Fisheries Newsletter

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Editorial

Welcome to the last issue of the millennium of our Fisheries Newsletter.

As always, the various Programmes at the SPC Marine Resources Division have been busy on all fronts. Fisheries Development Officers Steve Beverly and William Sokimi criss-crossed the Pacific. Steve continued his duty travel to Pohnpei in the Federated States of Micronesia where he helped the local fisheries service deploying FADs. As for William, he trained a boat crew in longlining techniques for the Nauru Fisheries Corporation.

The Training Section collaborated with the Information Section to assist the Vanuatu Fisheries Department in publishing information leaflets on fisheries resources (resource management, aquaculture, fish identification sheets, bottom fish fishing techniques).

The Community Fisheries Section has a new boss, Ueta Fa'asili from Samoa. No need to introduce him as he is well known throughout the region; he was the former Director of Fisheries for Samoa for many years.

Wade Whitelaw of the Oceanic Fisheries Programme presents the results of his gamefishing assessment in Papua New Guinea. It shows that this activity is not well developed as there are only a few boats involved. However, be careful of the volcano if you are fishing near Rabaul, as some ominous smoke is currently rising from it.

Steve Beverly got around this quarter. In addition to his work in Micronesia, he found time to attend the Fish Expo, in Seattle, Washington in November. This kind of event is always very interesting as it showcases the new techniques and gear available on the market. In his article on page 31, Steve gives us a sampling of the new items presented at the Expo.

Happy reading and Happy 2001!

Jean-Paul Gaudechoux
Fisheries Information Adviser (Jeanpaulg@spc.int)

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Michel Blanc

Albert Petersen, a professional tuna grader with 15 years of work experience in Fiji Islands

SECRETARIAT OF THE PACIFIC COMMUNITY
Prepared by the Information Section of the Marine Resources Division and printed with financial assistance from France.

FISHERIES DEVELOPMENT SECTION

Fisheries Development Officer, Steve Beverly, continued his work in the Federated States of Micronesia, and spent the month of October in Pohnpei. He worked with the Artisanal Fisheries Support Station Manager and staff doing FAD survey work and a FAD deployment.

Three FAD site surveys were conducted using SPC supplied electronic equipment (echo sounder with portable transducer housing and GPS with plotter) and Pohnpei State Government's 7 m outboard vessel (Figure 1). Three FAD sites were chosen: north of Pohnpei Passage, northwest of Palikir Passage, and west of Tauak Passage. One FAD was deployed at Palikir Passage. The FAD mooring was laid out and rigged at Caroline Fisheries Corporation's net mending yard in Kolonia (Figure 2). It was then loaded onto a local tugboat and deployed (Figure 3).

The position of the Palikir Passage FAD is about 2.5 nm northwest of the passage in an area considered to be a good fishing ground at a depth of 1,200 m.

Pohnpei State has materials to rig and deploy several additional FADs. The Artisanal Fisheries Support Station staff has the necessary skills to rig and deploy FADs at the other two sites.

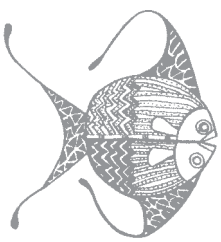


***Figure 3: Deploying the FAD from M/V* Lien Dekehtik**

Steve Beverly

Figure 1: Survey vessel with transducer mounted on port side

Steve Beverly

Figure 2: Rigging a FAD mooring at CFC's yard

Steve Beverly

During October, Fisheries Development Officer, William Sokimi, assisted the Nauru Fisheries Corporation (NFC) with training of the crew on their 18 m catamaran tuna longliner, F/V *Victor Eoaeo II* (Figure 4). NFC purchased the longliner second-hand in Australia, and had it refitted before sailing it to Nauru. The vessel had an Australian skipper and local crew.

Fuel and water shortages on Nauru at the time of the visit limited the amount of fishing that William could undertake. Only two trips were made with two sets per trip. Fishing was restricted to close to the island, and only a few fish weighing over 400 kg were caught.

