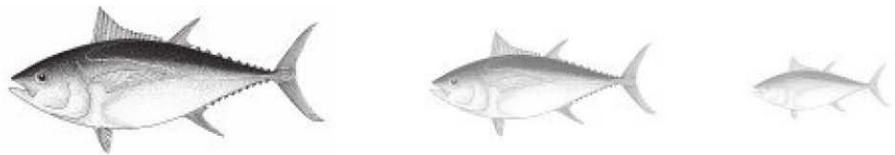


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## Editorial



Welcome to the last issue for 2010 and my first as Editor. In this issue, we have news of a research breakthrough at USP Marine studies (p.3), highlights of collaborative efforts by our regional partners (p.5) and the latest on a widely advocated marine ecosystems health assessment measure from CSIRO, Australia (p.7). Much is happening in our region, with threats of tuna stocks diminishing, illegal and overfishing as well as the impacts of climate change. These issues have been well researched and documented in various publications, some of which are listed in this issue (p.13).

In July 2010, the PIMRIS library assistant and other participants from the South Pacific attended the OceanTeacher Academy Course on Disaster Planning and Recovery in Belgium, funded by UNESCO/IOC Project Office for IODE; a report of her experience is included (p.8).

The PIMRIS team wishes you all a very Merry Christmas and a safe and successful New Year.

Susana Macanawai, PIMRIS Coordinator

## Contents

New Faces, New Places	2
Marine Research at USP	3
Regional Fisheries Collaboration	5
Fisheries Health Test study	7
Training Report	8
Regional Efforts & News	10
New Additions & Publications	13
Conference Notices	16



**We kindly request Fisheries Divisions in Pacific Island countries to deposit hard or soft copies of any of your publications (published or unpublished reports, research papers, technical papers etc.) with PIMRIS. The Annual Reports are especially important. The items will be added to the PIMRIS library collection and made available online (in full-text) through the PIMRIS Regional Repository.**

## Directory

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

### **Pacific Regional Environmental Programme (SPREP)**

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## New Faces, New Places

### **Farewell Maria!**



Maria Kalenchits – former PIMRIS Coordinator was farewelled by the USP library staff with a very colourful tea party in April 2010. Maria has returned to her homeland, Estonia after 3 years in the

Pacific region. All the best Maria and Vinaka for your contributions to PIMRIS!

### **PIMRIS Coordinator**

In November this year, Susana Macanawai joined the PIMRIS team as the new coordinator. Previously, she worked at USP for seven years in various capacities and locations. Before joining PIMRIS, Susana worked as a reference librarian at Queensland University of Technology (QUT) and then as a project officer at UQ, with the Excellence in Research for Australia Project.



### **Stéphanie Watt: Librarian**

**Assistant, SPC,  
Noumea, New  
Caledonia** – visited PIMRIS library as part of her tour of the USP Laucala libraries in November.



We were grateful for the opportunity to meet Stephanie who shared her experiences of ASFA data input and other work with us.



# Freshwater prawn research breakthrough at USP

By Monal Lal, Johnson Seeto and Tim Pickering

A milestone in aquaculture research has been achieved at the Seawater Laboratory of the Division of Marine Studies at the University of the South (USP). In post-graduate research co-supervised by SPC's Aquaculture Section, the Monkey River prawn *Macrobrachium lar* has been successfully reared in captivity for the first time ever – from eggs through the planktonic larval phase of their lifecycle to the post-larval stage.



This prawn, known locally as *ura dina*, is indigenous to Fiji and a number of other Pacific Island countries, including the Solomon Islands, New Caledonia and

Post-graduate student Monal Lal holds one of the freshwater prawn broodstock used for his research, flanked by his supervisors Tim Pickering of SPC (left) and Johnson Seeto of Marine Studies at USP (right).

Vanuatu. The largest river prawn in these places, *M. lar* is the basis of valuable inland fisheries for sale in local markets and restaurants.

