PIMRIS NEWSLETTER

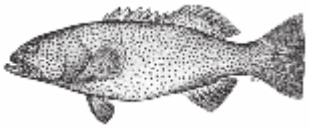
Pacific Islands Marine Resources Information System

Published by the PIMRIS Coordination Unit,

c/- Marine Studies Programme, University of the South Pacific,
P.O. Box 1168, Suva, Fiji
Tel: (679) 323 2934 Fax: (679) 323 1526 Email: pimris@usp.ac.fj

Vol. 17, no. 4 **Dec 2005** **ISSN 1015-3217**

Editorial



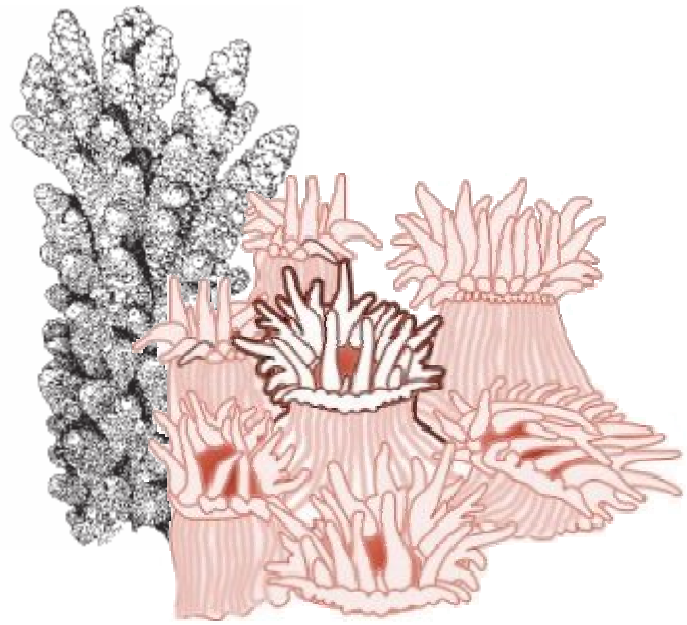
Coral reefs are one of the most diverse ecosystems in the world but they are also among the most fragile. The symbiotic relationship between coral polyps and zooxanthellae allows corals to grow wherever there is an ample supply of sunlight and carbon dioxide, but also makes them sensitive to a range of environmental characteristics, meaning they are a useful indicator of environmental quality. Since coral reefs also provide homes to many other marine creatures, the entire community can be disrupted if conditions change too far from optimum levels.

While corals can be damaged by natural predators and processes like the crown-of-thorns starfish and cyclones, they are also now under threat from a variety of human activities. Pollution and silt from agricultural and industrial operations can block the sunlight or smother the coral. Over-fishing and the use of destructive fishing techniques, particularly poisoning, dynamiting and bottom trawling, can weaken reefs or reduce them to rubble. And corals are now facing a danger of extinction on a wider scale due to coral bleaching caused by global warming (pp.3-6).

This issue highlights various aspects of coral reefs and the communities they support, contributing to a major goal of PIMRIS: to distribute information on all aspects of the Pacific marine environment. This goal is shared by both a new magazine, *Melanesian Geo* (p.6) -- from which the article on live reef food fish (pp.7-10) has been abridged – and SPC's "Fisheries News Clippings" (p.13). And don't forget that an electronic version of this newsletter, in full colour, is available on the PIMRIS website: http://www.usp.ac.fj/library/pimris.htm. Ko rabwa,

Chris Nelson, PIMRIS Coordinator

Contents



A branching *Acropora* coral and coral polyps

--- Opinions expressed in articles included in the PIMRIS Newsletter do not necessarily represent those of any participants. --

Directory

PIMRIS is a cooperative network of fisheries and marine resources libraries and information centres in the Pacific. Participants include ministerial libraries and the regional agencies listed below. For additional information contact the Coordination Unit or a specific agency.

Pacific Regional Environmental Programme (SPREP)
Satui Bentin
Information Resource Centre Manager and PEIN Coordinator
satuib@sprep.org.ws
www.sprep.org.ws

Secretariat of the Pacific Community (SPC) / Secrétariat général de la Communauté du Pacifique
Jean-Paul Gaudechoux
Fisheries Information Adviser /Conseiller en information halieutique
JeanPaulG@spc.int
&
Rachele Oriente
Librarian / Bibliothècaire
RacheleO@spc.int
www.spc.int

South Pacific Applied Geoscience Commission (SOPAC)
Dorene Naidu
Library Services Officer
Dorene@sopac.org
www.sopac.org

South Pacific Forum Fisheries Agency (FFA)
Ben Hall
Information Officer
Ben.Hall@ffa.int
www.ffa.int

University of the South Pacific (USP), PIMRIS Coordination Unit
Chris Nelson
Librarian/PIMRIS Coordinator
nelson_c@usp.ac.fj
www.usp.ac.fj/library

Library Assistant
(Vacant)

New Faces, New Places

Dr Pa'olelei Luteru has been appointed as inaugural Dean of the Faculty of Islands & Oceans after an academic restructuring at the University of the South Pacific. He returns to the region after ten years in Europe where he has worked for the African, Caribbean and Pacific (ACP) Group of States, most recently as Assistant Secretary-General for Political Affairs & Human Development. Pa'o is no stranger to USP, as he held posts including Director of Planning and Development in the Vice-Chancellor's Office there earlier in his career. Dr Luteru gained his PhD from Flinders University in Australia. (*Photo credit*: Johnson Seeto)

SPC Assistant Librarian **Anne Gibert** spent a fortnight at the PIMRIS Coordination Unit in November-December to begin cataloguing material contained in the Bob Johannes Collection. Bibliographic records for items in this collection will appear in the online library catalogues of both USP and SPC libraries as they are completed.

Clare Ame was elected the new Chair of the Pacific Islands Regional Group (PIRG) of the International Association of Marine Science Libraries & Information Centers (IAMSLIC) in December. She will take up her duties in this role early in 2006. More regional libraries are expected to join PIRG after a recruitment drive led by SPC Librarian **Rachele Oriente**.

Bharti Latchmi and **Ashmita Devi** completed work in the PIMRIS Coordination Unit as student assistants in November/December. They conducted a stocktake of the monograph collection, cleaned and reorganized shelving and prepared items from the Johannes and Yamaguchi donations for cataloguing. Their work is much appreciated and will benefit all PIMRIS users.

Coral Bleaching in Fiji and the South Pacific

Ed Lovell (Lecturer in Coral Reef Ecology, USP)

Coral bleaching is a global phenomenon that seems to be increasing in frequency, scale and severity. There were 60 bleaching events between 1979 and 1990 (Glynn 1993). Few were reported before that period. The worst on record affected the Indian Ocean, Southeast Asia and Australia in 1998. The South Pacific experienced major mass coral bleaching a few years later.