Unloading the catch from F/V *Victor Eoaeo II* is a tricky operation, as the vessel can not enter the small boat harbours. Therefore, the fish is unloaded from the refrigerated sea water tanks on the vessel to a small dinghy (Figure 5), which takes the fish ashore where it is unloaded onto a truck and taken to the fish market for weighing and marketing. With the small amounts of fish being landed, all fish was sold locally.

William Sokimi

***Figure 4: NFC's tuna longliner F/V* Victor Eoaeo II**

William Sokimi

Figure 5: Unloading the catch to a small dinghy to take ashore

William worked with the crew to make up new and replacement gear. He also made recommendations on how to improve line setting on the vessel, as well as looking at the management side of the fishing operation, including how the crew could be paid with an incentive to catch fish.

From Nauru, William moved to Kiribati in early November to finish a long-standing project using the Fisheries Department's twin-hull longline vessel, F/V *Tekokona II*. This vessel was designed for tuna longlining in Kiribati.

Previous issues of the Fisheries Newsletter (Nos 89 and 92) have described this vessel and the work previously undertaken. The objective of this final stage was to assist the Fisheries Department in catching tuna, and handling, processing and chilling them to export standards, and to make one or two trial shipments to overseas markets. The limited number of flights and their destinations out of Tarawa, and the limited cargo space available, make this a difficult task.

Persistent problems with the hydraulic system on F/V *Tekokona II* limited the fishing activities, causing the first two trips to be cut short, although some good-sized yellowfin tuna were caught. The main bait used was milkfish (Figure 6) from the local farms.

The third trip produced four good-sized bigeye tuna, each over 50 kg in weight. These fish were handled carefully (Figure 7) and exported as the first trial shipment to Japan from Tarawa.

Fisheries Development Adviser, Lindsay Chapman, travelled to Tuvalu in November to identify constraints to development of

William Sokimi

Figure 6: Locally grown milkfish used for longline bait during the project

William Sokimi

***Figure 7: Unloading a large bigeye from F/V* Tekokona II**

the tuna fishery in Tuvalu. He made suggestions on development options including the assessment of options presented in other documents, such as the 1994 ADB and CFTC reports. These formed input to a National Tuna Development and Management Plan for Tuvalu, which was being developed by the Forum Fisheries Agency and the local Fisheries Department.

Lindsay looked also reviewed Tuvalu's involvement in tuna fishing activities; the development of possible objectives and strategies for future development of the tuna fishery in Tuvalu; an assessment of the infrastructure, support services and training available in Tuvalu at present, with suggestions on future needs and directions; and an assessment of the roles of government and the private sector in future development of the tuna fishery in Tuvalu.

Overall, the situation in Tuvalu is unique, as there is very limited infrastructure, limited land for development, no safe anchorage, and the airstrip can only accommodate small aircraft. All of these factors hinder future development, although the Government of Tuvalu is keen to try and address these limitations so that domestic development of the tuna resource can occur.

Also in November, Steve attended the annual Seattle Fish Expo and WorkBoat Northwest in Seattle Washington, USA, where new products and technologies available to commercial fishermen in America and Canada (see feature article) were displayed.

In Noumea, Steve worked with *Ecole des Métiers de la Mer* (EMM), planning a course for longline skippers that will be held during 2001, and helping with the layout of EMM's longline vessel, F/V *Nondoue.* Also in the works are broadbill fishing trials with a New Caledonia longline company, Navimon.

For the remainder of the year Steve spent planning these two activities and working on field reports for his two completed FSM projects.

Other activities in Noumea included finalising the draft of William's Samoa project; and the commencement of two awareness-raising brochures.

The first brochure is on marine debris and derelict fishing gear, with suggested best practices to minimise dumping or discarding garbage at sea. This includes the worldwide prohibition on the dumping of any plastics into the marine environment. This is a joint effort with SPREP, with financial assistance from the Western Pacific Regional Fishery Management Council in Hawaii.

The second brochure is on bycatch from tuna longlining operations, and ways to minimise the incidental take of unwanted species, and the release of these species alive whenever possible. This is an important issue for Pacific Island countries and territories, as they need to demonstrate responsible fishing practices in developing their domestic tuna longlining operations. It is anticipated that both brochures will be published in the first half of 2001 in both English and French.

