

MARINE STUDIES

Annual Report

2002

MARINE STUDIES PROGRAMME
INSTITUTE OF MARINE RESOURCES



The University of the South Pacific

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PART 1 : STRATEGIC ACHIEVEMENTS

CHAPTER 1 : EXECUTIVE SUMMARY

The **mission** of the USP Marine Studies Programme is to:

- **provide the necessary opportunities for Pacific Islanders to understand, conserve, develop, manage and utilize their living and non-living resources in a rapidly changing world**
- **provide Pacific Islanders with the widest possible range of opportunities for research, education, training and employment in the marine sector**
- **provide for improved collaboration between the University of the South Pacific, island nations, regional and international bodies in their common goals in the marine sector.**

The Marine Studies Programme (MSP) offered a wide range of undergraduate courses during 2002 in Marine Science and Marine Affairs, both on campus and by distance mode. A new course on the Law of the Sea (MS205) was approved. Active teaching links with other universities (eg. University of Long Island and Macquarie University) were strengthened. Twenty five students, most of whom were supported by Canadian funding (CSPODP-II), were enrolled at postgraduate level. Two of these students graduated with Masters degrees. CSPODP-II scholarships ceased in 2002. Several international marine scientists visited MSP and The Institute of Marine Resources (IMR). Research links with institutions in Nouméa, New Caledonia, were strengthened. Both MSP and IMR continued to attract external funding for equipment and other facilities. The external adviser for MSP visited in April and her Report was received in July.

The number of workshops offered by MSP and IMR increased significantly; topics included aquaculture, post harvest fisheries, and methods for surveying coral reefs. The United Nations Train-Sea-Coast course on Responsible Fisheries was validated and is now available for fee-paying participants. Working individually and collaboratively, MSP and IMR completed a series of research contracts on topics which included the social and economic impact of ice making

facilities for local fisheries in northern Vanua Levu, and the implications of exporting live reef food fish to California. Aquaculture emerged as an important research theme. The IMR continued to coordinate the Southwest Pacific's Global Coral Reef Monitoring Network of eight countries. Research publications remained steady with contributions to refereed journals, conference proceedings and books.

Significant staff changes included the resignation of Professor G Robin South in March. Professor South had coordinated MSP since its initiation in the early 1990's. Dr Veikila Vuki also resigned, and other staff went on study leave to complete their PhD studies. The MSP vacancies in Marine Geology and Ocean Law and Policy were filled, a postgraduate coordinator was appointed, and IMR secured two new staff. From March, MSP and IMR were jointly directed by Dr Cameron Hay in an acting capacity.

New office accommodation for the IMR staff was completed. The Seawater Laboratory facilities in MSP were rendered fully operational and a new research vessel was acquired. An opportunity for much better teaching and research facilities in coral reef ecology and aquaculture was presented when the Fiji Government generously offered the island of Makogai as a USP marine field station — an option that is being pursued.

CHAPTER 2: PROFILE

INTRODUCTION

Marine Studies is an interdisciplinary, university-wide programme, coordinated by the Professor of Marine Studies in collaboration with USP Schools and Institutes, and with the advice of the Marine Studies Programme Advisory Board whose membership includes representatives from Regional and international agencies and donor organisations.

The following are administered through Marine Studies:

- The Marine Affairs Programme
- The Marine Science Programme

- The Institute of Marine Resources (IMR)
- The Dravuni Island Field Station
- The Pacific Islands Marine Resources Information System (PIMRIS)
- The International Ocean Institute, Pacific Islands Regional Operational Centre (IOI-PI)
- The Marine Studies Training Programme (MSPTRAIN)

Marine Studies also provides support services to all marine-related activities at the University, including the operation of small boats and a dive facility for research.

The Institute of Marine Resources (IMR) began operation in 1978 on the lower Laucala Campus. In addition to research and consultancies, the IMR ran a three-year Diploma of Tropical Fisheries that contributed to the development of fisheries in the South Pacific by providing training for students in marine biology, maritime skills, fishing technology, fisheries management and socio-economics. Staff of the IMR also contributed to courses in the Biology Department (SPAS). In 1989, after review, the Diploma was suspended. It recommenced in 1994 in a different mode and ceased in 1998.

During the early 1990's the USP Council decided to relocate IMR to the Solomon Islands. While that move was eventuating, the new Marine Studies Programme was initiated under the direction of the second IMR director, Professor G Robin South who arrived in 1990. In May 1999, the University was given new facilities for IMR at Aruligo on Guadalacanal by the Solomon Islands Government. The site was excellent, about 25 km west of Honiara and adjacent to the Solomon Islands aquaculture centre. Sadly, the IMR facilities were destroyed during the ethnic troubles that currently afflict the Solomon Islands. The current IMR director came to Suva in April 2000, and accommodation and facilities were made available, indefinitely, for IMR on the lower Laucala Campus. Since 2000, IMR has become an integral part of the Marine Studies Programme. Currently, the six IMR staff are engaged mainly in consultancies and in teaching parts of several MSP courses.

FACILITIES

The Marine Studies facilities are located on the lower Laucala Campus, adjacent to Laucala Bay on a site that was previously an RNZAF flying boat base. The present facilities, gifted by the Government of Japan, were opened in 1998. This new complex houses the entire staff of the Marine Studies Programme, and parts of the IMR and the Institute of Applied Sciences (IAS). It is the nucleus for teaching, research and multidisciplinary approaches to Marine Affairs and Marine Science.

Office spaces: There are 26 office/laboratory stations. The administrative offices of the Marine Affairs Programme, Marine Science Programme, IMR, IAS, Pacific Islands Marine Resources Information System (PIMRIS) and International Ocean Institute (IOI-Pacific Islands) are housed in the main building. Most postgraduate students are dispersed throughout several of the offices, typically with two or three students per office. A special room, with study spaces for eight postgraduate students, was recently completed to alleviate a serious office shortage problem that becomes acute when there are visiting scientists. In 2000 an ex-RNZAF building was renovated to house additional IMR staff. It has four offices and sufficient space to accommodate IMR's library and equipment. Unfortunately, the modern marine studies complex does not have any space for a communal staff room where staff and postgraduate students can gather for morning tea, discussions etc.

Lecture halls and seminar spaces: There is a modern lecture theatre that seats two hundred people. This theatre is the hub of teaching in the complex, and is widely used by MSP and many other University Departments. An 84-seat seminar room that can be combined with a 15-seat tutorial room provides a flexible tutorial and classroom area, and is also widely used by other departments and organisations. A 20-seat conference room is much used for University meetings, for small workshops and occasionally as a work station (eg. for setting up MSPTRAIN). Because of the increasing requirements for workshops and seminars, the demand for seminar space far outstrips supply. In 2002 several MSP workshops were therefore held in government seminar rooms in Nausori.

Laboratories: MSP contains two 50-seat teaching “dry” laboratories with a common technical preparation area. Both labs are fully serviced and can be used for a wide range of disciplines. These labs can also be subdivided into four smaller units. A specialized post harvest fisheries laboratory with walk-in freezers is a valuable research and teaching facility much used in collaborative work between MSP and organisations such as IAS, SPAS, The Secretariat of the Pacific Community (SPC), NGO’s and government departments interested in post harvest fisheries development. The marine studies building also provides air-conditioned space for the Regional Herbarium (administered by IAS) and for USP’s regional marine collection, in which small laboratories are dedicated to preparing specimens and microscopy.

A Seawater Laboratory and Micro-algal culture room, together with water reservoirs of 30 Mt capacity, provide MSP with the capability to breed and rear a range of marine, brackish water and freshwater fish, shellfish and seaweed on an experimental and modest commercial scale. There is capability to pump seawater of variable quality directly from the lagoon in large volume; plus the capability to obtain high-quality ocean water from beyond the reef by water-tanker vessel. Supplying open-ocean water for the MSP’s Seawater Laboratory is, however, time-consuming and expensive. Recent improvements have enabled the laboratory to produce batches of saltwater shrimp *Penaeus monodon* for sale to private-sector shrimp farms. Rearing shrimp larvae is a technically demanding aquaculture activity, and represents a considerable achievement for MSP. The laboratory is equipped for large-scale micro-algae production and brine-shrimp *Artemia* production, thus providing the essential food-chain for the production or study of a wide variety of larval fish, crustacean and mollusc species.

A small laboratory was recently established for making DNA extractions and analyses (in collaboration with IAS) and funds were approved to convert a little used dark room into a specialized histology laboratory.

The new building also includes a marine geological sample preparation and analysis area. This contains basic equipment such as washing facilities, drying oven, wet and dry sieves, sieve shaker machines, rock cutting and thin sectioning equipment, balances and assorted glassware. Teaching materials are also stored here.

Field station: MSP operates a small field research station on Dravuni Island within the Great Astrolabe Reef, approximately 35 nautical miles south of the Suva campus in Kadavu province. One of the two buildings which comprises the field station offers two laboratories and rooms for a few researchers with showers and toilets. The new dormitory has seven rooms for two to four persons each. A large renovated kitchen completes the well-equipped facility. Transportation to the island is provided by an inter-island ferry, the *Bulou-ni-Ceva*, which departs twice a week from Suva. Previously, MSP ran a small Atoll Research Station on Tarawa Island in Kiribati. In recent years this was reduced to nominal status. The space that it occupied is now used by the USP Centre Director in Kiribati, and the station is closed.

ORGANISATIONAL STRUCTURE

The Professor of Marine Studies (and Coordinator of the MSP) provides academic leadership and is the administrative Head of MSP. The Director of IMR was appointed Acting Coordinator of MSP from March 2002, after the resignation of Professor Robin South. In addition, there are 11 academic staff and 21 administrative, technical and support staff. MSP's organisational and operational structures are depicted in Figure 1 and 2. An unusual feature of the Programme is that it reports to two schools: the School of Pure and Applied Science (SPAS) and the School of Social and Economic Development (SSED).