*M. lar* has been a subject of research to assess its potential for aquaculture since the early 1970s in places such as Hawaii, with the hope that it can be farmed much like its cousin the Malaysian giant freshwater prawn, *Macrobrachium rosenbergii*, whose annual production value in Asian alone is estimated at around one billion US dollars.

The Monkey River prawn has a number of favourable characteristics for aquaculture, which include its large size, widespread acceptance among local communities as a delicacy, and the fact that it is a tough, hardy species that can survive out of water for short periods of time.

Another important characteristic of the species is that it is indigenous to many Pacific Island countries where there is interest in developing freshwater prawn farms. If research on *M. lar* culture techniques could make breeding and rearing more practical, then the introduction of an exotic prawn to establish freshwater prawn aquaculture in the Pacific Islands could be avoided.

A major drawback to further research into the suitability of *M. lar* for culture has been – until now – the inability to grow young prawns (known as postlarvae) in captivity after hatching from egg. Past researchers could reach about Stage 6 or 7 out of an estimated 11-13 larval stages, but then the larvae would die for unknown reasons.

This has meant that post-larvae for any culture work had to be caught by hand from the wild, which is time consuming and tedious. This is a barrier for larger-scale farming operations involving this species, because the easiest and most sustainable way to obtain large numbers of post-larvae required for commercial farming is in a hatchery.

The earliest published attempts at growing *M. lar* larvae in the laboratory all the way through to the post-larval stage was by Wilbert Kubota in 1972 at the University of Hawaii, followed by John Atkinson in 1977 at the same institution. Satya Nandlal recently completed his PhD thesis on the aquaculture of *M. lar* at the University of the South Pacific (USP). His research included extensive field trials and attempts to rear the species to the post-larval stage in the hatchery. Unfortunately, in all these studies the larvae could only be reared up to a certain stage, and then all larvae died.

The success of the present study in reaching the post-larval stage can be attributed for the most part to the development of a suitable feed that appears to better meet the nutritional requirements of the larvae, in addition to culturing it at its preferred salinity level in an appropriate rearing environment.

Another finding of this study is that *M. lar* larvae develop through approximately 13 stages in the ocean before they change into post-larvae (compared with 11 stages for *M. rosenbergii*). After they become post-larvae, the animals migrate landward and eventually settle in high-elevation freshwater streams far inland.

So far, five post-larvae have been produced in the USP laboratory. They metamorphosed into postlarvae after 77, 78, 85, 101 and 110 days of culture, respectively. It is a major achievement, because what previously appeared to be impossible has now been proven possible. For the future, however, this species still compares very poorly with *M. rosenbergii*, which can routinely reach post-larval stage in only 20–30 days and with 20–50% survival of big batches. There is scope for much more research into *M. lar*, and the work done here is an important step towards further developing and refining techniques for its culture.

This study at USP was initiated as part of an SPC-coordinated regional strategy for domesticating *M. lar* - through linked studies in Fiji, Vanuatu and New Caledonia - and funded by the Australian Centre for International Agricultural Research in collaboration with SPC. The study was undertaken by Master of Science student Monal Lal and supervised by Johnson Seeto and Dr Timothy Pickering of SPC.

Apart from larval culture research, investigations are also continuing on capture-based culture of *M. lar* for grow-out in small ponds by rural householders as a cash crop. A new technique for rearing prawn larvae — developed by Japan International Cooperation Agency Senior Volunteer Tomohiro Imamura while at USP — was instrumental in achieving this outcome.

(Source: SPC Fisheries Newsletter #131. Reproduced with permission)

## **Polynesian countries seek to protect and maximise benefits from fisheries through close cooperation**

*By Anouk Ride*



Senior representatives of the Fisheries Administrations of Cook Islands, New Zealand, Niue, Samoa, Tokelau and Tonga have just concluded a successful round of cooperation talks in Auckland, building on the signature of TeVakaMoana Arrangement (TVMA), in January.

This release comes from the current Chair Mr Peter Graham, of the Cook Islands Ministry of Marine Resources.