What is Coral Bleaching?

Coral bleaching is a descriptive term applied to the influence of higher sea temperatures on a variety of coral reef organisms, which include sea anemones and giant clams as well as corals. What they all have in common is the internal presence of symbiotic algae, the zooxanthellae. Prolonged, unusually high sea temperatures cause physiological problems and the algae are expelled from these host organisms. The resulting appearance of coral or other organisms is a lightening or whiteness, though the inherent coloration of the animal host may dominate, commonly, as purple, blue or yellow.

The unusual occurrence of warm water appears to be the result of a calm weather phenomenon moderated by oceanic and local current. When coinciding with the zenith of the sun on its seasonal transit, warming of the sea surface occurs often to depth.

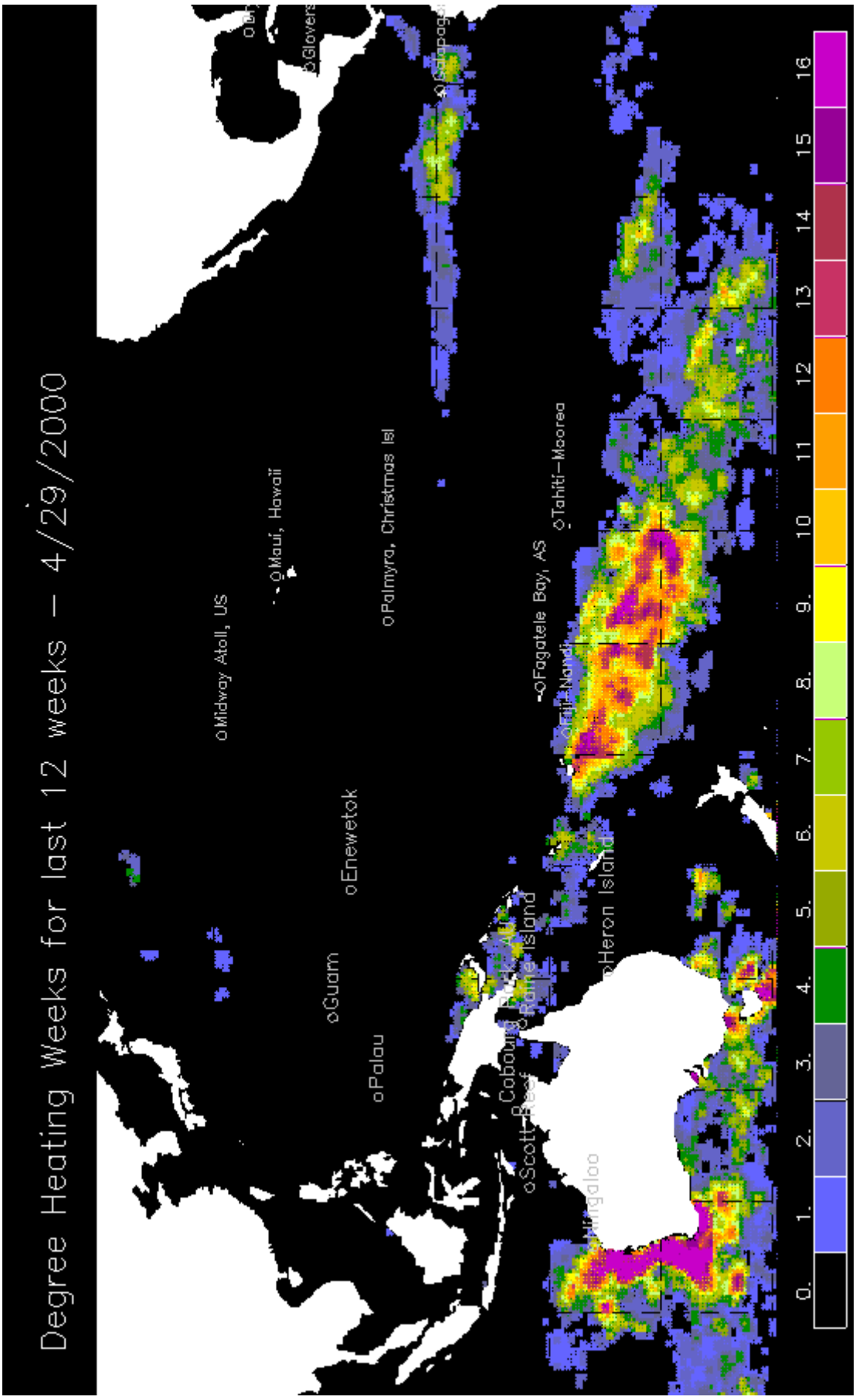
During late February through to early March 2000, mass bleaching occurred in Fiji after a prolonged period of temperatures in excess of 30^0C. This coincided with similar coral bleaching being reported across the South Pacific from Papua New Guinea to Easter Island. Prior to and during this period, satellite surveillance of sea surface temperatures (SST) revealed a band of progressively elevating temperatures. They were above average in PNG as early as September 1999. The waters around Fiji began to warm in the third week of December 1999. By mid-February it had reached its full extent. By the middle of March, the trans-Pacific zone of higher temperature began to break up but the effect on the corals was by then widely reported. For Fiji, this was during the week surrounding March 1st. Interestingly, the satellite record of SSTs north of Vanua Levu indicated much cooler waters and an aerial survey of this area revealed far less bleaching (<5%). By April 15, the warm water mass had dissipated, retracting towards Papua New Guinea.

The figure on page 4 illustrates the event in April 2000 using Degree Heating Weeks (DHWs) which indicate the accumulation of thermal stress that coral reefs have experienced. One DHW is equivalent to one week of sea surface temperatures 1° Celsius greater than the expected summertime maximum. Two DHWs are equivalent to two weeks at one degree above the expected summertime maximum *or* one week at two degrees above the expected summertime maximum (and so on).

For the duration of the event, Tonga and the Cook Is. and areas south of Fiji showed 10-15 DHW. Bleaching occurred after 5-6 DHW in Fiji. South Pacific countries such as Kiribati, Tuvalu and the Samoas experienced no coral bleaching

A major bleaching occurred subsequently in Fiji in 2002 and mainly affected the north sides of the two main islands, which had escaped the 2000 bleaching. 2003-2005 were years where the incidence of bleaching was generally low. Chronic bleaching was reported from the Momi Bay area and Bau Waters every year and in the Yasawa Islands in 2005. Kiribati suffered severe bleaching in 2003 in the Phoenix Islands and in the Gilberts in 2005.