Figure1: Organisational Structure

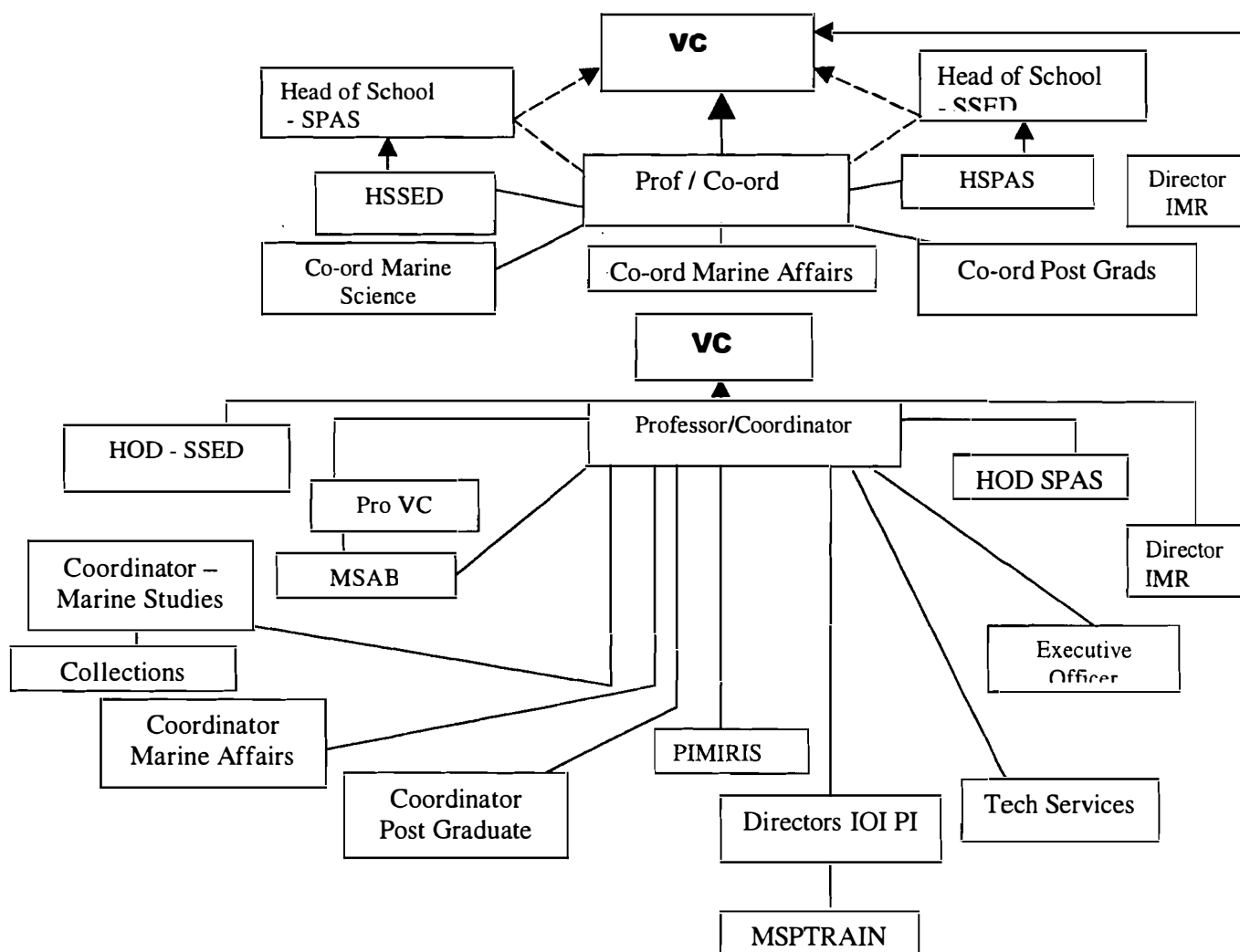
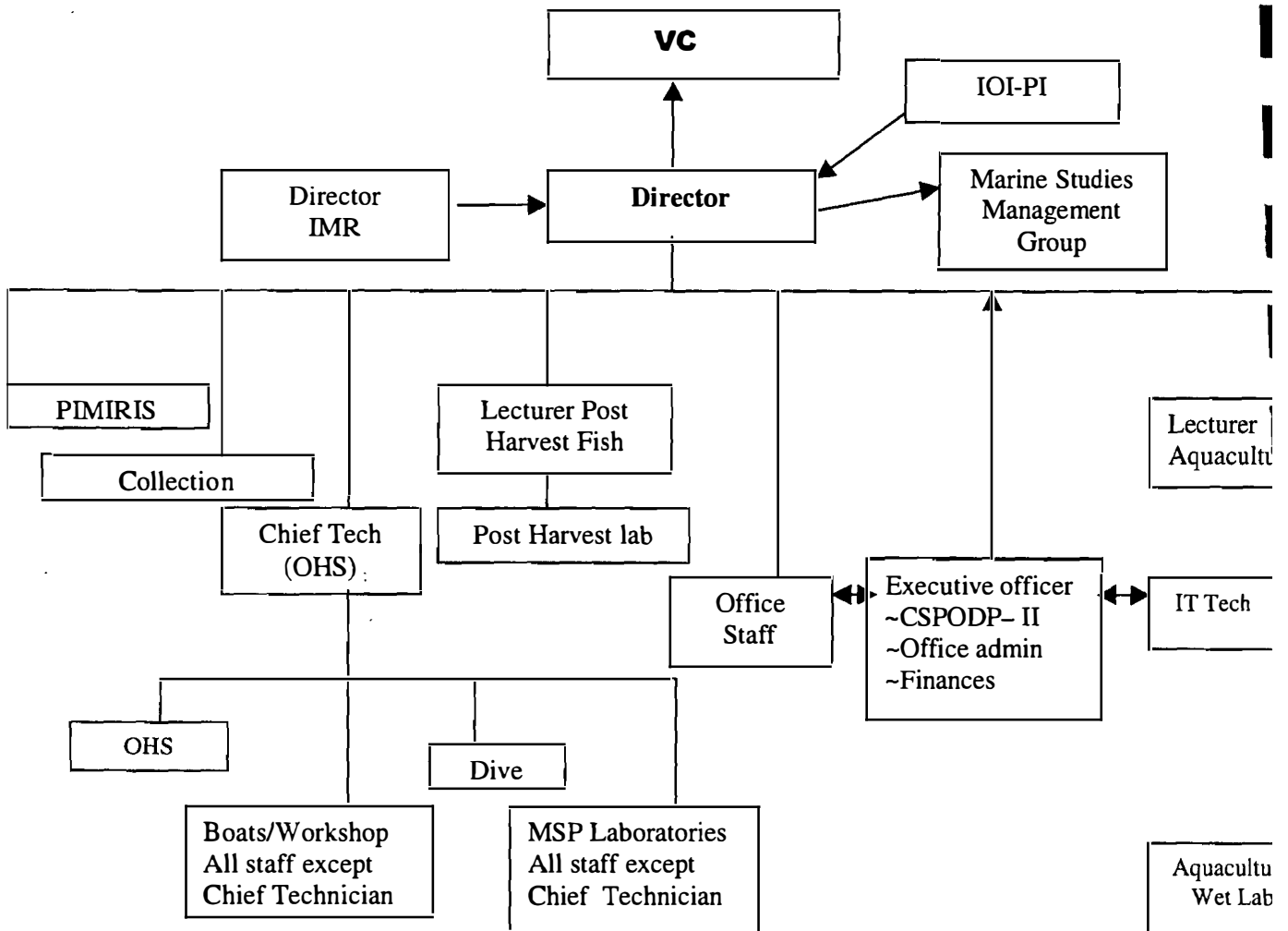


Figure2: Organisational Structure – Operation



TEACHING, RESEARCH AND TRAINING

Teaching

The following Marine Studies programmes are offered:

School of Social and Economic Development

- Certificate in Ocean Resources Management
- Diploma in Ocean Resources Management and Policy
- Diploma in Fisheries Economics and Management
- Bachelor of Arts (BA) in Marine Affairs (Double Major)
- Bachelor of Arts (BA) in Marine Affairs (Minor)
- Postgraduate Diploma in Marine Affairs
- Master of Arts (Marine Affairs)
- Doctor of Philosophy (Marine Affairs)

School of Pure and Applied Sciences

- Certificate in Earth Science and Marine Geology
- Bachelor of Science (BSc) in Marine Science
- Postgraduate Diploma in Marine Science
- Master of Science (Marine Science)
- Doctor of Philosophy (Marine Science)

Marine Affairs Programme

The Marine Affairs Programme (MAP), formerly known as the Ocean Resources Management Programme (ORMP), was established in 1986 initially as a collaboration between the University of the South Pacific and the Forum Fisheries Agency (FFA), and funded by the Government of Canada through the FFA. In that year it offered for the first time a course on Ocean Resources Management (UU301). This 300-level (final year) broadly-based interdisciplinary unit was open to students in both the arts and sciences.

ORMP has come a long way since 1986. Its name change in 1997 to the Marine Affairs Programme (MAP) is perhaps an indication of the new direction on which the programme has embarked. It is now a wholly USP programme under the Marine Studies Programme and administered under the School of Social and Economic Development (SSED). Ocean resources management and ocean governance are recognised to cover a much wider area than fisheries.

During 2002, two major academic challenges were facing MAP: the departure of Professor South and the subsequent vacancy of the professorship; and the first external review of the Marine Studies Programme. Despite the additional burdens, staff acquitted themselves most successfully.

MAP continues to contribute to the development of a cadre of people who are aware of the importance of the marine environment and the role of humans in the use and management of marine resources. The year 2002 witnessed a substantial increase in the number of students enrolled in Marine Affairs courses. The uptake of 2002 graduates into the workforce was encouraging, with the Fisheries Department being a major employer.

A total of 15 students took the Marine Affairs postgraduate diploma courses, several of whom will undertake Masters degrees in MAP. Both postgraduate courses are still on offer by demand and attract students from outside the MAP.