“TVMA has formalised existing cooperation and lays a foundation for improved collaboration in fisheries. A core focus of this work is securing and realising the sustainable benefits and interests that TeVakaMoana participants have, and aspire to have, in highly migratory fisheries, throughout the Pacific.

The meeting in Auckland provided an opportunity to discuss strategies, confirm a work programme and map out next steps, including in advance of this year’s Western and Central Pacific Fisheries Commission (WCPFC) meeting in Hawaii said Mr Graham.

By cooperating and drawing on our collective strengths we are more likely to achieve our sustainable development aspirations. Everyone has something to contribute.

Fisheries are a significant cornerstone for our economic future. This work is critical. Some of our Participants are the smallest of small island developing states in the Pacific region, and it’s vital that their development rights and interests are protected, and are able to be realised.

We recognise the need for TVM cooperation to secure our interests, and the need to cooperate with others, who also have interest in the shared Pacific fisheries. Closer cooperation in order to ensure we can all get equitable and sustainable benefits is going to be a key to this.

Mr Graham outlined some of the key outcomes from the meeting:

1. Agreement on a comprehensive work programme and governance structure and consideration of a draft programme design, presented by the New Zealand Aid Programme, to support the TVM work programme.
2. TVM are considering the implementation of zone based limits for albacore, skipjack, bigeye and yellowfin tunas and swordfish, in order to preserve and protect TVM participants’ interests in these fisheries and to fulfill our international obligations. We are also working towards ensuring we have a solid foundation for developing future measures for these stocks, including within WCPFC.

3. Work to identify ways to enhance the returns from fisheries to TVM economies by way of access, harvesting, supply, processing, transportation, marketing, creation of employment opportunities or otherwise.
4. TVM Participants made further progress on a draft sub-regional Niue Treaty Subsidiary Arrangement called TeVaka Toa Arrangement (TVTA). TVTA is significant because of our shared interests in the southern long-line fishery, and concerns about the level of illegal unreported and unregulated (IUU) fishing. TVM participant cooperation to date has resulted in quick cooperative action and substantial penalties from IUU fishing vessel operators.
5. We expect that TVTA will take this cooperation to a new level, and strengthen our ability to achieve even stronger results in this area, including in deterring IUU fishers. TVTA has been developed specifically for our subregional context. However in saying this, it's also been pleasing to note the way that TVTA has informed and is compatible with work underway at a regional level to develop a regional Niue Treaty Subsidiary Agreement. Next steps are for officials to finalise the draft TVTA, which we can then put forward for Ministerial endorsement. We hope that TVTA can signed by Ministers in July 2011.
6. TVM Participants also took the opportunity to discuss WCPFC related issues. It's obvious to us that there are a number of items up for discussion at the WCPFC meeting in December where TVM participants have common interests. These include stock-related measures, the issue of increasing costs, and the effectiveness of management measures. We will be looking at ways that we can progress work on these items between now and the WCPFC meeting, to ensure we get the best possible outcomes.
7. TVM Participants have agreed to establish a common web-portal which will set out information about TVM Participants work. It is hoped that this will be set up and running before Christmas, and will serve as a communication platform for TVM and third parties.”

*(Source: Forum Fisheries Agency (FFA) website)*



## Scientists question fisheries health test

*A measure widely advocated as a means of assessing the health of marine ecosystems is an ineffective guide to trends in biodiversity, and more direct monitoring is needed, a new study has found.*

Reference: 10/144

The findings – published this week in *Nature* – followed an examination of whether changes in fishery catches reflect changes in the structure of marine food webs, and therefore are a suitable guide to assess the impacts of fishing on marine ecosystem health.



Global fisheries are at a crucial turning point, with high fishing pressure being offset in some regions by rebuilding efforts. (CSIRO)

CSIRO Wealth from Oceans Flagship scientist, Dr Beth Fulton, and Dr Sean Tracey from the Tasmanian Aquaculture and Fisheries Institute at the University of Tasmania, were members of the international team involved in the study.