Coral bleaching near Suva



Source: NOAA (http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwp.4.29.2000.gif)

How is the Coral Reef Affected?

Though generally correlated with high water temperatures, coral bleaching occurs differentially in the reef environment, with corals at depth and in inshore areas being less affected in terms of the amount of bleaching and mortality. Hard coral death was highest in areas characterized by the clearest water such as the fore-reef environments. This reef zone is dominated by table-like *Acropora* assemblages and mortality may reach 80%.

Surprisingly, this layer of warm water extends to depths of >30m. Bleaching is found here but not with the mortality that is experienced in shallower water. In addition, more turbid inshore waters experience less bleaching. The key to this observation is the differential penetration of light and its effect on the algal photosynthetic processes within the host animals. In the presence of high temperatures and light, toxic photosynthetic products, such as the build up of oxygen radicals, poison the animals. Many corals survive the harmful effect of light, being moderated and protected by pigments within the animals. Some species of corals were tolerant to the high temperature, not bleaching at all.

In Fiji, there appears to be good survivorship of corals on many reefs. Where there has been high mortality, the presence of relatively unaffected areas assures a source of recruitment. The fish and invertebrates do not appear to be affected by the event though more rigorous observations may determine a change in the species composition. Coral specific symbionts and predators must vary with the abundance of their hosts. For many, it seems that the habitat relief is all that matters whether it be living coral or algal-covered skeletons.

The Future of Coral Reefs

Some say that as global warming progresses, we may be witnessing the end of the coral reefs as we know them. From the observed bleaching, it is assumed that the photosynthetic processes within the corals are operating at the upper level of their temperature tolerance. Increases in temperature due to global warming may be progressively lethal to currently resistant corals. One scenario may include the dominant genus *Acropora*, most affected, being replaced by the more resistant *Porites* genus. With the inshore and reef flat species adapted to an environment of fluctuating water temperatures, future recruitment may rely on these habitats.

For many areas, coral bleaching may be a process that (as with cyclones or outbreaks of the coral eating crown-of-thorns starfish) causes disturbance that ultimately results in reef renewal by providing surfaces for new settlement and the removal of monopolising species. Species diversity may increase through recruitment from peripheral environments. In some affected areas, however, the mortality has been so complete and sources of recruitment so distant that a substantial amount of time will be required for the re-establishment of the "pre-bleaching" diversity of coral fauna.

Several efforts are underway to describe the phenomenon in Fiji. IOI-Pacific and the Marine Studies Programme at the University of the South Pacific are working together with NOAA to ground-truth the satellite SST data. The University of Rhode Island and the Reef Check Foundation are sponsoring the assessment using the Reef Check methods. [*See also opposite page – Ed.*]

Resources on coral reefs and coral bleaching available on the Internet include:

Coral Bleaching [Aust. CRC Reef site]	(http://www.reeffutures.org/topics/bleach.cfm)
Coral Bleaching Hotspots [DHW maps]	(http://www.osdpd.noaa.gov/PSB/EPS/SST/climohot.html)
Coral Reef Information System [NOAA]	(http://www.coris.noaa.gov/)
International Coral Reef Action Network	(http://www.icran.org/)
International Society for Reef Studies	(http://www.fit.edu/isrs/)
Millenium Coral Reefs Landsat Archive	(http://oceancolor.gsfc.nasa.gov/cgi/landsat.pl)
Palau International Coral Reef Center	(http://www.picrc.org/)
Status of Coral Reefs of the World	(http://www.aims.gov.au/pages/reflib/reflib-00.html)

New Publications

Astrolabe, Inc. 2005, The Great Astrolabe Reefs: 2005 report [DVD available in NTSC or Pal format]
(*Available from*: Astrolabe, Inc., 601 Springloch Rd., Silver Spring, MD 20904-3555 USA. Ph: (301) 625-9443 Email: jkoven@astrolabe.org) US$15 (including free airmail shipping)

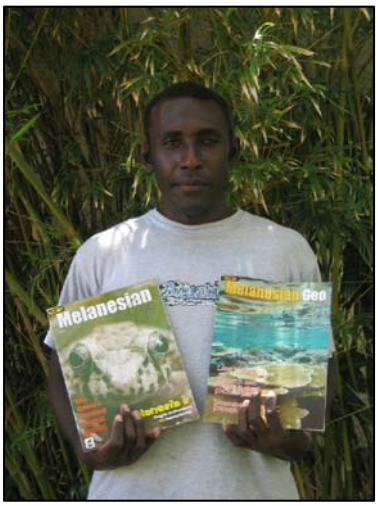
Astrolabe, Inc., has been working on the Astrolabe Reefs near Suva for 17 years. The Astrolabe Reefs were among the healthiest and most biologically diverse of any mid-Pacific reefs, but the climate changes that sparked the 2000 coral bleaching event brought death to many of the corals and coralline algae. Other algae that are not beneficial to the reef structure quickly moved in and today the reefs are more algal than coral. These reefs are not atypical of others around the world.

During our 2005 expedition we found that the number of juvenile corals had doubled and sometimes tripled since 2004. The coralline algae that cement the reef structure were healthy. This is heartening news, but not all of these will survive, and it is not a question of *if* but of *when* sea surface temperatures will rise to untenable levels again and linger long enough to kill corals. The most resilient species will perhaps thrive in time, but the reefs will be bereft of their rich diversity.

Astrolabe are currently digitizing 17 years of photographic history of the Astrolabe Reefs. A database has been constructed and coral specimen and locality images have been scanned and coded through 2002 (about 8,000 slides). Invertebrate images (another 4,000 slides) are also being scanned. It is distressing to compare the reefs of the early 1990s with those of today, but this historical record will serve as a baseline for researchers studying coral reef recovery.

-- Joan Koven, Astrolabe, Inc. President

Melanesian Geo: a magazine of society and the environment in Melanesia, ed. Patrick Pikacha for the Conservation Awareness Program (CAP). Published twice a year; first issue Jan-Jun 2005.
(*Available from*: CAP, PO Box R63, Ranadi, Honiara, Solomon Islands. Free PDF copies are available via email by contacting dboseto@yahoo.com, lakembalass@yahoo.com or ppikacha@yahoo.com.)



Melanesian Geo is a new, student initiated magazine dedicated to documenting the rich biodiversity of the region in print and digital photography. Many of the authors and editorial team members are postgraduate environmental students of the University of the South Pacific, but articles have also been contributed by freelance writers concerned about environmental issues. The new magazine targets a general public readership, in particular the region's future leaders -- high school and university students interested in Melanesia's diverse environment, people and cultures.