A short fieldwork to the western part of Viti Levu was undertaken during late August. Approximately sixty third year and fourth year students participated in the trip which provided practical exposure to the oceans and coastal issues examined in the classroom. The success of the fieldtrip underscores the value in providing these learning opportunities to Marine Affairs students.

The teaching staff consisted of Dr Joeli Veitayaki, Dr Nathan Evans who joined as Lecturer in Ocean Law and Policy, and Mr Alan Resture who took over from Ms Jese Verebalavu-Faletoes as Ms Vina Ram-Bidesi's replacement. Mr Seremaia Tuqiri taught the third year course on Integrated Coastal Zone Management, in semester 2. Ms Ram-Bidesi continues as a PhD student at the University of Wollongong and is due to rejoin Marine Affairs in mid 2003.

Dr Veitayaki went on sabbatical leave from the 15 September, his first after over ten years with the USP. The sabbatical was used to conduct research, work for the International Ocean Institute-Pacific Islands (IOI-PI), attend conferences and meetings, and take up a fellowship at the Australian National University. Places visited during the leave included Dakar in Senegal, Penang in Malaysia, Townsville in Queensland and Cape Town in South Africa. During this time Dr Evans assumed the role of MAP Coordinator.

Marine Science Programme

Dr. Timothy Pickering was appointed Coordinator Marine Science in 2002, as a means of linking MSP with the various SPAS departments through which Marine Science or other relevant courses are taught. The Coordinator's role has expanded to take on academic leadership of the Marine Science courses in a way equivalent to the existing Coordinator Marine Affairs.

Courses in Marine Science at both the undergraduate and postgraduate levels in 2002 were coordinated by: Johnson Seeto (MS111), Veikila Vuki (MS213 MS311 MS312 MS411) until her departure in September, Tony Chamberlain (MS204 MS313), Suzanne Pohler (MS211), Subhashni Appana (MS305 MS307), Tim Pickering (MS311 MS324 MS411 MS425) and Professor Paddy Nunn (MS415/416). Some of these courses, for example MS111 and MS204, were offered both on-campus and by distance-mode through University Extension. MSP also conducts jointly with SOPAC the Certificate in Earth Science and Marine Geology programme.

Teaching in 2002 proved a challenge because of the resignations of Dr Vuki and Professor South and by the absence of others (Milika Naqasima-Sobey, Vina Ram-Bidesi) on study leave. Dr Vuki's courses were later coordinated by Jone Maiwelagi with assistance from Veikila and Shereen Sharma. Dr Suzanne Pohler filled the Lecturer in Marine Geology post. Delays in filling the other vacancies means that two IMR staff (Lynette Kumar and Reuben Sulu) will facilitate courses during the first semester of 2003. Marine Science lecturers, however, continued to help teach in Marine Affairs courses. In Semester 2 the Climate Change Vulnerability and Adaptation Assessment courses MS415 and MS416 were again offered.

Courses and Student Enrolments

In 2002, the Marine Studies Programme had a total of 326 student enrolments in 16 undergraduate courses (10 Marine Science, and 6 Marine Affairs). This total comprised 155 student enrolments in Marine Science and 171 in Marine Affairs.

There were 9 courses taught at the postgraduate level (5 Marine Science, and 4 Marine Affairs) to 25 students: 16 in Marine Affairs and 9 in Marine Science.

Training

MSPTRAIN

MSPTRAIN is the training section of the MSP under which many training activities outside of the normal USP academic courses are managed, and coordinated.

MSPTRAIN was involved in workshops, courses and meetings during 2002. During the first half of the year, preparations were made for the first offering and validation of a regional Train-Sea-Coast course on the Code of Conduct for Responsible Fisheries. The MSPTRAIN Coordinator was a resource person in the climate change course on Vulnerability and Adaptation Assessment, the Code of Conduct for Responsible Fisheries, coordinated and team-taught the second semester Marine Affairs Programme course MS302: Principles of Integrated Zone Management.

National Activities: Two national workshops were coordinated by MSPTRAIN through the Post-Harvest Fisheries section on *Hazard Analysis and Critical Control Points (HACCP)*. This course contained the core training manual and curriculum developed by the U.S. Seafood HACCP Alliance to teach HACCP concepts for food safety. The workshop curriculum referenced and incorporated recommendations from the following U.S. agencies: National Advisory Committee on Microbiological Criteria for Foods; the U.S. Food and Drug Administration's (FDA) Fish and Fishery Products Hazards Control Guide; the U.S. FDA's mandatory seafood HACCP regulations (21 CFR 123); and other HACCP models. Demand and interest expressed by the private sector and Fiji's Ministry of Health led to the courses being offered twice, in August

and December . Funding for the first workshop was provided by the Secretariat for the Pacific Community (SPC) through AusAID fund allocation, and The University of the South Pacific (USP) through the Canada-South Pacific Ocean Development Programme (CSPODP).

Regional Activities: The following training activities were coordinated.

- *Responsible Fisheries in the Pacific Islands Region: The Implementation of Post-UNCED International Instruments* (or the *Code of Conduct for Responsible Fisheries*) Course, 24 June –5 July 2002. The primary objectives of this course were to: (a) use the 1995 FAO Code of Conduct for Responsible Fisheries and its associated technical guidelines and international plans of action (IPOA) as vehicles to review fisheries management options and issues including other instruments and arrangements in the Pacific Islands Region; and (b) build capacity among senior Pacific Island fisheries managers, representatives from the private sector, and non-government organisations in assessing and implementing responsible fisheries management.

Course preparation (writing and editing) was a collaborative effort between the International Waters Programme (IWP), based at the South Pacific Regional Environment Programme (SPREP), USP, a hired consultant (Dr Judith Swan), Forum Fisheries Agency (FFA), and SPC. A pedagogical expert funded by the Train-Sea-Coast programme of the UN Division of the Law of the Sea oversaw the course writing and delivery. There were a total of 13 participants.

- *Workshop on the Live Reef Fish Trade in the Pacific Region*, 16 – 20 September 2002. MSPTRAIN's role was as the local coordinator assisting SPC Nouméa with logistics.
- *Seaplant Workshops*, November 2002. Two regional workshops funded by UNDP and the Government of Canada were held consecutively, and targeted Pacific Island women in the local community with the purpose of empowering them with the knowledge and basic skills for income generation. These workshops were: *Health Care Product Development* (11 – 15 November); and *Sea Plants for Income Generation* (18 – 22 November). The women were also taught skills on income management.

The International Ocean Institute-Pacific Islands (IOI-PI)

The IOI has been associated with MSP from the beginning, and is involved in training and research. Instrumental in the setting up of the Ocean Resources Management Programme, which became the Marine Affairs Programme, the IOI offered in 1983 the first course in marine resources management at USP, which ultimately led to the development of the current courses.

The IOI as a global network continues to be one of the MSP's conduits into the global stage. The IOI was instrumental in the securing of funds for the constitution of the Marine Studies Facilities. In 1999, distinguished visitors including Heads of States, Ambassadors and dignitaries gathered at the MSP for XXVII *Pacem in Marebus*, IOI's annual conference.

The IOI has done much to promote USP and its contribution to ocean resources management in the Pacific. The two organisations complement each other's work. For example, the IOI-PI has funded the Women in Fisheries Network activities through Women and the Sea programme, financed globally through the Ocean Science and Research Foundation.

To date, the IOI has organised and funded over 32 training courses within the Pacific Islands region, most of which were conducted at USP. Over 140 Pacific Islanders have benefitted from these courses over the last two decades. In several instances, IOI training courses have resulted in the development of USP courses.

The IOI-PI provides MSP with support and expertise that it can use to its advantage in pursuing mandated tasks. IOI-PI arranged for two USP staff members (Mr Pita Tuisawau, and Ms Ala Lesuma from University Extension) to attend Train-Sea-Coast training in New York in 2002. The MAP and IOI-PI evaluated the JICA 3 years training programme on Aquaculture in the Pacific Islands.

The existing M-O-A with USP is being negotiated. It is hoped that the USP and IOI can agree to extend the operation of IOI-PI which is regarded as one of IOI's most important and successful centres. In 2002, IOI-PI transferred \$242,893.02 to cover USP's expenses since 1997. A new system of payment and reporting has been agreed with the USP Bursary .

The SEREAD (Scientific Educational Resources and Experience Associated with the Deployment of Argo Drifting Floats in the South Pacific Ocean) Project was transferred from IOI/ USP to

NIWA during 2002, despite opposition to the transfer. IOI-PI is no longer involved in this initiative. Dr Than Aung (Physics Department) and Professor South (IOI-Australia) have severed ties with the project.

The Director attended the first regional IOI-Centres meeting in Townsville in October. The discussions identified future activities of the Centres and potential for collaborations. In December, the Director attended the PIM Conference in Cape Town.

The IOI-PI thanks all the people who have assisted in its work in 2002, including the Secretariat and support staff at MSP, and the staff of USP and SOPAC.

Research

Research at MSP focuses on inshore tropical marine ecosystems and atolls from both the natural science and social science viewpoints.

The current research areas include:

- Aquaculture
- Post Harvest Fisheries
- Fisheries Biology
- Coral Reef Ecology
- Marine Sedimentology
- Marine Natural Products Chemistry
- Customary Marine Tenure
- Integrated Coastal Zone Management
- Community based Marine Resources Management
- Socio-economics of Fisheries
- Marine Biodiversity
- Invasive Species

MSP also conducts collaborative research with a variety of institutions worldwide, as well as with Regional organisations, national governments and the private sector in the Region.

Research Grants & Consultancies

Research funding worth approximately \$35,000 was obtained from the University Research Committee and \$35,000 from overseas governments. Approximately \$175,000 (Gross) was received from eight consultancies.