“Biodiversity indicators are used to track the impacts of fishing as a guide to management effectiveness,” Dr Fulton said.

“The most widely adopted indicator of biodiversity in the ocean at a global scale is the ‘average trophic level’ (position in the food chain) determined from fishery catches.

“This is intended to detect shifts from high-trophic-level predators such as Atlantic cod and tunas to low-trophic-level fish, invertebrates and plankton-feeders such as oysters.”

Dr Tracey said the study was the first large-scale test of whether average trophic level determined by fishery catch is a good indicator of ecosystem average trophic level, marine biodiversity and ecosystem status.

“We looked at average trophic level determined from a range of sources including global fishery catches, long-term surveys, stock assessments and complex computer modelling for marine ecosystems around the world,” Dr Tracey said.

“In contrast to previous findings, which reported declines in catch average trophic level thought to be due to the loss of large fish and the increasing catch of small fish, we found that catches are increasing at most levels of marine food webs and that the average trophic level has actually increased in the past 25 years.

“We also found that average trophic level determined from fishery catches does not reliably measure the magnitude of fishing impacts or the rate at which marine ecosystems are being altered by fishing.”

Dr Tracey says global fisheries are at a crucial turning point, with high fishing pressure being offset in some regions by rebuilding efforts. Relying on the average trophic level of catch could mislead policy development.

Dr Fulton said that, to target limited resources in the best way, researchers should focus on assessing species vulnerable to fishing that are not currently assessed effectively.

“We also need to develop and expand trend-detection methods that can be applied more widely, particularly to countries with few resources for science and assessment.

“Through such efforts we can better detect and convey the true impact of fisheries on marine biodiversity,” Dr Fulton said.

Led by University of Washington fisheries scientist, Trevor A. Branch, the study’s findings are published in a letter in *Nature* entitled: “The trophic fingerprint of marine fisheries”.

(Source: CSIRO website- <http://www.csiro.au/news/Scientists-question-fisheries-health-test.html>)

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## **OceanTeacher Academy Course on Disaster Planning and Recovery for Marine Librarians, 1-7 July 2010** **UNESCO/IOC Project Office for IODE in Oostende, Belgium**

*By Jainul Ali*



I was very fortunate to receive an invitation to attend this workshop and learn more about disaster preparedness planning and response especially for libraries. The course focused on disasters and emergencies that occur in many forms, from natural disasters to human instigated events.

We learned to develop a plan to deal with these events before they occur to mitigate the loss of access to information, in form of book collections, archives and digital materials. Methods used included case studies, lectures, role play, slide shows, demonstrations, hands on and disaster response mock drills.

For planning and preparedness, we had to prepare a dplan (disaster plan) which included information on facilities and buildings (emergency shut off, signs on main switches) building and risk assessment (involving landscape around the building, windows, ceiling leaks), the collection (in problem areas of the building, emergency exit and quick access, detectors, alarm system and fire extinguishers). There were also discussions on the roles of people on when and how to respond to a disaster and also utilizing emergency contact details at hand.

We were shown how to protect the collection through activities such as boxing, backup tapes off site, and correct shelving techniques. We also learned techniques in dealing with the aftermath such as different methods of handling various types of damaged books and other library materials (practices of drying wet and damaged books and dealing with mold, using simple copying paper or paper towels, fans, air and freezer drying).

We visited SYNTRA-WEST school in Brugge where they teach blacksmithing and web design techniques, including creative and artisanal bookbinding, paper restoration and conservation of books and archives.

My special appreciation and thanks go to UNESCO/IOC Project Office for IODE, Ostend project office administration, organizers and staff; Head Ocean Services IOC of UNESCO, USP Librarian Sin Joan Yee, former PIMRIS Coordinator Maria Kalenchits.