Articles in the first two issues have covered a wide range of issues and habitats, from shrinking tropical glaciers in New Guinea to the live reef fish trade in the Solomons (see following pages). We wish this new magazine every success in the future.

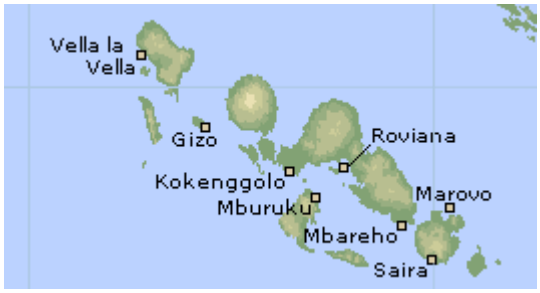
Circulation Manager David Boseto displays the first two issues

The Live Reef Food Fish Trade in the Solomon Islands

Tony Heorake

(reprinted in abridged format with permission from *Melanesian Geo*, issue 1, January-June 2005)

The live reef food fish trade (LRRFT) refers to the trade of coral reef fish species that are kept alive after capture until just before eating. It involves the exploitation and trade of wild-caught fish for human consumption in restaurants, particularly in major Asian cities like Hong Kong where there are affluent Chinese communities. Recently it has involved the export of juvenile coral reef fish caught from the wild for use in aquaculture operations (as growout) and later exported to LRFFT markets.



The New Georgia Group, Solomon Islands

The live reef food fish trade in the Solomon Islands occurs mainly in Marovo and Roviana lagoons and on Ontong Java Atoll. Although previous studies of the LRFFT in the Solomon Islands have been useful and important, our understanding of the nature of the trade still remains unclear and subject to speculation. For example, the impact of the LRFF trade on the biology and ecology of the marine ecosystem and its potential as an alternative source of income if properly managed are still to be studied and documented. Additionally issues of sustainability, coordination, monitoring and understanding of the scale and scope of the LRFF fisheries require special attention and proper planning. The total quantity exported and the area covered by the fishery remains unclear as well.

The fisheries sector in Solomon Islands contributes significantly both to the country's cash economy and peoples' subsistence livelihoods. According to experts, fish exports in the eighties for instance accounted for 20-40% of the countries export earnings. Solomon Islands earned between SI$10-12 million annually from the export of inshore fisheries resources (excluding tuna) in recent years, compared to only around half a million in 1983. The overall benefit from inshore fisheries resources has been steadily rising since the early 1980s.

Solomon Islanders also rely heavily on marine resources and have one of the highest per capita rates of seafood consumptions in the world. The major challenge for the country in terms of recent trends in the fisheries sector, including the introduction of the LRFFT, is appropriate and effective controls to ensure the sustainable management of the country's fisheries resources. Besides sustainable management, other factors such as market forces, high biodiversity and customary marine tenure (CMT) are equally important challenges for the Solomon Islands.

History & Development of LRFF trade in the Solomon Islands

The practice of preserving live fish caught in the wild until moments before it is cooked has been popular in China for many centuries. By 1968, a large number of Hong Kong restaurant consumers were paying very high prices for live fish. Owing to increasing demand for live fish, Hong Kong fishermen extended their operations farther into the South China Sea. The proliferation of the fishery expanded into new and unsuspecting fishing grounds east, southeast and west of Hong Kong as fish stocks within the inner and closer reefs and islands were severely stressed and rapidly depleted.

The Philippines was the first to be targeted in the mid 1970s by Hong Kong fishing boats due to its proximity and rich biodiversity. In 1984 and 1989, countries like Palau and Indonesia became the new targets respectively. Hong Kong businessmen also approached Yap in the 1980s but the industry was never established. The live-reef fishery entered Papua New Guinea and Tuvalu in 1991, and in 1994 the trade was established in the Solomon Islands. Meanwhile around early 1993, the live reef fisheries expanded westward into the Indian Ocean when the Maldives was targeted. By 1998, Hong Kong importers were exploring the Seychelles and Fiji as other possible sources of live fish for the trade.

An Australian-invested Hong Kong-based company, Ika Holdings, started buying live fish from communities in the Western Province in 1994. The company established a live fish holding pen at Liapari in the Vella La Vella lagoon. Villagers were hired to care for the fish pens and load them with live fish until there was sufficient fish for export. A large boat would be arranged by the company to collect the live fish destined for Hong Kong restaurants and other large Chinese coastal cities like Guangzhou. The operators employed pulse-fishing which targeted seasonal grouper spawning aggregations. The trade was introduced into Marovo and Roviana Lagoons and by 1997, it expanded into the northern atolls of Ontong Java.

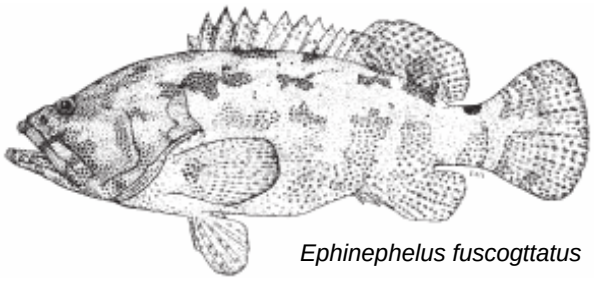
A foreign company surveyed the Isabel Province in 1997 as a potential source region for the LRFF but concerns were raised by the Arnavon Marine Conservation Area Management Committee when suspicious equipment used in cyanide fishing was located on board a fishing vessel. Advice provided to the Solomon Islands Government (SIG) by fisheries experts and an assessment on the trade done in December 1997 persuaded the SIG to impose a moratorium on the LRFF trade in 1999. The interim moratorium was to be enforced until a Management Plan for the trade was completed but immediately after the coup d'etat of 2000, the moratorium was lifted under controversial circumstances.

The LRFF trade mainly targeted the groupers: *Epinephelus fuscoguttatus* (Flower Grouper), *E. polyphekadion* (Camouflage Grouper) and Coral Trout (*Plectropomus areolatus*). The Humphead Wrasse (*Cheilinus undulatus*) had also been caught though data revealed that their export numbers had been falling. The majority of the targeted species were caught predominantly by hook and line. Specially designed hooks were issued to fishers to minimize injury and boats with specially built salt-water holding pens were provided by the company.