CHAPTER 3: STAFF LISTING

New appointments in 2002

Hay, Cameron, H. BSc (Hons) , PhD <i>Cant.</i>	Acting Coordinator, MSP
Evans, Nathan, BSc (Hons) <i>Murdoch</i> , PhD <i>Tas.</i>	Lecturer in Ocean Law & Policy
McArthur, Alastair, J. BSc (Hons) <i>Strath</i> , PhD <i>Nott.</i>	Postgraduate Coordinator
Pohler, Suzanne, MSc <i>Bonn</i> , PhD <i>Newfoundland</i>	Lecturer in Marine Geology

Departures

South, Robin, BSc (Hons) PhD DSc <i>Liv</i> , FLS	Coordinator & Professor Marine Studies
Vuki, Veikila, BSc <i>S. Pac</i> , MSc <i>James Cook</i> , PhD <i>Southampton</i>	Senior Lecturer in Oceanography

Academic Staff

Hay, Cameron H, BSc(Hons), PhD <i>Cant.</i>	Acting Coordinator
Bidesi, Vina Ram, BA <i>S. Pac.</i> , MSc <i>Kagoshima</i>	(on study leave)
Chamberlain, Tony, BSc <i>NSW</i> , MAppSc <i>AMC</i>	Lecturer in Post-Harvest Fisheries
Evans, Nathan, BSc (Hons) <i>Murdoch</i> , PhD <i>Tas.</i>	Lecturer in Ocean Law & Policy
Maiwelagi, Jone, G5 Master <i>FIT</i>	Fisheries Training Officer
McArthur, Alastair, J, BSc (Hons) <i>Strath</i> , PhD <i>Nott</i>	Professor and Postgraduate Coordinator
Pickering, Timothy, BSc(Hons), PhD <i>Well.</i>	Senior Lecturer in Aquaculture
Pohler, Suzanne, MSc <i>Bonn</i> , PhD <i>Newfoundland</i>	Lecturer in Marine Geology
Resture, Alan, BA PGD <i>S.Pac.</i> , MA <i>Hawaii</i>	Assistant Lecturer in Ocean Resources Management

Seeto, Johnson, BSc *S.Pac.*, MSc *Otago*

(on study leave)

Veitayaki, Joeli, BA, MA *S.Pac.*, PhD *ANU*

Senior Lecturer and Coordinator,
Marine Affairs

Administrative Staff

Bulai, Nanise

Secretary

Liwaiono, Fulori

Clerk/Typist

Naco, Susan

Clerk/Typist

Tuqiri, Seremaia, BA *S. Pac.*, Dip Mar Aff *Dal.*

Training Coordinator

Work, Georgina B., Agr *S. Pac.*, MBA *RMIT*

Executive Officer

Technical & Other Support Staff

Buruso, Waisake

Caretaker

Chand, Suren

Fish Assistant

Dawainavesi, Vilitati

Handyman

Dunn, Bani

Lab Attendant

Lavaki, Sunia, Cert Mar. Eng HigherNatDip *UK*

Chief Technician

Lesavua, Jope, G4 Master *FIT*

Fisheries Officer

Lima, Jone, Dip Med Lab Tech *FSM*

Senior Technician

Malo, Sidney, BSc, *S.Pac* Dive Master *PADI*

Field Technician

Manueli, Fiu, Instructor, Cert. *PADI*

Dive Officer

Patel, Hitesh, BTech *S.Pac.*

IT-User Assistant

Rokosuka, Semesa, G4 Cert Eng.,

Engineer

Cert Fitt & Mch, *FIT.*, MTP *AMC*

Sharma, Shiv, BSc, *S.Pac*

Technician

Singh, Rudra, MVM Qual.level *FNTC*

Asst. Engineer

Tulele, Netani, CL 6 Master Eng *FIT*

Mate

Varinava, Timoci, Cl 6 Master Eng *FIT*

Deckhand

Institute of Marine Resources

Hay, Cameron, BSc (Hons), PhD *Cant.*

Director

Forbes, Alex, BSc, MSc, PhD *Hawaii*

Honorary Research Fellow

Kumar, Lynette, BSc, MSc <i>S.Pac.</i>	Scientific Officer
Molea, Toata, BSc, MSc <i>S. Pac.</i>	(on study leave)
Sulu, John, BSc, MSc, <i>S.Pac.</i>	Research Fellow

Pacific Islands Marine Resources Information System

Kuruvoli, Simone, Cert. Lib. <i>S. Pac.</i>	PIMRIS Assistant
Lal, Subashni	Junior Library Assistant (temporary)
Rao, Ganeshan, BSc Ed Dip Admin St <i>S. Pac.</i> , Cert Lib Mgmt <i>Wash.</i> , MLSc <i>Br Co</i>	PIMRIS Coordinator

International Ocean Institute Pacific Islands Operational Centre

Liwaiono, Fulori	Clerk/Typist
Veitayaki, Joeli, BA, MA <i>S. Pac.</i> , PhD <i>ANU</i>	Director

The Marine Studies Programme Advisory Board*

Pro Vice Chancellor (Laucala) [Chairman]
Deputy Vice Chancellor
Professor and Coordinator of Marine Studies
Director of Planning & Development
Director, Institute of Marine Resources (IMR)
Director, Institute of Applied Sciences (IAS)
Director, International Ocean Institute - Pacific Islands (IOI)
Director, Pacific Centre for Environment and Sustainable Development (PACE-SD)
Head of School of Pure and Applied Sciences (SPAS)
Head of School of Social and Economic Development (SSED)
USP Bursar or nominee
University Librarian
Marine Studies Programme (MSP) Postgraduate Student representative
Fiji Government Representative
South Pacific Applied Geoscience Commission (SOPAC) representative

Fiji Department of Fisheries representative

Japan International Cooperation Agency (JICA) representative

Canada-South Pacific Ocean Development Programme (CSPODPII) representative

United Nations Development Programme (UNDP) representative

In Attendance

Coordinator, Marine Science

Coordinator, Marine Affairs

PIMRIS Coordinator

Training Coordinator, MSP

Convenor, Women & Fisheries Network

Executive Officer, MSP (Secretary)

*includes the IOI Advisory Board

CHAPTER 4 : SERVING THE REGION

Aquaculture

A joint SPC/USP Aquaculture Meeting was held at USP in Suva during March under the auspices of the SPC-coordinated Regional Aquaculture Strategy. This was a priority-setting exercise for aquaculture in the Pacific island countries. The participants included aquaculture practitioners from PIC governments, the private sector, and regional and international organisations. The outcomes of this meeting reinforced conclusions from earlier consultations for the USP04 project, in identifying freshwater prawn, tilapia fish, blacklip pearl and seaweed as front-runners among the various aquaculture commodities available for development in the region.

Taking its lead from these outcomes, the CSPODPII funded project USP04 “Aquaculture Training” continued into its second year and provided training in the farming of these four commodities. A series of short courses for rural farmers on prawns and tilapia were run in

Nausori and Sigatoka by IMR trainer Satya Nandlal, in collaboration with the Fiji Fisheries Department. These were well received. There is a high demand for such courses in Fiji, and requests from Tonga and Vanuatu are also coming for these courses and for training attachments. A seaweed farming video was filmed at Kiuva Village by USP Media Centre and MSP in collaboration with the Fiji Fisheries Department, and is now being translated into vernacular languages for the region. The Solomon Islands Pidgin version has already been used for SPC-funded training workshops held for seaweed farmers in the Solomon Islands. Two regional Shrimp Aquaculture Workshops were hosted at Laucala Campus in October, with attendance by about forty people from USP and SPC countries.

Fisheries Development

MSP has been registered as a Royal Institute of Public Health Training Centre for Food Hygiene and Sanitation and for HACCP courses. A Fish Handling module was developed for the Fiji Institute of Technology's Maritime School's Fisheries Deckhand Certificate. This module is being incorporated into the curriculum and will be offered on a regular basis pending a current audit of the Deckhand certificate.

USP has joined a major UK-based consortium to be listed as a preferred provider for a large EU-ACP Strengthening Health Condition of Fishery Products project. This project has started through the Post Harvest fisheries section (Mr A Chamberlain) and will react to national proposals from within the region. It is anticipated that USP will be a service provider for this project.

Marine Affairs Programme

Staff were heavily involved in outreach work for people in the local communities and governments, as well as internationally.

Dr Nathan Evans and Dr Joeli Veitayaki were the resource people at SOPAC's Regional Maritime Boundaries Project Consultation in Nadi, during April. Both presented papers to regional participants who are responsible for boundary delimitation in their countries. It is

intended that a three year project to complete this initiative will commence in the new year, with inputs from MAP staff.

As part of their mangrove management initiative, IOI-PI and MSP jointly organised a national stakeholders' meeting in November at which the status of mangrove use and management was the focus. The meeting, which was funded by SPREP, was a follow up to the regional mangrove workshop in July 2001. The workshop heard representatives from different organisations involved in the use and management of mangroves. It was decided that funding be sought to continue the work of the mangrove management initiatives within Fiji. The mangrove database that had been put together is undergoing validation and should then be available publicly. It is hoped that the database will further research in this area as it aids the availability of previous research findings.

PIMRIS

The PNG National Fisheries Authority and PNG Fisheries College were provided with in-country technical assistance in marine information management from 28 January to 13 February. Their libraries were organised, a library database was setup, and staff training was provided. Akosita Seru (Fiji Fisheries) and Ulusapeti Tiitii (Samoa fisheries –sponsored by SPC) were attached to PIMRIS from 18-29 November 2002. The skills covered during the training included: basic library skills, internet searching, library database development using CDS/ISIS software, and networking to facilitate information sharing.

Post Harvest Fisheries

USP-CSPODP II Post Harvest Fisheries Development Project educational and community training resources were distributed to fourteen Pacific Island countries. Sub-regional train-the-trainer workshops were conducted in Vanuatu, Fiji, Samoa and Cook Islands for Health, Fisheries, Education and NGO officers. More of these educational resources will be reprinted and sent to Fijian, Tuvalu and Kiribati Primary and Secondary Schools alongside comprehensive teacher-training programs. This activity is being developed in collaboration with the International Marine Alliance and the International Ocean Institute.