CORRECTION TO ARTICLE IN FISHERIES NEWSLETTER 94

Successful conclusion to Samoa project (pages 5 to 8)

The cost of constructing and rigging the 12.2 m *super alia* F/V *Ulimasao* is just under WST 400,000, and not the figure presented in the original article, which appeared in the last Fisheries Newsletter. This reduces the fixed costs (interest on loan repayment, depreciation, insurance, annual repairs and maintenance, and licensing fees) to an annual figure of WST 136,700. Variable costs (fuel, oil, ice, bait, food, replacement fishing gear and other costs) remain the same, and amount to WST 2,500/trip. A value of WST 4.87/kg has been used to calculate the total value of the catch.

Three projections are presented to show a range of different fishing strategies. If two complete crews are rotated on the vessel (one trip on and one trip off), allowing a quick turn-around between trips, then 60 trips could be completed in one year. If the owner wishes to rotate the crew so that each crew member fishes say three trips and has one trip off, then it is anticipated that 50 trips could be completed in one year. If a single crew is used for all fishing operations, then 40 fishing trips could be realised in one year. Under these three different fishing strategies, the annual profits that can be generated are presented in the table below.

Item	Value (WST) for 60 trips	Value (WST) for 50 trips	Value (WST) for 40 trips
Income			
Based on one set being 1,000 hooks with 3 sets made per trip, CPUE being 672 kg/set (2,019 kg/trip) and an average sale price of WST 4.87/kg	589,075	490,896	392,717
Expenditure			
Fixed costs for one year	136,700	136,700	136,700
Annual variable costs	150,000	125,000	100,000
Salaries based on 20 per cent of the catch value	117,815	98,179	78,543
Total expenditure	**404,515**	**359,879**	**315,243**
PROFIT	**184,560**	**131,017**	**77,474**

TRAINING SECTION

Second regional course on Seafood Enterprise Operations and Management for Pacific Island Women in Nelson

Fisheries Training Specialist (FTS) Terii Luciani travelled to Nelson (New Zealand) in late November to assist in the supervision of a regional course for Pacific Island women on seafood business operations and management. The course was part of the SPC Fisheries Training Section's regional programme on the management of fisheries enterprises and was funded through a grant from the New Zealand Government.

A total of 10 women from around the Pacific attended this course for three weeks. The main objective of this course was to provide an opportunity for women involved in seafood business management and

operations to upgrade their technical skills and develop strategies for enhancing the commercial viability of these businesses.

The course programme was developed around two main subject areas: "Seafood Technology" and "Seafood Business Management"; each area covering a number of specific subjects or topics, including:

- Seafood Technology
- Seafood Quality and Handling
- Seafood Spoilage
- Seafood Hygiene, Sanitation and Food Safety (including HACCP)
- Seafood Legislation
- Seafood Products, Processes and Technologies
- Seafood Product Development and Improvement
- Factory Visits
- Laboratories / Practicals / Work Groups
- Seafood Business
- Staff Performance Management
- Accounting and Financial Reporting
- Budgeting and Business Planning
- Marketing

On the last day of the course, the trainees were asked to complete a formal evaluation of the course. The evaluation was in 3 parts. The first part covered the content of the programme, the second covered general organisation, and the third helped SPC and the School of Fisheries with the planning of future courses.

A few important points came out of these evaluations, including the decision to run a third regional course in 2001. In general, the participants indicated that they were more than pleased with the programme as delivered. There seemed to be some debate as to the relevance of Accounting and related topics for the target audience but several participants indicated that these topics were a necessary part of their business and, therefore, relevant.

Many participants enjoyed the practical aspects of the programme and the factory visits, and suggestions were made that this part needed to be expanded. To this end, future programmes may be better if half the day was spent on theory and the remaining half day spent on practical, factory visits or presentations of products and services by New Zealand suppliers.

Many participants indicated a need for more staff performance management and related topics in future deliveries. This could be achieved by either reducing hours for Accounting and bookkeeping or in the seafood technology areas. More emphasis on Seafood Technology topics was welcomed. The facilities and management of Franklyn Hall were applauded and participants were pleased with the organisation and helpfulness of School of Fisheries staff and, in general, acknowleged that Nelson was a good venue.