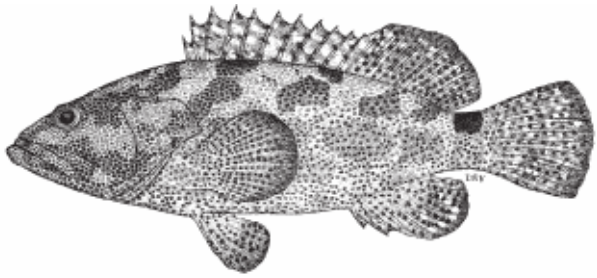
Hong Kong is the center of the LRFFT and the largest consumer of live reef food fish. There its estimated wholesale value is US$1 billion; local consumption averages around 27,000 tonnes per year. In 1997, the Hong Kong markets imported about 32,000 tonnes from at least ten Asian countries or regions, signifying the magnitude of the trade within the Asian region.

In its annual report, the ADB stated that some of the principal driving forces behind the trade in Hong Kong include the rising demand for live reef fish by Hong Kong's affluent population and the socio-cultural significance of live fish consumption as part of Chinese culture. In addition to those illustrated above, many other groupers are imported by the Hong Kong markets. Indonesia and the Philippines have been the major suppliers of Humphead Wrasse but in recent years imports have come from other countries in Asia and the Pacific.

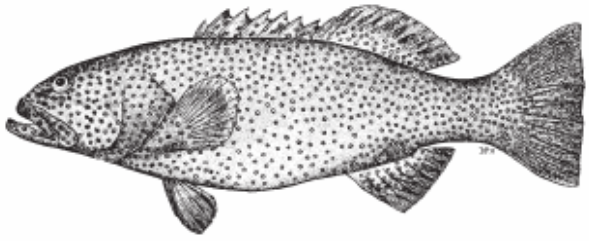
Major Species Targetted by the LRRF Trade



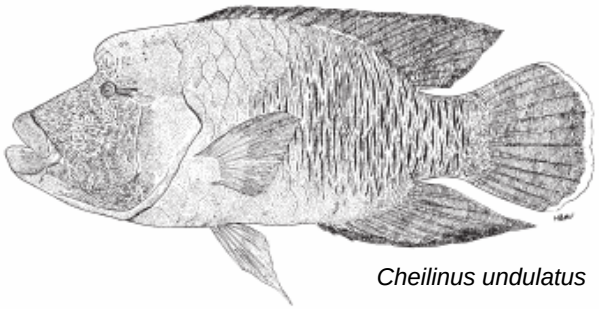
Ephinephelus fuscogttatus



Ephinephelus polyphekadion



Plectropomus areolatus



Cheilinus undulatus

(Source: Carpenter, K.E. & Niem, V.H. (eds.) 2001. *FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific*)

Major Issues with the LRFF trade in the Solomon Islands

Social/Cultural: The utilization of marine resources has been an integral part of many Solomon Islands societies for millennia. In recent years factors such as a rapidly growing population and rising dependence on the cash economy have placed an enormous strain on the nation's marine resources. With the introduction of a LRFF fishery as a commercial alternative in Marovo and Roviana lagoons and Ontong Java Atoll, peoples' lives have been dramatically affected. Since the trade also targets fish species that local communities depend on for subsistence and trade, the dietary intake of villagers and their subsistence fishery could be affected. Disputes over ownership of fishing grounds and customary rights are an associated feature of the trade as well. In certain regions, fishers spend most of their time fishing, often neglecting other domestic tasks like gardening and rearing of pigs and poultry.

Economical: While a complete picture of the economic impact of the LRFF trade in the Solomon Islands is scanty, live fish export between 1996-1999 has been valued at about SI$1.3 Million dollars; this signifies an increase of 38% over a three-year period. The royalties paid to the villages is about SI$0.50 kg^{-1} and to fishers, SI$5-10 kg^{-1}, but the same fish may fetch between US$20-$60 kg^{-1} and in Hong Kong restaurants some species of Humphead Wrasse were sold at up to US$180 kg^{-1}. Fishers and fishing communities involved in the trade have undoubtedly been exploited. The overall value of the trade in terms of Gross Domestic Product (GDP) is also very low and in any case, the incurred costs outweigh the perceived benefits.

Environmental/Ecological: The Solomon Islands has been involved in industrial fishing perhaps more than any other of the smaller nations in the region. Since the most significant zone is within 12 nautical miles, it is where most of the inshore fishery resources and fishing activities occur. This region also has rich ecological diversity yet it is susceptible to loss of biodiversity if it is unmanaged or exploited in an unsustainable manner.

Most of the fish targeted by the LRFFT form spawning aggregations and thus mature (reproductive) adults could be highly susceptible to intense fishing (increased effort) during their spawning season. A recent survey on the impact of LRFF trade on the spawning aggregations in the Marovo Lagoon has indicated both fish stocks and fish sizes are declining. In the Roviana Lagoon approximately half of the villagers noted a general decline in fishing stocks although there was no obvious change in fish sizes. Perhaps it is still too early to make any firm conclusions.

Sustainable Management: Some fish species traded in the LRFFT have been declining rapidly and may soon become endangered. The Humphead Wrasse although comprising a relatively small volume of export, is highly priced and in demand due to its taste, texture and prestige. Other fish species that are heavily exploited are also placed under increasing stress due to over-fishing by fishers and LRFF trade operators. The sustainable management of the LRFF fishery using a multi-disciplinary approach to management that combines both scientific knowledge and understanding of local marine tenure systems (CMT) into management policies, regulations and technology is vital. The importance of CMT in sustainable management of fisheries resources should be promoted.

Management and Legislative Controls: In order for the Solomon Islands to maximize revenue from its resources whilst maintaining a degree of sustainability of its marine resources, particularly inshore fisheries resources, there is a need for the establishment of proper management policies, guidelines and controls. Laws, regulations and ordinances would have to be effective, appropriate and relevant to the various situations faced by the Solomon Islands. Generally, fisheries policy (or lack of it) over the years has either remained in the doldrums or has been manipulated by certain people to benefit only a few. In many cases, enforcement is the major issue.

Challenges and Prospects of the LRFFT in the Solomon Islands

Fisheries Act and the LRFFT Regulation: Currently one of the major approaches to management of marine resources is the principle described as the "*precautionary approach*". Although this approach has its merits, it signifies major deficiencies in government with aspects such as scientific

data and information on fish biology and ecology, human and technological capacity, enforcement, policing and control where appropriate, applicable or necessary, and a general lack of policy direction and indecision. Administrative loopholes in legislation could also be manipulated and capitalized on by LRFFT operators.

High Biodiversity: Most of the live-traded fish species have relatively low abundance thus are generally susceptible to over-fishing. It is important that data and information relating to their biology and ecology are obtained prior to commencement of operations to ensure proper management and control of these important fish species since coral reef communities also depend on them. The removal of such high order species would also impact on the reef ecology and equilibrium of reef ecosystems since most of them are herbivorous and are important in maintaining the level of algae on the coral reefs. Once they are removed, their niches could be assumed by other predators that could trigger a new set of ecological regimes, which could be detrimental to the reef balance.