The Fisheries Module for the Secretariat of the Pacific Community's Community Education Training Centre (CETC) program ran again in the Seafood Village. The success of this module is largely due to contributions from USP staff and students such as Tony Chamberlain, Johnson Seeto, Jone Maiwelagi, Jese Faletosese, Aliti Vunisea, Samasoni Sauni, and Gabriel Tiūli. The training materials used were developed as part of the C-SPODP II Post Harvest Fisheries Development Program.

A series of four sea plant utilization workshops were run towards the end of the year with assistance from Dr Irene Novaczek from Prince Edward Island. This training has had positive impacts, and the Foundation of the People of the South Pacific-International (FSPI) is proposing a 4 year sea plant utilization project in collaboration with USP.

CHAPTER 5: STUDENT FOCUS

Library tutorials were conducted by PIMRIS for science students on the use of scientific indexes and abstracts. These included: *Biological Abstracts*, *Aquatic Sciences & Fisheries Abstracts (ASFA)* via Internet and CD-ROM versions, and *Chemical Abstracts*. Instructional sessions were also conducted on the use of reference publications, web-searching, and research skills. The tutorials were organised in liaison with lecturers and the Reader Services of the USP Library. A total of 721 students benefitted from specific information literacy sessions coordinated and/or conducted by PIMRIS staff. A specific display in PIMRIS educated users on mutilation.

The MSP provided a new photocopier for student use, while the Library provided paper and ink for a card operated machine – a service similar to that offered in the main USP Library.

A problem for students has been the steady decline in the number of computers available for their use. Originally, fifteen computers were supplied by the Japanese Government but only three remained operational by the year's end. Using funds provided by CSPODP II, six new computers were made available to postgraduate students. These were securely housed in a dedicated space. As a stop gap until new computers can be bought, the Mathematics and Computing Science department kindly donated a dozen elderly but functional computers for MSP's undergraduates, thereby rendering their computer laboratory fully operational. The permanent appointment of an

IT-user assistant, Mr Hitesh Patel, to MSP has helped many students faced with computer problems.

The end of the CSPODPPII scholarships concerned many impending postgraduate students. Considerable efforts are therefore being made by all MSP staff to secure new scholarships from other sources. However, this is proving difficult because the generous funding of the CSPODPPII project is a hard act to follow, especially when other donor countries do not attach such high priority to postgraduate scholarships.

Recent academic resignations disadvantaged several postgraduate research students who found themselves without supervisors. Professor Alastair McArthur was therefore appointed Post-Graduate Coordinator and students have been encouraged to inform him of any supervisory or other problems that they face. Alastair is also proactively interviewing all of the students to update MSP on their progress. Many postgraduate students have embarked on marine biological topics, but MSP currently has only two staff who are suitably qualified to be their supervisors. Efforts have therefore been made to obtain external supervisors. In one case, a Professor of Zoology from a New Zealand University came to Fiji to assist the student with data analysis and thesis writing.

Student complaints about the antiquated nature of MSP's diving equipment prompted efforts to provide new sets of equipment. During 2002 the IMR made six new sets of scuba diving equipment available for immediate student use until funds were secured to replace all of MSP's diving equipment. Concerns about student safety on field trips were addressed and new radios were supplied for the larger of MSP's boats. A new vessel, ideally suited for postgraduate research, was also made available.

Student concerns about the lack of any common room where they might meet staff and congregate were addressed. Medium works funds to renovate a large IAS chemistry laboratory exclusively for postgraduate students in MSP and IAS were approved in principle, though no funding materialised. It now seems likely that IAS alone will fund these renovations to provide space and facilities for postgraduate students in Marine Studies.

The absence of suitable laboratory facilities and tools for postgraduate students was also a concern. For example, the microscopes are in a lamentable state, without a technician with the qualifications or expertise to maintain and repair them. Efforts were made to rectify the scarcity of histology equipment. So far, IMR has provided a new Reichert Jung Histocut II microtome, and a space has been reserved for a histology lab. Funding was approved to modify the room accordingly, by installing a fume cupboard and window. In the meantime two students who needed access to good histological facilities, and otolith grinding facilities, were sent to James Cook University, Townsville, to learn the procedures and process their specimens. In conjunction with IAS, a DNA laboratory was established and it is anticipated that this facility will shortly be used by postgraduate students.

CHAPTER 6 : MAJOR RESEARCH ACHIEVEMENTS

There were several important advances in research, especially in aquaculture. Mr Avinash Singh achieved a breakthrough by successfully rearing larvae of fire shrimp, *Lysmata debelius*, a valuable marine ornamental species, through to the juvenile stage. This feat, which takes 100 days, has so far been achieved in only four other laboratories in the world. Dr Tim Pickering, Ms Dilpreet Kaur and Ms Monifa Fiu demonstrated that aquacultured live rock made from cement and sand functioned as an aquarium biofiltration medium equally as well as natural live rock harvested from coral reefs — an advance that may help to ease pressure on coral reefs from the harvest of marine aquarium products for export. Dr Alec Forbes (IMR Research Fellow) successfully produced post-larvae of the black tiger shrimp, *Penaeus monodon*, and discovered the presence of another valuable species (the kuruma shrimp, *Penaeus japonicus*,) in Laucala Bay. Mr Feral Lasi estimated the fishing mortality of three species of emperor fish in Suva Lagoon by analysing length-frequencies and otolith rings. This was the first applied fisheries research project on commercially important fin fish to be completed by MSP in the last decade. Mr David Boseto discovered several new species of freshwater fish in his electric-fishing survey of Fijian inland streams. Ms Mere Namudu produced a socio-economic survey technique to select rural communities that are suitable for establishing commercial seaweed aquaculture. John Reuben Sulu completed his Masters thesis in Marine Science entitled: 'Studies on the effect of nutrients, salinity and temperature on growth rate, agar yield and agar quality of the rhodophyta *Gracilaria maramae*'. His research showed that the growth of *Gracilaria maramae* increased

with nutrient levels, up to 300 µM, above which nutrients became toxic and inhibited growth. Nutrient levels affected agar quantity and quality. Optimum salinity for growth was 18-18 ppt (parts per thousand). There was an interaction between temperature and salinity on the growth of *Gracilaria maramae*. For more details refer: *Pacific Collection - General - QK 569 .G8 S85 2002*.

CHAPTER 7 : INTERNATIONAL ACTIVITIES

Dr Joeli Veitayaki presented a paper to the *Sustaining Seascapes Conference* in March at the New York Museum of Natural History. The paper was well received and is to be printed on the Museum's website. Useful contacts were made during the visit and at least one overseas student is now working with Dr Veitayaki because of his presentation.

In April, Dr Veitayaki attended the *Millenium Assessment Workshop* in Darwin with Ms Bale Tamata from the Institute of Applied Science. They identified a number of sites that could be included in the Millenium Assessment.

In May, Dr Joeli Veitayaki and Mr Alifereti Tawake presented a series of lectures at the University of Rhode Island's Coastal Resource Centre as part of their Summer Training Institute.

Dr Nathan Evans attended the 2nd *International Fishers' Forum* in Honolulu during November. This successful meeting examined the bycatch of seabirds and sea turtles in long line fisheries. As well as providing current practice and policy in bycatch mitigation, the meeting will hopefully stimulate future training and consultancy opportunities in this increasingly important area of research.

Dr Cameron Hay was invited to review research reports and studies on coral reef management at a workshop held at the Research Institute for Subtropics (RIS) in Naha, Okinawa in March 2002. During August he participated in a workshop on developing industry standards for the live reef food fish trade held in Townsville, Queensland, followed by the Pacific Regional Live reef Fish Trade Management Workshop in Suva in September, and a workshop explaining accrediting procedures as proposed by the Marine Aquarium Council (Suva, October). These workshops on

the live reef food fish trade proved advantageous to the IMR which secured a consultancy with an American Company on defining biosecurity and other issues associated with exporting live groupers from Fiji to California.

Staff of MSP represent the University on the CROP Marine Sector Working Group. They were instrumental in having education and local capacity building included as important issues in the Forum-funded Oceans Policy Document which was presented at the 2002 Earth Summit meeting in Johannesburg.

CHAPTER 8: COMMERCIAL ACTIVITIES

IOI-Pacific Islands and Marine Affairs jointly evaluated the *JICA Training in Aquaculture* course that was conducted in Fiji and Tonga for 3 years. The evaluation involved a trip to Tonga by Alan Resture. The Marine Affairs team presented a report to JICA.

During the inter-semester period, Marine Affairs staff delivered the first offering of the training course *Responsible Fisheries in the Pacific Island Region*. This 2-week course was developed and funded under the Train-Sea-Coast Program administered by the UN Division of Ocean Affairs and Law of the Sea. It is hoped that other offerings and adaptations of the course will follow.

The Director IOI-PI coordinated the regional *Global International Waters Assessment* during August and September, which was done in association with IOI-Australia where Professor South is now working. The project is funded by GEF and executed by SPREP.

In November Dr Joeli Veitayaki and Alan Resture joined Dr Padma Lal, Ms Meg Keen, Dr Paula Holland and Mr Isoa Korovulavula to formulate a course on *Economics for Community-based Projects* using the Train-Sea-Coast method. The meeting was successful in setting the tasks and outlying the modules to be developed.

The saltwater shrimp *Penaeus monodon* hatchery in the Seawater Laboratory at MSP was established in collaboration with a private sector partner, Gulf Seafoods (Fiji) Ltd. The capability to breed *monodon* at USP became possible by various upgrades to the Seawater Laboratory, funded from the USP04 project. Gulf Seafood funded further improvements to the seawater

intake and water storage capability of the Laboratory. The Gulf Seafood shrimp team was headed by Dr Alec Forbes (Honorary IMR Fellow) who employed three graduates of the 2001 MS324 Aquaculture class. The shrimp hatchery at MSP presents a marvelous on-going training opportunity for staff, students, and selected regional participants. To breed *monodon* successfully requires a dedicated team working around the clock, requirements beyond the capability of USP staff alone.

