	Atlantic and Gulf Reef Assessment
AIMS	Australian Institute of Marine Science
ASEAN	Association of South East Asian Nations
AusAID	Australian Agency for International Development
BAPPEDA	Council for Provincial Planning and Development
CATIE	Centro Agronomico Tropical de Investigacion y Ensenanza
CFC	Chlorofluorocarbon
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CORAL	The Coral Reef Alliance
CORDIO	Coral Reef Degradation in the Indian Ocean
COTS	Crown-of-thorns starfish (<i>Acanthaster planci</i>)
CSD	Convention for Sustainable Development
DFID	Department for International Development (of UK)
DNA	Deoxyribonucleic Acid
EIA	Environmental Impact Assessment
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRRF	Great Barrier Reef Research Foundation
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Facility
GIS	Geographical Information System
ICAM	Integrated Coastal Area Management
ICM	Integrated Coastal Management
ICRAN	International Coral Reef Action Network
ICRI	International Coral Reef Initiative
ICRI	International Coral Reef Information Network
ICRMN	Indian Global Coral Reef Monitoring Network
ICZM	Integrated Coastal Zone Management
IFRECOR	'French Coral Reef Initiative'
IMO	International Maritime Organisation
IOC	Intergovernmental Oceanographic Commission of UNESCO
IOI	International Ocean Institute
IUCN	The World Conservation Union

MAB	Man and the Biosphere site of UNESCO
MARPOL	International Convention of the Prevention of Pollution from Ships
MPA	Marine Protected Area
NGO	Non-Governmental Organisation
NOAA	National Oceanic and Atmospheric Administration (of USA)
PERSGA	Regional Organisation for the Conservation of the Environment of the Red Sea and Gulf of Aden
Ramsar	International Convention on Wetlands
RAP	Rapid Assessment Protocol
ROPME	Regional Organisation for the Protection of the Marine Environment
SACEP	South Asia Cooperative Environment Programme
SAREC	Sida Department for Research Cooperation
SCUBA	Self-contained underwater breathing apparatus
SIDA	Swedish International Development Agency
SIDS	Small Island Developing States
SPREP	South Pacific Regional Environment Programme
TNC	The Nature Conservancy
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNF	United Nations Foundation
USAID	US Agency for International Development
UV	Ultraviolet radiation
WCMC	World Conservation Monitoring Centre
WHA	World Heritage Area
WHS	World Heritage Site
WRI	World Resources Institute
WWF	World Wildlife Fund (USA)
WWF	World Wide Fund for Nature (elsewhere)
WWF	World Wrestling Federation