Protecting Spawning Aggregations: Certain reef fishes can be vulnerable to over-fishing, since they congregate to spawn at certain times of the year and at predictable locations on reefs. Thus over exploitation of spawning aggregations can lead to the elimination of the breeding fish population and certain fish species could be extirpated. The protection and closure of spawning aggregations during certain times of the year should be encouraged to enhance fish populations where they are declining or under threat of being eliminated. Banning the use of certain gear like hookahs and compressors and the use of sodium cyanide in spawning aggregations is also important for the sustainable management of the trade and the ecology of marine ecosystems.

Customary Marine Tenure (CMT): The incorporation and recognition of traditional management practices into important legislations such as the Fisheries Act (1998) and the LRFF trade regulation is vital for the sustainable management of fishery resources and particularly the LRFF trade in the Solomon Islands. In the Marovo and Roviana lagoons, disputes over primary use rights verses secondary use rights of resources have arisen. If laws and regulations do not clearly define such issues, disputes and consternation among villagers could potentially affect the LRFF fishery. On the other hand, in regions where most decisions and/or disputes are referred to Chiefs or a House of Chiefs as in the case of Ontong Java, problems associated with marine tenure could be mitigated and resolved amicably.

Aquaculture: One of the long-term and exciting alternatives for the LRFF industry and the Solomon Islands government to consider especially when wild fish stocks are depleting very rapidly is aquaculture. According to an ADB report on the LRFF trade in the Asia Pacific region, of the range of species supplied to the LRFF trade, groupers are the most favoured for aquaculture by farmers due to their faster growth rate and high value. In recent years the Solomon Islands through the WorldFish Center (formerly ICLARM) has been investigating the feasibility of a new artisanal fishery based on the capture and culture of pre-settlement coral reef fish species targeted by the live fish trades. The results of this feasibility study albeit preliminary are very encouraging and have indicated various aspects of the fishery that have potential to be developed into a sustainable fishery that is economically viable for many rural communities in the Solomon Islands.

Summary and Recommendations

Coordination and constant communication between the government and resource owners are fundamentally important to the success of the LRFF fishery. In the past, administrative loopholes and government fragmentation have been capitalized on by corrupt individuals and groups. Empowerment of traditional resource owners is paramount to resource management because they have a vested interest in conserving and managing their resources for future generations. They are also the ones in the front line, so if workshops and other activities could be conducted to inform and encourage them to manage their resources they would be very effective co-managers. Village data collection and monitoring programs on spawning aggregations should be established as well, to detect any decline in fish stocks early, before it is too late to reverse the situation. The technological and human capacity of the government is also crucial for effective management of marine resources in the Solomon Islands.

Agency News

New Modern Office for Forum Fisheries Agency

New modern office space for the Pacific Islands Forum Fisheries Agency (FFA) was officially opened in September at the Agency's grounds at West Kola'a Ridge, Honiara. The new look office with modern work stations is a complete refurbishment of the existing building constructed over 20 years ago and has created new space for some of the staff arriving soon under the FFA's new organisational structure and new funding arrangements.

"Thanks to funding from New Zealand, Australia and Taiwan the FFA now has a new office to match its new corporate image and strategic direction. During the renovation, FFA staff had to relocate to temporary office space in the FFA Conference Centre. The tireless work of the Fletcher Kwaimani construction crew deserves special mention and thanks" said FFA Director-General, Mr. Feleti Teo.

"During the renovation period we knocked down walls, dug a 250m trench through the middle of our main road to lay cables, refitted bathrooms and kitchen, painted the building, retiled the floor, rewired the network and much, much more – I'd never have believed it all possible in such a short time" said Mr Teo.
(Source: FFA website, 1 Sep, 2005)

FFA staff in the new premises

Eminent Japanese Researcher Donates Books to USP Library

On December 5th a ceremony was held at the Lower Campus Library of USP to mark the donation of more than 200 books from the personal collection of Professor Masashi Yamaguchi. Based at the University of the Ryukyus in Okinawa, Japan, Professor Yamaguchi spent much of his early career researching aspects of coral reefs and invertebrate species in the Pacific, fields in which he is now an acknowledged world expert. He has authored many scientific books and papers himself and has edited and translated a number of Japanese texts into English.

Professor Yamaguchi was represented at the handover by the Resident Representative of the Japan International Cooperation Agency in Fiji, Mr Tadashi Ikeshiro. Mr Ikeshiro outlined Professor Yamaguchi's association with the Pacific region over many years and stated that JICA was very pleased to have been able to facilitate this donation by transporting the books from the Ryukyus.

Professor Leon Zann (Head, Marine Studies Programme) accepted the donation for the University, thanking Professor Yamaguchi and JICA. The two professors share many research interests on coral reef ecology and have worked together over the years.

Mr Tadashi Ikeshiro (JICA) congratulates Professor Zann on the donation of books from Professor Yamaguchi

Evocative Marine Sculpture Unveiled on USP Lower Campus

An evocative new sculpture was unveiled in October in the foyer of the Marine Studies Programme on USP's Lower Campus. Created entirely from scrap metal by a small team of USP students and staff, the sculpture depicts a variety of ocean creatures of special economic and cultural significance to the Pacific Islands region.

Holly Gittlein, a postgraduate student in Marine Studies from Alaska explained the choice of species represented and discussed how the sculpture had been designed and created over a period of many months, team members working entirely in their spare time. Her colleagues were fellow student Sekope Delai, Ben Fong from the Oceania Centre for Arts & Culture and Vili Dawainavesi from the Marine Studies workshop. To complete the work of art the team scavenged components including old car bonnets, hot water cylinders and other discarded metal parts.

Professor of Marine Studies Leon Zann thanked the team for their spectacular sculpture, noting it would be a lasting tribute to their ingenuity and artistic talent as well as a perfect addition to the new Faculty of Islands & Oceans. Deputy Vice-Chancellor Esther Williams also congratulated the team on their accomplishment, adding that it was a wonderful demonstration of the skills, initiative and environmental awareness of USP students and staff.

Team member Holly Gittlein with the new marine sculpture
(Photo credit: Randy Thaman)

Other News from the Region

Palau: Bill to ban bottom trawling

A measure has been introduced in the Senate to ban the practice of bottom trawling in the territorial waters and exclusive economic zone of Palau. The bill, introduced by Senator Yukiwo Dengokl, stated that bottom trawling has been found to destroy up to 98 percent of the coral cover of seamounts as well as cause the depletion of the targeted fish stocks. Scientific studies around the world have shown that bottom trawling is devastating, and some scientists are now pushing for the establishment of a moratorium on bottom trawling on the high seas.