With minimal staff, the IMR completed four profitable commercial contracts and, in addition, administered the Southwest Pacific Node of the *Global Coral Reef Monitoring Network* for which it received funding from CSPODP II and from the IOI. This included running a 14 day “Train the Trainers” workshop in October for which expertise was obtained from the NGO, Greenforce, and from the University of New Caledonia. IMR staff also assisted with MSP academic courses and several aquaculture courses for which they were reimbursed salaries.

Whether the IMR made a profit in 2002 depends entirely upon the University reimbursing IMR the salaries of staff for the periods that they spent working for the Marine Studies Programme, on teaching and coordinating tasks that arose from MSP staff resignations. If the reimbursements are made from these salary savings in MSP, then the IMR made a profit of about \$60,000. If they are not considered, then IMR operated at a small loss in 2002.

PART 2 : ACADEMIC AND RESEARCH-RELATED ACTIVITIES

CHAPTER 1 : DEVELOPMENTS IN TEACHING

The External Advisor's Report commented on the content of undergraduate and postgraduate courses, as well as on the skills which Marine Studies students need to have when they graduate.

The Marine Science staff discussed the need to improve the structure and cohesion of the undergraduate degree programme, and provide more cross-disciplinary depth and breadth so that Marine Science issues can be adequately addressed. In 2002 staff decided to revise the Marine Affairs course MS301 to reflect the suggestions made by the External Advisor. After the revisions are tested satisfactorily with on campus students, corresponding changes will be made to the version taught by distance mode. A new course entitled Law of the Sea (MS205) was approved.

The year required a sterling effort by the Marine Science teaching staff who had to cope with the departures of Professor South and Dr Vuki. The process of appointing replacements was still ongoing by year's end. During the year MSP welcomed Dr Susan Pohler into its ranks as a marine geologist, and Dr Nathan Evans whose interests include oceans law and policy. Professor Alastair McArthur was appointed to assist with the supervision of the postgraduate research students. Dr Tim Pickering was promoted to Senior Lecturer.

CHAPTER 2 : OTHER STUDENT MATTERS

New CSPODPII scholarship awards were offered to Mr Ryan Goundar, Mr Samasoni Finikaso, Mr Rudolf Dora, Ms Dilpreet Kaur and Ms Malama Momoemausu for PG Diploma and Masters study. Ms Shereen Sharma received a scholarship from IRD – ORSTOM (Noumea) to pursue a Master of Science programme. Seven students were enrolled on PhD programmes in Marine Studies: Mr Samisoni Sauni (Tuvalu), Mr Johnson Seeto (Fiji), Mr Satya Nandlal (Fiji), Mr Posa Skelton (Samoa), Mr Temakei Tebano (Kiribati), Mr Gabriel Titili (Solomon Islands), and Ms Jese Verebalavu (Fiji). Mr John Reuben Sulu (Solomon Islands) received his Masters degree. Mr Toata Molea continued his PhD studies on the live reef fish trade at James Cook University. Mr

Anthony Chamberlain was enrolled for PhD studies at USP on developmental issues in post-harvest fisheries.

CHAPTER 3 : RESEARCH

Marine Studies research in 2002 covered diverse areas of interest including aquaculture, coral and fisheries biology, marine algae, tuna histamine levels, integrated coastal zone management, fisheries access agreements, critical impact analyses, and students' attitudes towards the marine environment. Much of this research was conducted by postgraduate students, guided by their academic supervisors.

Research in aquaculture was concerned mainly with tilapia fish, shrimp/prawn feed trials, and marine aquarium species. Mr **Kalo Pakoa** researched the aquaculture of Corallomorph. Mr **Satya Nandlal** focussed on *Macrobrachium* aquaculture. The life cycle of this commercially important native species has never been completed successfully anywhere in the world. After several attempts, stage 6 (of the possible 11 stages) of the life cycle has been attained. Mr Nandlal is studying mud crabs (*Scylla serata*), and grow-out pond trials at Montfort Brothers Fish farm continue. His results showed that juvenile crabs, weighing on average 50 g and fed on a trash *Tilapia* diet, attained weights of 600 to 900 g in 4 months. Satya is also working on stock improvement of *Tilapia* in collaboration with the Fisheries Division, Fiji, Queensland University of Technology and the World Fish Centre. Mr **Avinash Singh** investigated the fire shrimp, a species of the cleaner shrimp group that by removing parasites is important to the overall health of many reef organisms. By culturing his ornamental species through its long larval life cycle over about ninety days, Mr Singh defined the number of larval stages. He also tested feeds to increase growth rates, and the production of eggs and larvae. Aquaculture socio-economics was also studied, with a project on seaweed by Ms **Merekeleni Namudu**. Ms **Dilpreet Kaur** and Ms **Monifa Fiu** conducted experiments on the nitrification capabilities of aquacultured versus natural "live rock".

In fisheries research, Mr **Ferral Lasi**'s study of the age, growth, mortality and reproductive biology of three species of Emperor fish in the Suva Lagoon neared completion by the end of the year. Mr **Samasoni Sauni** studied the impact of the 2000 coral bleaching on inshore fisheries in Fiji. Mr **Ribanataake Awira** studied the impact of commercial fishing on the spawning

aggregation and the population dynamics of groupers in Kiribati, and he considered the development of a village-based management system. The influence of temperature and handling procedures, post-harvest, on histamine levels in skipjack tuna was explored by **Mr Gabriel Titili**. **Cameron Hay**, **Lynette Kumar**, **Reuben Sulu** and **Satya Nandlal**, working with Fiji Fisheries staff, began a survey of ciguatera poisoning in Fijian waters and in local markets. **Mr David Boseto** began a study of Fijian freshwater fish on Viti levu and Taveuni using electric fishing methods and is reviewing the list of Fijian freshwater fish in the region. At least two new species have been found along with several new Fijian records.

Several projects were concerned with marine algae. **Mr Aisake Batibasaga** studied the *Kappaphycus* farming industry in Fiji. **Mr Anir Lal** investigated benthic marine algae of Majuro Atoll, Marshall Islands, and **Mr Posa Skelton** studied marine algae in Samoa. Mr Skelton assessed the flora for introduced species, with two possible candidates (*Spatoglossum* sp. and *Codium arenicola*). When he surveyed Pago Pago Harbour and other sites in Tutuila Island, American Samoa, for introduced algae in collaboration with the Bernice P. Bishop Museum, he discovered an exotic species of *Grateloupia* sp., possibly recently introduced, while *Gracilaria ephemera*, found in Apia, was new to science. **Dr Cameron Hay** (working with Jane Turnbull) wrote a review of seaweeds likely to become invasive in New Zealand.

Dr Susanne Pohler, recently arrived from Austria, continued research on Devonian carbonates in the Carnic Alps, Austria, and is still involved with her habilitation project with the University of Cologne on carbonate sediments in fore arc basins. She is currently investigating patterns of contemporaneous sedimentation in Laucala Bay.

Mr Dako Nating concluded his research on mangrove biodiversity on the southeast and west coasts of Santa Isabel Island, Solomon Islands, where mangroves are traditionally managed. In a study that recorded 71 molluscs, 46 crustaceans and 25 mangroves, he described how the distribution and abundance of several ground-dwelling mangrove fauna were determined by multiple factors such as: sediment grain size, organic carbon content, organic matter, larval supply and the horizontal flow of sediments. **Ms Shereen Sharma** completed her field work on water quality assessment and modulation of the wastewater discharge plume pattern in Laucala Bay. **Mr Johnson Seeto** continued his work on the taxonomy of the shallow water echinoderms

in Laucala Bay. Mr **Temakei Tebano** submitted his autecological study on the biology of *te bun* (*Anadara holoserica* Reeve 1843) in Tarawa Lagoon.

In research on Marine Affairs Ms **Jyotishma Rajan** explored the relationship between the PAFCO tuna cannery and the town of Levuka. Despite PAFCO's sensitivity over the findings, the material is worthy of publication. Mr **Ryan Gounder** assessed the attitudes of tertiary students towards the marine environment. Mr **Reuben Bakeo** analysed the impact of regional fisheries access agreements on Vanuatu. Mr **Leonard Paia** examined whether tuna access agreements hinder the development of the tuna domestic industry in the Forum Fisheries Agency (FFA) region, or are a stepping-stone to the development of the industry. The Solomon Islands was used as a case study because this country currently has the largest tuna domestic industry in the region and has access agreements with Japan, Taiwan and Korea on a bilateral basis. The Solomon Islands are also party to the Fisheries Treaty with the United States administered by FFA on a multilateral basis. Ms **Jese Verebalavu** focussed on the integration of sustainable coastal tourism development into coastal zone management. Mr **Samasoni Finikaso** studied the problems and prospects for inshore fisheries resources management in Tuvalu. Mr **Rudolf Dora** commenced his field research with FFA on the development of multilateralism in the South Pacific: he will assess the development and implementation of regional and international instruments for the management and conservation of the shared fisheries in the region.

PUBLICATIONS

A. Books

Chamberlain T, Titili G, Tuara P and J Verebalavu. *Business Skills - Community Fisheries Training, Pacific Series - 7*. Ed. Kim des Rochers. The University of the South Pacific/Secretariat of the Pacific Community, 2002. 31pp.

King M, Lambeth L, Sauni S, Veitayaki J, Vuki V, Vunisea A and T Chamberlain. *Fisheries Management - Community Fisheries Training, Pacific Series - 8*. Ed. Kim des Rochers. The University of the South Pacific/Secretariat of the Pacific Community, 2002. 38pp.

Nitis-Mue D, Crane J, and T Chamberlain. *A Gift From The Sea - Early Childhood Song and Story Booklet + audiocassette*. Ed. Karen Chamberlain. Marine Studies Program, The University of the South Pacific, Suva, Fiji, 2002. 16 pp.

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B. Journal Articles

Evans, N, 2002 . Maritime Boundaries and the Pacific Islands. *Waves* 9(1), 12-13.