Terii Luciani

Elvine Lehartel from Tahiti attented the course

Terii Luciani

Other extra curricular activities included a visit to a green-lip mussel farm

Information materials available for Vanuatu

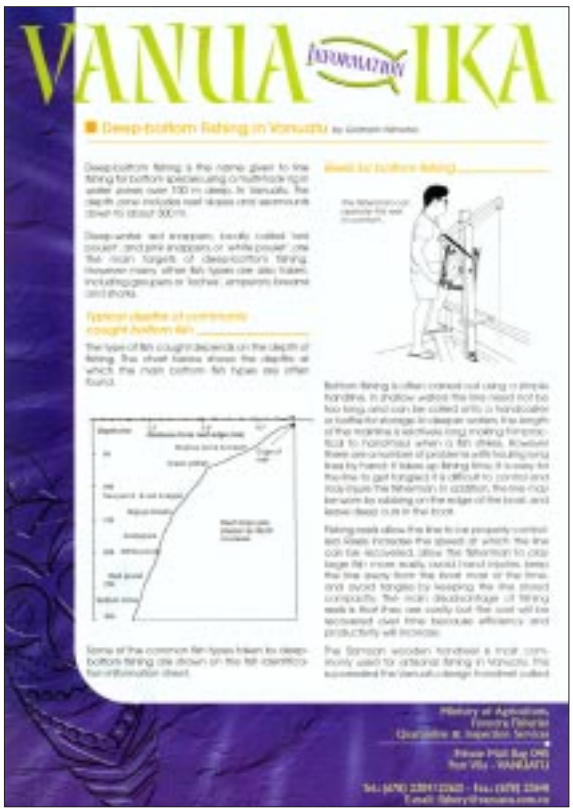
The Vanuatu Department of Fisheries is producing a series of colour fact sheets (A4 size) called *Vanua-ika.*

Initiated by Graham Nimoho, Principal Fisheries Extension Officer, and Terii Luciani, SPC Fisheries Training Specialist, the fact sheets cover topics on resource management, bottom fishing techniques, aquaculture, current research findings, fish identification, and the Fisheries Division.

Each fact sheet is written in plain, easy-to-read English (some will be produced in Bislama) and has illustrations and diagrams. Sources for more information are also provided.

During his short attachment with the SPC Fisheries Information Section and Training Section Graham assumed responsability for all aspect of the production of two fact sheets.

For more information about the *Vanua-ika* fact sheets email: cfpinfo@spc.int



Tuna fishery co-management in Samoa: a model for the region?

Since 1995, the offshore commercial fishery in Samoa has expanded rapidly due to the introduction of horizontal longline gear to capture large tunas for export, mainly to canneries in Pago Pago. Tuna catches have increased from 1700 tonnes in 1996 to 5100 tonnes in 1999. The industry employs over 1000 people and is the major export earner of the country.

The rapid expansion of the offshore fishing industry has created many problems for both the private and public sectors. Thirty-three lives were lost at sea from 1997 to 2000 due to lack of seamanship skills, lack of basic safety equipment and poor vessel construction. Considerable quantities of fish are still rejected due to poor onboard handling of the catch. Mooring facilities in Apia are inadequate to deal with the considerable increase in the number of fishing vessels. Although the government had taken measures to address some of these problems including establishing a VHF-radio communication network and implementating safety and manning requirements for fishing vessels, the industry has, until recently, had minimal involvement in the decision-making process.

The responsibility of developing and managing the offshore fishing industry in a sustainable manner rests not only with government agencies but also with the various stakeholders involved in the industry. In acknowledging the diversity of stakeholders, Samoa initiated in October 1999 the development of a Commercial Fisheries Management Advisory Committee (CFMAC).

This committee is comprised of elected representatives from the Upolu and Savaii fishers, boat builders and fish exporters as well as appointed representatives from the Fisheries Division, Ministry of Transport, Treasury Department, Port Authority and Department of Trade, Commerce and Industry. Meetings are held every two months with special meetings organised to address particular and urgent issues.