## **Building regional taxonomic capacity supports marine management and biodiversity conservation efforts – Marine Reference Collection based at the Division of Marine Studies, FSTE, The University of the South Pacific**

*Ed Lovell – School of Marine Studies, The University of the South Pacific*

*Johnson Seeto – School of Marine Studies, The University of the South Pacific*

*Victor Bonito – Reef Explorer, Fiji*

### Value in the Reference Collection

- Teaching tool for University teaching & other activities such as USP Open Day
- Tool for biodiversity and biogeography research & environmental impact
- Attract researchers both domestic & from abroad
- Promotes cooperation between institutions
- Repository for marine organisms from research
- Biodiversity science through voucher repository & catalogue
- Training of regional taxonomists
- Repository for voucher specimens for bioactive compound
- Showcase for dignitaries, schools, and community groups.

### Database Entries

- Coral – 922
- Algae – 1375
- Echinoderm – 132
- Molluscs – 1166
- Pisces – 1508
- Arthropoda (in process)



A collection of mollusks (9,000 specimens: 800 species) from the Astrolabe reefs and lagoon, Kadavu has been donated by Joan Koven, Astrolabe Inc.

The collection of hard corals (Scleractinia) and reef invertebrates is being upgraded with field and lab digital photographs, as well as expanded with new records and potentially new species as part of an ongoing effort to compile a checklist for Fiji and the Southwest Pacific.

### Status of the Collection

The collection contains about 8000 species of algae/seagrasses and about 5500 specimens of marine invertebrates and fish. The specimens are mostly Fiji collections. Peter Beveridge began collecting specimens in 1967. This collection was formally started in 1970 by Peace Corps volunteers, Mike Gawel and Bruce Carlson.

### Marine Collection Linkages

- Samoan Invasive Species Project
- Ocean Biogeographic Information System (OBIS)
- Pacific Island Network for Taxonomy (PACINET)
- Fiji Fish Project

## News from around the Region

### Riparian and Instream Surveying - Fiji

The WCS team in partnership with Wetlands International Oceania is in the field conducting freshwater fish and riparian forest surveys in Kubulau, Wainunu and Sasa in Macuata. The team is trying to answer a fundamental question for conservation and development, “What is the role of riparian (the interface between land and a river or stream) forest buffers in preserving in-stream fish abundance, diversity and water quality?” Similar research has shown that at least 30 m wide riparian buffers are necessary to maintain ecosystem functions and processes. However, this is the first time that this research is being done for tropical high islands whose river catchments are generally steeper, shorter and have specialized fish fauna and riparian forest, and the first time that it has been directly applied in Fiji.

In the first week in Wainunu, the research team recorded over 23 species of freshwater fishes and worked in mainly well-forested catchments with few invasive species. These areas seem generally well stocked with large gudgeons (*vo*) and flagtails (*ika droka*) and the water quality benefits from an abundance of riparian vegetation like Tahitian chestnut trees (*ivi*). However, as most of the fishes are migratory, major obstacles such as high waterfalls or hanging culverts bisect the stream and many of the fishes are prevented from going upstream no matter how well-intact the riparian forest. Maintenance of a wide and continuous riparian buffer strip around rivers will help preserve fish abundance and water quality. Building fish ladders into hanging culverts can also potentially help to increase fish abundance and diversity upstream.

The results of this research will be made available for local and national conservation and development planning and can also have application throughout the Pacific on similar high island ecosystems.



(Source: Vatu-i-Ra Community Bulletin, Vol.15 – WCSFiji website)

## **Solomon Islands vessel apprehended for illegal fishing**

*By Jeremy Inifiri*

Police intercepted and apprehended a fishing vessel allegedly fishing illegally inside our waters over the weekend.

The fishing vessel, believed to be owned by Global, a local company and license holder, was caught outside Choiseul Province and escorted back to Honiara by Police Patrol boat Lata. The vessel was one of two apprehended under Operation Kurukuru 2010, coordinated by the Pacific Forum Fisheries Agency (FFA), which involved 15 participating countries namely; Australia, Cook Islands, Fiji, France, Kiribati, New Zealand, Niue, PNG, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United States and Vanuatu. The other vessel was apprehended in Tuvalu.