Mamet B and S Pohler, 2002. Algae from early and middle Devonian limestones, Tamworth Belt, New South Wales, Australia. *Alcheringa* 26: 435-450. RJ.

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Veitayaki J, 2002 "Taking Advantage of Indigenous Knowledge: the Fiji case". *International Social Science Journal* 173. R.J.

Zhang S, Barnes C R, and S.M.L. Pohler, 2002. Relationships between lithofacies belts and conodont faunas, Gun River Formation (Lower Silurian), Anticosti Island, Quebec; a statistical approach. *Canadian Journal Earth Science* 39: 1767-1782. RJ.

C. Conference papers

Chamberlain T and W Snowden. "Food safety and quality education and training - building capacity in the Pacific". Paper presented to *FAO/WHO/SPC Pacific Islands Food Safety and Quality Consultation*, Nadi, Fiji, 11-15 November 2002.

Seeto J "Marine toxin research at the Institute of Marine Resources". Paper presented at a *Workshop on Marine Toxins*, The University of the South Pacific, 17-22 June 2002.

Veitayaki J and N Evans. Maritime Boundaries – "The benefits of delimitation " at the *Regional Maritime Boundaries Consultation*, South Pacific Applied Geoscience Commission, 24-26 April 2002, Nadi, Fiji.

D. General Website

www.usp.ac.fj/marine

POSTGRADUATE STUDENTS (MSP)

Student Name	Programme and Funding	Research Topic	Supervisors
Ribanataake Awira (Kiribati)	PGD/ MSc CSPODPPII	The Impact of Commercial Fishing on Spawning Aggregation and Population of Groupers and the Development of a Village-Based Management System in the Republic of Kiribati	Dr Veikila Vuki (until August) Dr Michel Kublicki
Reuben Bakeo (Vanuatu)	MA (Marine Affairs) SPODPPII	Fisheries access agreements	Prof. Nii K. Plange Dr Joeli Veitayaki
Aisake Batibasaga, (Fiji)	MSc (PT) ROC/Taiwan Govt	A study of the <i>Kappaphycus</i> farming industry in Fiji	Dr Tim Pickering
David Boseto (Solomon Is.)	MSc (PT)	Diversity, distribution and abundance of Fijian Freshwater Fishes	Dr Cameron Hay Dr Aaron Jenkins (Wetlands International)
Akuila Cakacaka (Fiji)	PGD (Marine Science)	To be confirmed	Dr Tim Pickering Mr Satya Nandlal
Rudolph Dorah (Solomon Is.)	PGD/ MA (Marine Affairs) CSPODPPII	The Development of Multilateralism in the South Pacific: Assessment of the Development and Implementation of the Regional and International Instruments for the Management and Conservation of the Shared Fisheries in the South Pacific..	Dr Nathan Evans Dr Joeli Veitayaki
Samasoni Finikaso (Tuvalu)	MA (Marine Affairs) CSPODPPII	Problems and Prospects for Inshore Fisheries Resources Management in Tuvalu: A Case Study of Vaitupu and Funafuti Atolls	Dr Joeli Veitayaki Prof.Randolph Thaman
Monifa Fiu (Fiji)	MSc (Marine Science)	To be confirmed	Dr Tim Pickering Mr Ed Lovell Dr Cameron Hay
Ryan Gounder (Fiji)	MA (Marine Affairs) CSPODPPII	An assessment of tertiary students attitudes towards the marine environment	Dr Nathan Evans Dr J. Veitayaki
Dilpreet Kaur (Fiji)	PGD / MSc (Marine Science) CSPODPPII	To be confirmed	Dr Tim Pickering
Samuela Lagataki (Fiji)	MA (PT) ROC/Taiwan	Mangrove Conservation	To be confirmed
Anir Lal (Fiji)	MSc (PT) CSPODPPII	Benthic marine algae of Majuro Atoll, Marshall Islands	Prof. Robin South (until April)

Ferral Lasi (Solomon Is.)	MSc CSPODPPII	Biology of lagoon fishes in Suva, Fiji.	Dr Cameron Hay
Malama S. Momoemausu (Samoa)	PGD/ MA (Marine Affairs) CSPODPPII	To be confirmed	To be confirmed
Merekeleni Namudu (Fiji)	PGD (Marine Affairs)	Socio-economic indicators in Fiji rural communities as predictors of success in seaweed farming Development	Dr Joeli Veitayaki Dr Tim Pickering
Satya Nandlal (Fiji)	PhD (PT) CSPODPPII	<i>Macrobrachium</i> aquaculture	Prof. Robin South (until April) Dr Peter Mather, (Queensland University of Technology)
Dako Nating (Solomon Is.)	MSc (graduated December 2002) CSPODPPII	Mangrove meiofauna biodiversity of the southern & western coasts of Santa Isabel, Solomon Islands & Southwest Viti Levu, Fiji.	Johnson Seeto
Leonard Paia (Solomon Is.)	MA (Marine Affairs) CSPODPPII	Fisheries access agreements	Dr Sandra Tarte. Dr Joeli Veitayaki
Kalo M. Pakoa (Vanuatu)	MSc CSPODPPII	Aquaculture of Corallomorphs	Dr Tim Pickering
Stanley Qalovaki (Fiji)	PGD (Marine Science)	To be confirmed	To be confirmed
Jyotishma Rajan (Fiji)	PGD/ MA (Marine Affairs)	Vulnerability or Viability: a Critical Impact Assessment of the Bumble Bee / PAFCO Agreement on Ovalau, Fiji Islands	Dr Joeli Veitayaki Mr Lionel Gibson
Samasoni Sauni (Tuvalu)	PhD (PT) CSPODPPII	Impact of the 2000 coral bleaching on inshore fisheries in Fiji.	Dr Veikila Vuki (until August) Dr Tim Adams (SPC) Dr K. MacKay (CSPODP)
Johnson Seeto (Fiji)	PhD (PT)	A taxonomic survey of the shallow water echinoderms of Laucala Bay, Fiji	Prof. Robin South (until April)
Shereen Lata Sharma (Fiji)	MSc French Cooperation in Science Scholarship	Evaluation of dispersion process from Kinoya outfall area (chemical and physical approaches)	Dr Veikila Vuki (until August) Dr Pascal Douillet (IRD)
Shiv Sharma (Fiji)	PGD (PT)	To be confirmed	To be confirmed
Avinash Singh (Fiji)	MSc CSPODPPII	Aquaculture of Fire Shrimp	Dr Tim Pickering

Posa Skelton (Samoa)	PhD (PT)	A survey of the benthic marine algae of the Palolo Deep National Marine Reserve of Samoa	Prof. Robin South (until April)
Reuben John Sulu (Solomon Is.)	MSc (graduated December 2002) CSPODPPII	Studies on environmental tolerance of <i>Gracilaria maramae</i> to three major environmental factors.	Dr Tim Pickering Prof. W. Aalbersberg
Temakei Tebano (Kiribati)	PhD (PT)	The biology and harvesting of <i>Anadara holoserica</i> (Reeve 1843) in Kiribati.	Prof. Robin South (until April) Prof Colin McLay (University of Canterbury)
Gabriel Titili (Solomon Is)	PhD(PT) CSPODPPII	Tuna histamines in the artisanal fishery in Solomon Islands and Fiji	Prof. Robin South (until April) Dr Richard Beyer Prof. Bill Aalbersberg (Director, IAS)
Ron Vave (Fiji)	MSc (PT)	Coral recruitment levels during a post-bleaching recovery period	Dr Tim Pickering
Jese Verebalavu (Fiji)	PhD CSPODPPII	The integration of sustainable coastal tourism development into coastal zone management.	Dr Nii K. Plange Prof. Vijay Naidu (University of Waikato) Dr Kelly Bricker (West Virginia University)

ACADEMIC VISITORS

Visitors in 2002 included:

Crown Prince and Princess of Tonga	Tonga
President of Marshall Islands	Marshall Islands
Mathieu Belbesch	IOC/WHO, Touloux, France
David Bellamy	UK
Barbara Best	US Agency for International Global Environment Centre
Richard Beyer	Fiji
Hanns Buchholz	Hannover University, Germany
John Carter	Halifax, Canada
Sam and Veitania Chung	Fiji
Rucksack Club	Fiji
Neil Landman and J. Cochran	AMNH

Patty Debenham	SeaWeb, USA
Stephen Edgar	Victoria University, NZ
Reg Everest	CQU, Australia
Andrew Finlay	Greenforce
David Greenfield	University of Hawaii
Gospel High School	Fiji
Staff of Greenforce	UK
Healy Hamilton	CAS, Australia (?)
Rob Harcourt	Macquarie University
Alice Hicuburundi	UNDP, New York, USA
Patricia Hume	AUI, Australia
Masanami Izumi	FAO, Samoa
Patricia Kailola	Tonga/Australia
Joan Koven	Astrolabe Inc.
Detlef Krug'er	Boschenfeloweg' 4, Germany
Michelle Lam	Marine Aquarium Council
Frank Larkins	University of Melbourne
Wilco Liebrechts	Suva
Richard Liggins	NZ
E. Martin	SOPAC, Suva
Colin McLay	Univ. of Canterbury, NZ
Peter Muriwai	Al-Sedan, Kuwait
Takashi Nagura	OFCF
Irene Novaczek	Institute of Island Studies, PEI, Canada
David Olsen	Wildlife Conservation Society
David Paton	Southern Cross Centre for Whale Research
Pennsylvania State University (team)	USA
Davina Potts	Macquarie University, Australia
Cristelle Pratt	SOPAC, Suva
Bernard Salvat	IRD, Noumea
Peter Seed	Atlas ocean products
John Sherriff	ACIAR, Canberra, Australia
Yukio Suetomi	OFCF

Anna Tiraa	Cook Islands
Hideki Tome	JICA
Jean-Pascal Torrenton	IRD, Noumea
Takashi Toyama	JICA
University of West Virginia (team)	USA
Laurent Wantiez	Univ. New Caledonia
Claire Whelan	Univ. of Sydney, Australia
Toby Wood	Queensland University and WWF
Masaru Yamauchi	OFCF
Robin Yarrow	Suva
Being Yeeting	SPC, Noumea
Shumon Yoshiara	JICA