CFMAC has been the main contact point for the private and public sectors to address development and management issues concerning the offshore fishing industry, provide advice, and present recommendations to the Samoan government for consideration.

To date, the committee has dealt with a variety of issues including safety at sea, vessel crew training, seafood quality and regulations, shore infrastructures and resource management and sustainability.

In general, the CFMAC is a forum where issues concerning offshore commercial fisheries are discussed, problems identified and possible solutions developed. In adopting this approach, Samoa is achieving greater awareness, acceptance and ownership of fisheries management arrangements through the committee's interaction between the various stakeholders.

After the management of inshore fisheries resources by its coastal communities, Samoa is again innovative, this time with its approach to the co-management of offshore resources.

SPC's Training Section is keen to make the Samoan strategy known to the region and a manual describing the purpose and operations of the CFMAC will soon be produced in collaboration with the Samoa Fisheries Division. Depending on the region's feedback and the availability of funds, the Section is also considering the possibility of organising a regional workshop on the co-management of commercial fisheries resources.

Lindsay Chapman

Part of the alia fleet in Apia, Samoa

Two women on the SPC Nelson Course

The 22nd SPC Nelson course welcomes the participation of two women in the region's most popular fisheries training programme. The two female participants are Ms Lausu Asela from the Ministry of Fisheries of Tonga and Ms Tukutama Desiree Pauai from Niue Fisheries Division. The SPC Nelson course is an annual event and has been attended by 256 fisheries officers from 21 countries and territories.

During the reporting period, Section staff liaised with the New Zealand School of Fisheries tutors for programme contents and course organisation, selected course participants and organised travel arrangements. The course will start on 12 February 2001 at Nelson and will be attended by a total of 12 participants from the region.

This year a French speaking trainee from Wallis and Futuna will be attending the course. He will be in New Zealand five weeks prior to the course commencement to attend an intensive English language programme.

This regional course is funded by the New Zealand government, the Commonwealth Secretariat and the Commonwealth Foundation.

Towards an increased collaboration with PNG National Fisheries College

During a recent visit to Papua New Guinea, SPC Fisheries Training Adviser, Michel Blanc spent a few days at Kavieng, home of the PNG National Fisheries College (NFC). The purpose of the visit was to better understand NFC's present restructuring and plan future collaboration projects between the College and the Training Section.

In Kavieng, the AusAid-funded NFC Strengthening Project (NFCSP) was initiated early last year with Hugh Walton, the previous director of the New Zealand School of Fisheries, as project manager; Rusty Strickland as Fishing Operations Manager; and several short-term consultants in areas such as post-harvest, organisational management, and fisheries management.

The purpose of the NFCSP is to assist the PNG government with the upgrading of the NFC to a training institution with the capacity to identify industry needs, develop appropriate training strategies and curricula and deliver cost-effective training.

The NFCSP comprises several components:

- *Institutional Strengthening*: development of the College's mission statement, management structure, staff appraisal systems and recruitment of new staff matching profile requirements.
- *Training Development*: development and delivery of training courses in response to changing industry needs.
- *Student Support*: provision of interim funding for the support of fisheries and seafood handling cadetships, to assist in the transition to fee-based training, and satisfy immediate industry needs.
- *Facilities development*: upgrading the existing facilities (slipway, marine engineering workshop) and construction of new facilities (seafood handling teaching facility) for the training of qualified deckhands and seafood handlers to national competency standards.

In addition to the above activities, the NFCSP will also provide advisory services to the newly formed New Ireland Commercial Fishing Association (NICFA), a registered society with some 240 members including some seafood retail and processing companies, exporters and a majority of small-scale commercial fishers. The NICFA was established with the objective of coordinating and promoting consultations with provincial and national fisheries authorities and with other bodies involved in fishing and associated industries of PNG.

Following discussions with NFCSP staff, several areas of potential assistance by the Section were identified:

- *Staff development*: New staff are being recruited at the College and it is likely some will lack a teaching background. A priority for NFC will be to provide teaching

skills training to its new staff. The Section is proposing to use its network of training providers for the setting-up of individual training attachments to expose NFC staff to the teaching procedures of selected overseas institutions. Another option under consideration is the organisation of an in-house train-the-trainers course as was done in June 2000 at the Vanuatu Maritime College. The Vanautu course focused on competency-based teaching for adults and was run by NEXT Vanuatu, an Australian institution that specialises in adult teaching.