Speaking to Solomon Star yesterday, Deputy Director Offshore of the Ministry of Fisheries, Ferald Lasi confirmed that the vessel had breached the Fisheries Act of 1998 and therefore it was brought to Honiara. He however said that this was no new case as they have cited the vessel doing such illegal fishing in the past.

"We have cited the vessel fishing illegally in areas it wasn't supposed to fish in, however we haven't the resources and capability to chase and bring it in.

"However we are indeed glad with the Operation Kurukuru as through coordinated operation itself, we've managed to bring the vessel in and have its fishing dealings investigated."

Mr. Lasi said that vessels that have license are only allowed to fish twelve miles outside the base line (offshore). Those that fish within the 12 mile will be apprehended as it is a breach of the Fisheries Act. He said that investigations are still underway and hopefully by the end of the week they will be able to determine if the vessel will be penalized or be released.

(Source: Solomon Star: <http://www.solomonstarnews.com/>)

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## **PACIFIC NATIONS CUT TUNA ACCESS BY 30 PERCENT**

*Licensed fishing days cut from 40,000 to 28,500*

A group of Pacific fishing nations has called for a near-30 percent cut in next year's tuna catch as concern about over-fishing increases.

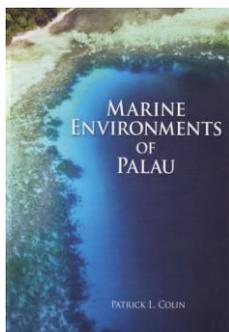
The eight members of the Parties to the Nauru Agreement group control waters where a quarter of the world's tuna is caught.

At a meeting in Majuro, in the Marshall Islands, they agreed to cut licensed fishing days from 40,000 to 28,469 next year, [a reduction of about 29 percent].

The PNA nations operate a system known as the "vessel day scheme", selling "fishing days" instead of licensing a set number of vessels to fish in the region.

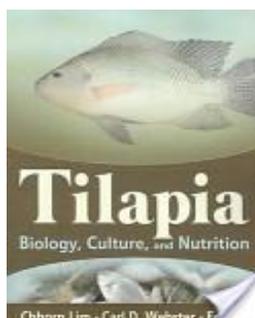
*More details: <http://pidp.eastwestcenter.org/pireport/2010/November/11-29-02.htm>*

## New Additions to PIMRIS Library



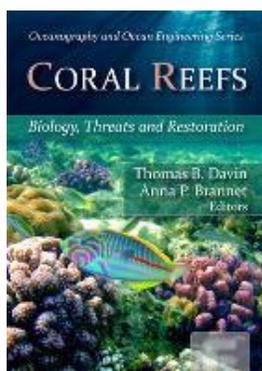
**Marine environments of Palau** by Patrick L. Colin. Koror, Palau; Honolulu: Indo-Pacific Press for Coral Reef Research Foundation: Mutual Pub., LLC, 2009. ISBN: 9780615274843.

This book details the shallow water habitats of the remarkable islands of Palau in the western Pacific Ocean. Considered one of the “Seven Wonders of the Underwater World,” Palau is renowned for its superb diving and snorkeling. This volume covers Palau as it has never been before, providing information not only on the popular spots that every tourist will want to visit, but also more remote and exotic habitats that are seldom seen.



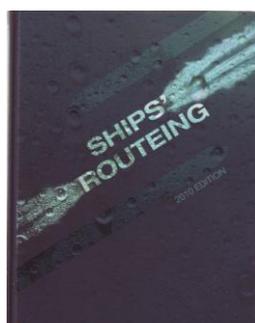
**Tilapia: biology, culture and nutrition** by Chhorn Lim and Carl D. Webster. New York: Food Products Press, c2006. ISBN: 1560223189 / 9781560223184.