RESEARCH GRANTS

Researcher	Project Title	Funding/Sponsorship Org.	Funding Amount
Hay, C, L. Kumar, R Sulu and S Nandlal	Surveying Ciguatera in Fijian waters and Local Markets	USP	\$27,308

COMMERCIAL CONSULTANCIES

Researcher	Project Title	Funding/ Sponsoring Org.	Funding Amount
Seeto J.	Text for Fiji Philatelic Bureau Bulletin No. 183. Murex Shells of Fiji. Stamps	Fiji Philatelic Bureau	F\$300
Veitayaki J, Resture A & N Evans	Evaluation Study Report The Third Country Training Programme on the Sustainable Use of Coral Reef Fisheries Resources with Special Emphasis on Shellfish Seed Production and Release in the Kingdom of Tonga	JICA	F\$14,676
Veitayaki J & A Resture	Global International Waters Assessment for Oceania Region	IOI	F\$27,861
Veitayaki J, N Evans & S Tuqiri	Train Sea Coast Courses on Responsible Fishing and the Economics for Community-based Projects	UNDOALOS/SPREP	F\$48,221

Veitayaki <i>et al.</i>	What is the Code of Conduct for Responsible Fisheries.- Translation into 9 regional vernacular	IOI/ FAO	F\$23,000
Nandlal S, Veitayaki J, Kumar L, & J Rajan	Socioeconomic survey of northeast Macuata Province, Fiji	OFCF	F\$15,000
Hay C & L Kumar	A proposal to import live Groupers from Fiji to California : biosecurity and other issues	Kingfisher Co. Inc.	F\$8,500
Hay C, Kumar L & R Sulu	Coordination of GCRMN	IOI	F\$8,800

CHAPTER 4 : STAFF LEAVE AND CONFERENCE

- ◆ Fieldwork on feasibility of farming freshwater prawns in Cook Islands, 14 days, February, *Mr S. Nandlal*, (funded by Forum Secretariat).
- ◆ Western and Central Pacific Fisheries Commission – Second Preparatory Conference (2nd session), February, Madang, Papua New Guinea, *Dr N. Evans*
- ◆ First SPC Aquaculture Meeting, March, The University of the South Pacific, Suva, *Drs T. Pickering, C. Hay and Mr R. Sulu*.
- ◆ Sustaining Seascapes Conference, March, New York American Museum of Natural History, *Dr J. Veitayaki*
- ◆ Millenium Assessment Workshop, March, Darwin, Australia, *Dr J. Veitayaki*
- ◆ Dialogue on Conservation and Utilization of Coral Reefs in Okinawa, March, (funded by RIS), Research Institute for Subtropics (RIS), Naha, Okinawa, Japan., *Dr C. Hay*
- ◆ First Session of the Sub-Committee on Aquaculture (funded by FAO), April, Beijing, *Mr S. Nandlal*
- ◆ CITES SIDS OCEANIA meeting (funded by CITES), April, Mocombo Hotel, Nadi, *Mr S. Nandlal*

- ◆ Regional Maritime Boundaries Consultation, April, South Pacific Applied Geoscience Commission, Nadi, *Drs N. Evans and J. Veitayaki*
- ◆ MSP Postgraduate Writing Workshop, April, USP, Suva, *Dr V. Vuki*
- ◆ APEC Integrated Ocean Management Forum Two, APEC Marine Resources Conservation Working Group, June, Canberra, *Dr N. Evans*
- ◆ Consultation on development strategies and plans for dissemination of improved fish breeds, June, National Aquaculture Genetics Research Institute, Pathumathani, Thailand, *Mr S. Nandlal*
- ◆ CETC Workshop, July, Narere and USP, Suva, *Mr A. Chamberlain*
- ◆ Fact finding trip to Tarawa, Kiribati, 8 days, July (Request from VC's Office), *Dr C Hay*.
- ◆ LMMA PCT Meeting, July, Rarotonga, *Dr J. Veitayaki*
- ◆ SEAWEB organised Media Conference running parallel to the SPREP Conservation Conference, July, Rarotonga, *Dr J. Veitayaki*
- ◆ Pacific Mainstreaming Conservation Conference, July, Rarotonga, *Dr J. Veitayaki*
- ◆ New Directions in Pacific Social Science Research Workshop, July, Australian National University, Canberra, *Dr J. Veitayaki*
- ◆ Coral Trade Workshop, July, USP, Suva MSP, *Dr V. Vuki*
- ◆ Post Harvest Fisheries /HACCP Workshop, August, USP, Suva, *Mr A. Chamberlain*
- ◆ Workshop on setting best standards for live reef food fish trade (LRFFT), August, International Marine Life Alliance, Marine Aquarium Council, Nature Conservancy. Coral Reef Research Centre (CRC), Townsville, Queensland, *Dr C. Hay*

- ◆ Marine Sector Working Group (MSWG) meeting, 2 days, August, SOPAC, Suva, *Dr C. Hay*
- ◆ FishGov Food Meeting, September, Dakar, Senegal, *Dr J. Veitayaki*
- ◆ Fiji Locally Managed Area Follow up Meeting, October, Votua and Bose Vanua in Tavua Levu, Fiji, *Dr J. Veitayaki*
- ◆ Workshop of Live Reef Food Fish Trade in Pacific Region, 4 days, October, SPC and USP, Laucala Campus, Suva, *Dr C. Hay, Ms L. Kumar, Mr R. Sul.*
- ◆ Marine Aquarium Council (MAC) Training Workshop on Certification, 4 days, October, Tradewinds Hotel, Lami, Suva, *Dr C. Hay, Ms L. Kumar*
- ◆ Fiji Locally Managed Area Biological Survey in Vanuaso, October, Gau, Fiji, *Dr J. Veitayaki*
- ◆ Survey of Inshore Fisheries in Dromuna, October, Kaba Point, Fiji, *Dr J. Veitayaki*
- ◆ IOI Regional Director's Meeting, October, IOI-Australia, Townsville, *Dr J. Veitayaki*
- ◆ Survey of Coastal Fisheries Opportunities, October, Macuata, Vanua Levu, Fiji, *Dr J. Veitayaki*
- ◆ FAO/WHO/SPC Pacific Islands Food Safety and Quality Consultation, November, Nadi, *Mr A. Chamberlain*
- ◆ Fish for All Summit Meeting, November, (funded by Australian Centre for International Agricultural research (ACIAR) and World Fish Centre), Penang, Malaysia, *Mr S. Nandlal*
- ◆ Third Meeting of the Asia-Pacific Group of Fisheries and Aquatic Research (GoFAR), November, (funded by ACIAR and World Fish Centre), *Mr S. Nandlal*
- ◆ Fifth Symposium on Diseases in Aquaculture, November, (funded by ACIAR), Gold Coast, Brisbane, *Mr S. Nandlal*

- ♦ Second International Fishers Forum, November, Western Pacific Regional Fishery Management Council, Honolulu, *Dr N. Evans*
- ♦ Fisheries 2002, November, World Fish Centre, Penang, Malaysia, *Dr J Veitayaki*
- ♦ DACUM Meeting for Train Sea Coast Course on Ecological Economics, November, USP, Suva, *Dr J. Veitayaki*
- ♦ Mangrove Management Initiative, November, USP, Suva, *Dr J. Veitayaki*
- ♦ Survey of Inshore Fisheries in Mali and Macuata, Vanua Levu, Fiji , December, *Dr J. Veitayaki*
- ♦ Leadership Program, 2002, November, USP, *Dr C. Hay*
- ♦ Strategic Corporate Planning Workshop Programme, MAFF, Fiji, December, Pacific Harbour International Hotel, Deuba, *Mr S. Nandlal*.

CHAPTER 5 : OVERALL COMMENTS ON WORK AND PROGRESS

An External Review of MSP was conducted in April by Dr Padma Lal (ANU), MSP's first External Adviser. The review was coordinated by MSP's Executive Officer, a major exercise involving staff of MSP and from the two schools (SSED and SPAS) which administer the multidisciplinary programme. The MSP staff thank Dr Lal for her commitment and energy in completing the review within the two weeks allocated.

MSP staff have considered the External Adviser's Report (three meetings) and a written response will be prepared early next year. The review has come at the close of the first decade of the Marine Studies Programme. It is timely to consider how the roles and existing structures of MSP meet the region's needs, given the changing demands and the overall University restructure to be considered in 2003.

Secretariat staff provided administrative support to workshops organized wholly or in part during the year. These included:

- First Freshwater prawn hatchery workshop (28 days), Naduruloulou Research Station, Nausori (March)
- First SPC Aquaculture meeting : Building for Aquaculture in the Pacific (with SPC) (March)
- Train-Sea-Coast Course on Responsible Fisheries (July)
- Global International Waters Assessment for Oceania Region (July)
- Post Harvest Fisheries HACCP Workshop (August)
- Workshop for women on farming *Tilapia* and prawns, Nausori, CSPODP-funded (August)
- Pacific Regional Live Reef Fish trade Management Workshop (with SPC, IMA, Nature Conservancy and Asian Development Bank) (September)
- Workshop for men on farming *Tilapia* and prawns, Nausori, CSPODP-funded (September)
- Global Coral Reef Monitoring Network (GCRMN) International “train the trainers” workshop, 14 days (September/October)
- Third workshop on farming *Tilapia* and prawns, Nausori, CSPODP-funded (October)
- C-SPODP/II/MSP Two workshops on Potential for Farming Saltwater Shrimp in Pacific Island Countries and Shrimp Diseases Diagnosis and Prevention, CSPODP-funded (October)
- Meeting on Train-Sea-Coast Economics for Community-based Projects (November)
- Fourth Workshop on farming *Tilapia* and prawns, Sigatoka District Council, (November)
- Hazard Analysis & Critical Control Points (HACCP) Workshop, USP, Suva (December)