- *Pre-sea safety and fishing course*: The first level of fisheries training at NFC and the initial qualification in the new PNG certification structure for fishing vessel crew is the Certificate in Fishing Operations 1 (CFO1). This five-week course, similar to the SPC Pacific Island Qualified Fishing Deckhand certificate, will be delivered in competency-based format, first in Kavieng and, later, in other Provinces. The first course is scheduled for March 2001 and the Training Section will partly fund a consultant tutor to come to NFC to help the new local tutors running the course. The Section has similarly assisted Vanuatu and Tonga with the running of their initial pre-sea course.

- *Pearl farming attachments*: Niugini Pearls Limited is a small company with a hatchery and farm sites on two islands opposite Kavieng. Owned by the landowners of the Tigak Islands, the company's objective is to seed 7500 shells every six months. At this stage, the company has a broodstock of 2000 oysters. Early in 2001, the Training Section will organise a training attachment for two staff of Niugini Pearls. The training will focus on spat collection and hatchery techniques, farm systems and seeding. Section staff are in the process of organising the attachments, which are likely to be based at Penrhyn, in the northern group of the Cook Islands.

- *Safety-at-sea materials*: Following the translation of SPC safety-at-sea materials in Bislama and Solomon Islands Pidgin, the Section will collaborate with staff of NFCSP for the translation of the same materials – safety check-list posters and stickers – into PNG Pidgin and Motu. The materials will be printed in Port Moresby and distributed to the provinces by the College.

- *Masterfisherman attachment*: The New Ireland Commercial Fishing Association (NICFA) requested the services of an SPC masterfisherman for a period of two to three months early in 2001. The purpose of this attachment will be to assist with the deployment of several FADs in the Kavieng area and promote appropriate small-scale methodology for pelagic longlining and deep-bottom fishing. Planning for the attachment is currently underway.

Interestingly, the AusAid/NFCSP and another major fisheries development projects funded by the ADB, work in harmony and apparently complement each other quite well. For instance, a fishing wharf will soon be built under the ADB project in parallel to the renovation and building of new NFC facilities in the same area, including a large seafood handling teaching facility, a functional marine engineering workshop used for both training and commercial purposes and a renovated slipway.

If those projects continue to progress according to plan, Kavieng will possess all the required tools to support a profitable commercial fishing industry — rich fishing grounds, a modern training institution, onshore support facilities and trades and a powerful commercial fishing association.

Peter Watt

FTV* Leilani, *the NFC's training vessel

In brief

- Staff of the Training Section will attend the annual APIMTIMA meeting in Nadi from 26 to 30 March 2001. This regional meeting gathers the heads of maritime training institutions and maritime authorities to discuss issues of common interest including the advent of STCW-95 and corresponding legislation and training courses. This year, the Training Section will participate in a session on Safe Ship Management Systems (SSMS), which are gradually being implemented throughout the world as a way to reduce the chances of accidents at sea and downtimes due to breakdowns or mechanical failures. Of particular interest to the Pacific region are the Safe Operational Plans (SOP), the scaled-down version of SSMSs, which are compulsory in New Zealand for small commercial vessels.

- A funding proposal for the continuation of the successful pilot SPC/Australian Fisheries Academy Traineeship Program for Pacific Island Fishers was forwarded to AusAID in November 2000. If approved, the programme will be repeated in 2001 and eight commercial fishing deckhands will be selected to spend 10 weeks in South Australia. The traineeship will include six weeks of shore training at AFA campuses in Adelaide and Port Lincoln and four weeks of at-sea training onboard commercial fishing vessels. The excellent feedback on the pilot programme received from the trainees, their managers and from the training provider makes Section staff believe that this traineeship programme has the potential to become the SPC/Nelson course of the private sector.