The bill also proposes to prohibit any Palau national from engaging in or assisting in bottom trawling anywhere in the world. Violators -- who can either be individuals or business entities -- would be punished under the bill by a jail term of up to 10 years and/or a fine of not more than US$500,000. (PACNEWS 1: 16 Dec 2005)

Australia: Reef closures helping fish stocks

The scientist at the head of an 11-year study into the effects of line fishing on the Great Barrier Reef says the policy of area closures to allow spawning has been very successful. Professor Bruce Mapstone from the CRC (Cooperative Research Centre) for the Great Barrier Reef World Heritage Area says they undertook one of the world's biggest fishing experiments to get a better idea of the effects of both commercial and recreational line fishing. He says the data is still being analysed but it is already clear that the policy of fishing bans in certain areas of the reef has worked.

"Some of things that we've learned along the way include the area closures that the Great Barrier Reef Marine Park Authority has put in place have really been very effective in protecting significant portions of the stock that has been fished elsewhere from fishing so that they can spawn and rekindle the populations of the fish for future generations to harvest," he said. Professor Mapstone says the findings show the Great Barrier Reef Marine Park Authority has been successful in re-populating fish stocks.

(*ABC News Online,* 12 Dec 2005, via *SPC Fisheries News Clippings*, 16 Dec)

Hong Kong: UN expert urges reform of fishing subsidies at world trade talks

At the World Trade Organization meeting in Hong Kong on December 14, a United Nations environment expert urged adjustment to the over $15 billion in annual fisheries subsidies worldwide. These amount to roughly one fifth of fishing industry revenue and contribute to the dangerous depletion of global fish stocks.

Monique Barbut of the UN Environmental Programme (UNEP) told the gathering, "In the past year, a consensus has emerged in the WTO that it's no longer a question of whether, but of how, fisheries subsidies reform should take place." The talks are part of the Doha Round of trade discussions aiming for more equitable trade terms for developing countries.

Barbut pointed to a growing consensus that some subsidies do deplete fish stocks in all but the most carefully managed and monitored populations. Among the most damaging are those for infrastructure, capital costs, access to foreign countries stocks and price support, she said. "The WTO negotiations aiming to discipline these subsidies do hold out a real hope for more sustainable management of this sector, and this Doha Round mandate is a key opportunity for the trading regime to contribute to sustainable development," she added.

She said the economic importance of fisheries extends across all developing countries, with net foreign exchange receipts from the sector amounting to $17.4 billion per annum, providing livelihoods for 200 million people. Fisheries also make a huge contribution to food security, with more than a billion people relying on fish as their primary source of protein. However, the limits of sustainable exploitation of many fish species have now been surpassed. Three quarters of global marine fisheries are harvested at their maximum rate or beyond sustainable levels. Despite increasing capital investment in the fishing industry and bigger and more powerful fleets, global fisheries production has been almost flat for the last few years. This fisheries crisis not only increases poverty and constrains development, but is also causing potentially irreversible ecological damage in some major marine ecosystems, Ms. Barbut stressed.

She emphasized that harmful subsidies must be differentiated from beneficial ones that discourage over-fishing, for example, and that special treatment for developing countries must be built into fisheries subsidy reform, noting that recent proposals have begun to explore how expertise from outside organizations, can be applied in the area. (*UN News Service*, 14 Dec 2005, via *SPC Fisheries News Clippings*, 16 Dec)

Vanuatu: Rising seas force Islanders to move inland

Rising seas have forced 100 people on an island in Vanuatu to move to higher ground in what may be the first example of a village formally displaced because of modern global warming, a UN report has said.

With coconut palms on the coast already standing in water, inhabitants in the Lateu settlement on Tegua Island in Vanuatu started dismantling their wooden homes in August and moved about 600 metres inland. "They could no longer live on the coast," Taito Nakalevu, a climate change expert at the Secretariat of the Pacific Regional Environment Programme (SPREP), said during a 189-nation conference in Montreal on ways to fight climate change. So-called "king tides," often whipped up by cyclones, had become stronger in recent years and made Lateu uninhabitable by flooding the village four to five times a year. "We are seeing king tides across the region flooding islands," he said.

Pacific Islanders, many living on coral atolls, are among those most at risk. Off Papua New Guinea, about 2,000 people on the Cantaret Islands are planning to move to nearby Bougainville Island, a four-hour boat ride to the south-west. Two uninhabited Kiribati islands, Tebua Tarawa and Abanuea, disappeared underwater in 1999.
(PACNEWS 1: 16 Dec 2005)

Need to keep up on the latest Fisheries news?

"Fisheries News Clippings" is a service provided by the Secretariat of the Pacific Community Fisheries Information Section. This is a new initiative from SPC to advance understanding in fisheries issues by providing news of international and national interest. They welcome feedback on this service and recipients are free to distribute the clippings links amongst their own networks. To receive regular updates via email, join "Fisheries News Clippings" by contacting Jean-Paul Gaudechoux, Fisheries Information Adviser. Phone: +687 260169 (direct line), fax: +687 263818, or email: jeanpaulg@spc.int

New FAO Publications

Papers presented at the Expert Consultation on Interactions between Sea Turtles and Fisheries within an Ecosystem Context, Rome, 9-12 March 2004 (FAO Fisheries Report No. 738, Supplement) Rome, 2004. 244 pp. ISBN 92-5-105238-7. TR/M/Y5750/E

This meeting was attended by experts on various aspects of sea turtle biology and conservation, fishing gear technology, fisheries management and socio-economics. This document includes all the contributions prepared by the participants. The first four papers provide an overview of available information on biology, distribution and the main sources of natural and man-induced sea turtle mortality for the Atlantic, Pacific and Indian Oceans and the Mediterranean Sea. Gear technology developments to reduce impacts on sea turtles are reviewed in papers 5 to 7. Special emphasis is given to the Turtle Excluder Devices (TEDs) and mitigation measures in pelagic longline fishing. Management experiences in reducing sea turtle bycatch in coastal fisheries, including implementation of technology standards and area/time closures, are covered by paper 8. Examples of conservation efforts aimed at preserving nesting beach habitats and at preventing direct take of sea turtles and their eggs are presented for two locations in Indonesia (paper 9). The examples show the importance of community empowerment in the implementation of conservation measures. Finally, paper 10 describes an important case study from the State of Orissa (India). Here olive ridley turtles congregate in large numbers in the shallow coastal waters that also happen to be the richest fishing grounds and the source of livelihoods for traditional fishing communities in that region. Experiences made in implementing various management measures to reduce sea turtle mortality due to fishing are presented, with particular emphasis on the consequences that these have had on traditional fishing communities.