Tilapia is the second-most cultured fish species in the world, and its production is increasing each year. However, for several reasons profit margins remain slim. *Tilapia: Biology, Culture, and Nutrition* presents respected international experts detailing every aspect of tilapia production around the world. Biology, breeding and larval rearing, farming techniques, feeding issues, post-harvest technology, and industry economics are clearly presented.



**Coral reefs: biology, threats and restoration** by Thomas B. Davin and Anna P. Brannet. Hauppauge, NY: Nova Science Publishers, c2009. ISBN: 9781606921043. 269pp.

Coral reefs are ancient and extremely complex communities functioning as a single unit. They are the 'rain forests of the sea,' containing the richest biodiversity of all marine ecosystems. This book examines the biological aspects of coral reefs and the importance of their existence. Environmental threats to coral reefs are reviewed (i.e., global warming, overfishing), and ways in which the coral reef ecosystem can be restored are also discussed. Marine ornamental fish play an extremely important role today in the international fish trade.



**Ships' routing** by the International Maritime Organization. 10<sup>th</sup> ed. London: International Maritime Organization, 2010. ISBN: 9789280142457 / 9280142453.

Both the safety of shipping and the cleanliness of oceans are promoted in many ways, one of which the continuing development of routing measures to control the navigation of vessels and to monitor their progress....This edition incorporates routing measures that have been adopted through May 2010.

## New Publications

### Journal Articles

Adams VM, Mills M, Jupiter SD & Pressey RL (2010). **Improving social acceptability of marine protected area networks: a method for estimating opportunity costs to multiple gear types in both fished and currently unfished areas.** Biological Conservation. DOI: 10.1016/j.biocon.2010.1009.1012.

Brander K (2010). **Impacts of climate change on fisheries.** Journal of Marine Systems, Vol. 79, Iss. 3-4, pp. 389-402. DOI: 10.1016/j.jmarsys.2008.12.015.

David G, Leopold M, Dumas PS, et al. (2010). **Integrated coastal zone management perspectives to ensure the sustainability of coral reefs in New Caledonia.** Marine Pollution Bulletin, Vol. 61, Iss. 7-12, pp. 323-334. DOI: 10.1016/j.marpolbul.2010.06.020.

Jenkins AP, Jupiter SD, Qauqau I, et al. (2010). **The importance of ecosystem-based management for conserving aquatic migratory pathways on tropical high islands: A case study from Fiji.** Aquatic Conservation Marine and Freshwater Ecosystems, Vol.20, Iss.2, pp. 224-238. DOI: 10.1002/aqc.1086.

Lamarche G, Pelletier B, Goff J (2010). **Impact of the 29 September 2009 South Pacific tsunami on Wallis and Futuna.** Marine Geology, Vol. 271, Iss. 3-4, pp. 297-302. DOI: 10.1016/j.margeo.2010.02.012.

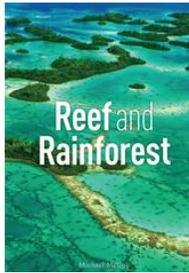
Rasalato E, Maginnity V, Brunnschweiler JM (2010). **Using local ecological knowledge to identify shark river habitats in Fiji (South Pacific).** Environmental Conservation, Vol. 37, Iss.1, pp. 90-97. DOI: 10.1017/S0376892910000317.

### Reports/Guidelines/Books

**The future of Pacific Islands fisheries** by Robert Gillett and Ian Cartwright. Noumea, New Caledonia: Secretariat of the Pacific Community (SPC), c2010. ISBN: 9789820004221.

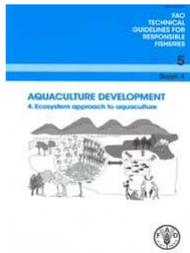
**WCS-Fiji marine biological monitoring handbook** by the Wildlife Conservation Society. Version 3.1. Suva, Fiji: Wildlife Conservation Society, 2010. 34 pp.