Tilapias as alien aquatics in Asia and the Pacific: a review / Sena S. De Silva, Rohana P. Subasinghe, Devin M. Bartley & Alan Lowther. (FAO Fisheries Technical Paper No. 453) Rome, 2004, 72 pp. ISBN 92-5-105227-1. TC/M/Y5728/E

Tilapias are an important group of fish which contribute to food supply in many areas of the world. While there has been a significant increase in production of tilapias globally over the past two decades, there is also some controversy that tilapias cause considerable environmental and biodiversity damage. This publication presents a broad analysis of the overall contribution that tilapias have made and their impact on the Asia-Pacific region. It also discusses the benefits of responsible use of alien species such as tilapias for improving the quality of life of the rural poor.

Impacts of trawling and scallop dredging on benthic habitats and communities / Svein Løkkeborg. (FAO Fisheries Technical Paper No. 472) Rome, 2005, 66 pp. ISBN 92- 5-105325-1. TC/M/Y7135/E.

Over the last two decades, concerns about the impact of towed fishing gears such as trawls and dredges on benthic habitats and organisms have increased. This publication reviews the most recent experimental studies of the impact of towed fishing gears on benthic communities. Otter trawls, beam trawls and scallop dredges are likely to have different physical impacts on the sea bed owing to their different catching techniques. The most noticeable physical effect of otter trawling is the furrow created by the doors. Beam trawling and scallop dredging cause a flattening of irregular bottom topography by eliminating natural features. The long-term effects of fishing activities have not been investigated although several studies provide clear evidence of short-term consequences. The difficulty in conducting impact studies that produce clear conclusions stems mainly from the complexity and natural variability of benthic communities.

Towards improving global information on aquaculture (FAO Fisheries Technical Paper No. 480) Rome, 2005, 178 pp. ISBN 92-5-104995-5.

In recent years the demand for reliable data, information and reporting on aquaculture has greatly increased, driven not only by the need to formulate and monitor sound policies and development plans but also by new information and reporting requirements of international agreements and initiatives, and by the increasing public demand for transparency and accountability. This document presents the outcome of an expert consultation organised in 2004, including a draft strategy and outline plan for improving information on status and trends of aquaculture.

Announcements

Ocean Yearbook (Vol. 21) - Call For Papers & Student Competition

For over 20 years under the senior editorship of the late Elisabeth Mann Borgese, the *Ocean Yearbook* has published leading edge articles, reports and reference materials devoted to the issues and concerns affecting the world's oceans. Marine biologists, oceanographers, and specialists in foreign policy, ocean development, coastal zone management, international law, and strategic studies around the world have found the *Ocean Yearbook* an invaluable tool for research. Editorship of the *Ocean Yearbook* is a cooperative effort of the International Ocean Institute and the Marine & Environmental Law Institute at Dalhousie University Law School. Published previously by the University of Chicago Press, the *Ocean Yearbook* has been published by Transnational Publishers since Volume 20.

The *Ocean Yearbook* editors -- Aldo Chircop, Moira L. McConnell and Scott Coffen-Smout -- are now inviting submissions for Volume 21. Articles on any of the following topics will be considered:

- Issues and Prospects
- Ocean Governance
- Living Resources of the Ocean
- Non-living Ocean Resources
- Transportation and Communications
- Environment & Coastal Management
- Maritime Security
- Military Activities
- Regional Developments
- Training and Education

Manuscripts should be between 4,000 and 20,000 words in length, written in English, typed and doubled-spaced on letter-size (A4 or 8.5 x 11) paper, with full bibliographic citations. View citation guidelines at http://as01.ucis.dal.ca/wag/template/uploads/law/oybguidelines.pdf or request a copy from the editorial office at Ocean.Yearbook@dal.ca. Please note that manuscripts are refereed before acceptance. While every effort is made to respond rapidly to authors, the review process can take several months. Authors are responsible for securing any copyright clearances necessary for the publication of their work. The deadline for submission for Volume 21 is **March 31, 2006.**

Student Prize 2006

The *Ocean Yearbook* has initiated an annual competition for students writing research papers on marine affairs subjects. Eligible students are persons registered for a degree programme at any university or other tertiary education institution. The papers will normally be between 25-30 pages (text, letter size), well-researched and well-written, cited and footnoted (as per above guidelines).

The successful author will have his/her paper published in a subsequent issue of the *Ocean Yearbook* and receive a cash prize of CA$250. The Editors will constitute the judging panel, and may refer submitted papers for external peer reviewing. The Editors reserve the right to admit or reject any paper. Papers should be submitted electronically in Word or Wordperfect and also as a hard copy. The deadline for student submissions is **May 15, 2006** with results being announced by July 14. The cash prize will be awarded shortly thereafter.

All enquiries and submissions should be directed to the co-Editor, *Ocean Yearbook* Editorial Office:

Scott Coffen-Smout, Co-Editor
Marine & Environmental Law Institute
Ocean Yearbook
Dalhousie Law School
6061 University Avenue
Halifax, Nova Scotia, B3H 4H9
CANADA
Tel: +1 902 494-3495
Fax: +1 902 494-1316
E-mail: ocean.yearbook@dal.ca
http://www.dal.ca/law/melaw

Conference & Workshop Notices

2006

Jan 23-28	3rd Global Conference on Oceans, Coasts, and Islands: Moving the Global Oceans Agenda Forward, UNESCO, Paris http://www.globaloceans.org/paris3
Feb 7-9	1st International Symposium on Mangroves as Fish Habitat, Miami, Florida http://www.rsmas.miami.edu/conference/mangrove-fish-habitat
Feb 20-24	13th Ocean Sciences Meeting, Honolulu, Hawaii http://www.agu.org/meetings/os06/
Feb 23 - Mar 2	Sharing the Fish Conference 2006, Perth, Western Australia http://www.fishallocation.com
Mar 6-10	World Maritime Technology Conference, London *includes "Reefs of the World" programming stream:* http://www.wmtc2006.com/technical/rw/default.asp
May 22-25	Coast to Coast 2006: Australia's biennial national coastal conference, Melbourne http://www.iceaustralia.com/coasttocoast2006/index.html
Jun 18-24	1st Asia Pacific Coral Reef Symposium, Shatin, NT, Hong Kong Special Administrative Region, China http://www.cuhk.edu.hk/bio/APCRS/index.htm

---

If undeliverable, please return to:

PIMRIS Coordination Unit
c/- Marine Studies Programme
University of the South Pacific
PO Box 1168
Suva, FIJI