**Principles and practice of ecosystem-based management: a guide for conservation practitioners in the tropical western Pacific** by Pepe Clarke and Stacy Jupiter. Suva, Fiji: Wildlife Conservation Society. ISBN: 9789829120021.



**Reef and rainforest** by Michael McCoy. Melbourne, Australia: CSIRO Publishing, c2010. ISBN: 9780643096950. 256 pp.

*Reef and Rainforest* is a photographic portrayal of marine and terrestrial life in one of the world's most biodiverse regions – the tropics of north-eastern Australia, together with the South Pacific nations of Solomon Islands and Papua New Guinea... Along with the stunning photography, the detailed and reflective captions are drawn from the author's experiences.



**Aquaculture development. 4. Ecosystem approach to aquaculture.** FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 4. Rome, 2010, 66 pp., A5, PB. ISBN: 9789251066508. ISSN 1020-5292.

An ecosystem approach to aquaculture is a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity and resilience of interlinked social-ecological systems. Being a strategy, the ecosystem approach to aquaculture (EAA) is not what is done, but rather how it is done.



**Recent developments in the tuna industry: stocks, fisheries, management, processing, trade and markets** by Makoto, P.M.; Guillotreau, P.; Chin-Hwa, S.; Ishimura, G. FAO Fisheries and Aquaculture Technical Papers No. 543. Rome, 2010, 146 pp. ISBN: 9789251066201. ISSN 2070-7010.

This technical paper reviews world tuna fisheries, including fishing operations, stock conditions, management measures and socio-economic aspects of the tuna industry such as recent changes in processing, trade, marketing and consumer preferences.



**Climate change implications for fisheries and aquaculture: overview of current scientific knowledge.** FAO Fisheries and Aquaculture Technical Papers, 2009. ISBN: 9789251063477.

This document provides an overview of the current scientific knowledge available on climate change implications for fisheries and aquaculture. It contains three technical papers presented and discussed during the Expert Workshop on "Climate Change Implications for Fisheries and Aquaculture"(Rome, 7-9 April 2008).

## Conference & Workshop Notices

- 10 – 14 Jan 2011      **Sustaining Commons: Sustaining our Future**, Hyderabad, India. 13<sup>th</sup> Biennial Conference of the International Association for Study on Commons which is hosted by the Foundation for Ecological Recovery. Website: [www.fes.org.in](http://www.fes.org.in)
- 20 – 25 Jan 2011      **5th International Marine Debris Conference**, Honolulu, USA. Co-organized by the National Oceanic and Atmospheric Administration (NOAA) and the United Nations Environment Programme (UNEP). Website: [www.5imd.org](http://www.5imd.org)
- 27 Feb 2011            **Meeting of the Regional Steering Committee for the Pacific Islands Oceanic Fisheries Management Project (RSC6)**, Noumea, New Caledonia (SPC Headquarters).
- 28 Feb – 4 Mar 2011   **7th SPC Heads of Fisheries (HoF) Meeting**, SPC Headquarters, Noumea, New Caledonia.
- 24 – 31 Mar 2011      **5<sup>th</sup> International Conference on Community-Based Adaptation to Climate Change**, Dhaka, Bangladesh. Website: [www.bcas.net](http://www.bcas.net)
- 16 – 19 May 2011      **62<sup>nd</sup> Tuna Conference**, Lake Arrowhead Conference Center, California, USA. Website: <http://www.tunaconference.org>
- 23 – 26 Mar 2011      **21<sup>st</sup> Session of the International Oceanographic Data and Information Exchange Programme**, Liege, Belgium (UNESCO/IOC).
- 4-5 April 2011        **International Conference on Marine and Maritime Affairs (ICMMA)**, University of Plymouth, UK. Website: <http://www.icmma.info/>
- 4 – 5 April 2011      **Greenhouse 2011**. Conference is the latest in a series organized by CSIRO. Aimed at scientists and representatives from industry and government involved in the research and application of climate change science. Website: [www.greenhouse2011.com](http://www.greenhouse2011.com)