- One of the Section's objectives in 2001 is to secure funding for a cadet apprenticeship programme for fishing vessel engineers. An initial project proposal was with the Australian Maritime College in 1997 and subsequently submitted to AusAID for consideration. The proposal was not approved due to the high cost of the training. This time, Section staff will have several regional training providers bid for the project and the best proposal will be forwarded to aid donors for consideration.

- On our list for 2001 is the development of a CD-Rom on sashimi-grade tunas, which includes a selection of our best resource materials on sashimi-tuna marketing, tuna grading, and albacore loining. At present the materials exist as slides and videos and are used during SPC workshops in the region.

COMMUNITY FISHERIES SECTION

New Community Fisheries Adviser

Ueta Fa'asili of Samoa has recently taken up the position of Community Fisheries Adviser with SPC's Coastal Fisheries Programme.

He holds a BSc degree from the University of the South Pacific and has been the Head of the Fisheries Department in Samoa for the past 16 years.

Ueta has played a major role in a nationwide community fisheries management initiative that has since become a model for the region.

Jean-Paul Gaudechoux

American Samoa and Samoa assistance

The Community Fisheries Adviser travelled to American Samoa in December 2000 to provide technical input to the newly established community-based fisheries management programme. Following this the Adviser will travel to Samoa to review their village fisheries management plans and by-laws and discuss a proposed regional workshop on community-based management of subsistence and artisanal fisheries.

Niue's marine invertebrate species to be included in fisheries management plan

In November 2000 the Community Fisheries Section completed fieldwork in Niue. The work was requested by the Niue government as part of ongoing SPC assistance to Niue in the area of sustainable development and management of its marine resources.

SPC's Community Fisheries Officer undertook the fieldwork together with a Canadian-funded training attachment, USP Masters student in marine science, Lilian Fay Sauni.

Also assisting with the work were Brendon Pasisi, Desiree Tukutama and Charlene Funaki of the Niue Department of Agriculture, Forestry and Fisheries and Peace Corps volunteer, Wendy Cover. The aim of the fieldwork was to identify and document the important marine invertebrate species collected by women in Niue, to look at potential management measures for those species, and to ensure that species collected by women are included in an inshore fisheries management plan being developed by Niue Fisheries and SPC.

Although Niue has only a small fisheries section they recently created a new position – the Women's Fisheries Development Officer — a post held by Desiree. Niue Fisheries remains committed to seeing that the entire community is consulted and included in their work.

Niue, with a total land area of only 258 km^2 and a circumference of 65 km, is reputedly the largest upraised coral atoll in the world. The population is less than 2000, with nearly 10 times that number of Niueans now residing in New Zealand.

Niue has no lagoon and only a narrow fringing reef surrounds most of the island. The former reef and lagoon is raised to about 60 m above sea level, descending to over 1000 m depth within 5 km of the shore.

Lyn Lambeth

Lyn Lambeth

Lilian Fay Sauni examines the reef area

Niue's fringing reef is only accessible at low tide

Although a number of studies have been done on the marine resources of Niue, none have resulted in a clear idea of exactly what, or how many, species of invertebrates are utilised in Niue.

At first glance the rugged coastline and small reef flat area, accessible only in calm weather and at low tide, would appear to have few species that could be utilised.

However the women gather a surprisingly large number of invertebrates for food and shellcraft. By the end of the two-week fieldwork, 92 Niuean invertebrate names had been recorded, 55 of those were actually observed on reef trips, 29 of them are used for food and around 10 species or groups of species are used for shellcraft. Over 70 species have been definitely or tentatively identified.

The list is by no means exhaustive but will be a useful guide to the most commonly utilised species. Once the work has been completed a report will be submitted to Niue with recommendations for management of the most important species.

Publications and Information

The reports, *An assessment of the role of women within fishing communities in Tuvalu*, and *An assessment of the role of women in fisheries in Niue* have been printed as field reports and distributed. A draft report for Chuuk is awaiting comment from relevant agencies in FSM while the Kosrae report is in the process of being printed. These and other publications may be found in PDF format (and HTML for the bulletins) on the Community Fisheries Section homepage at:

http://www.spc.int/coastfish/sections/community/index.html

OCEANIC FISHERIES PROGRAMME

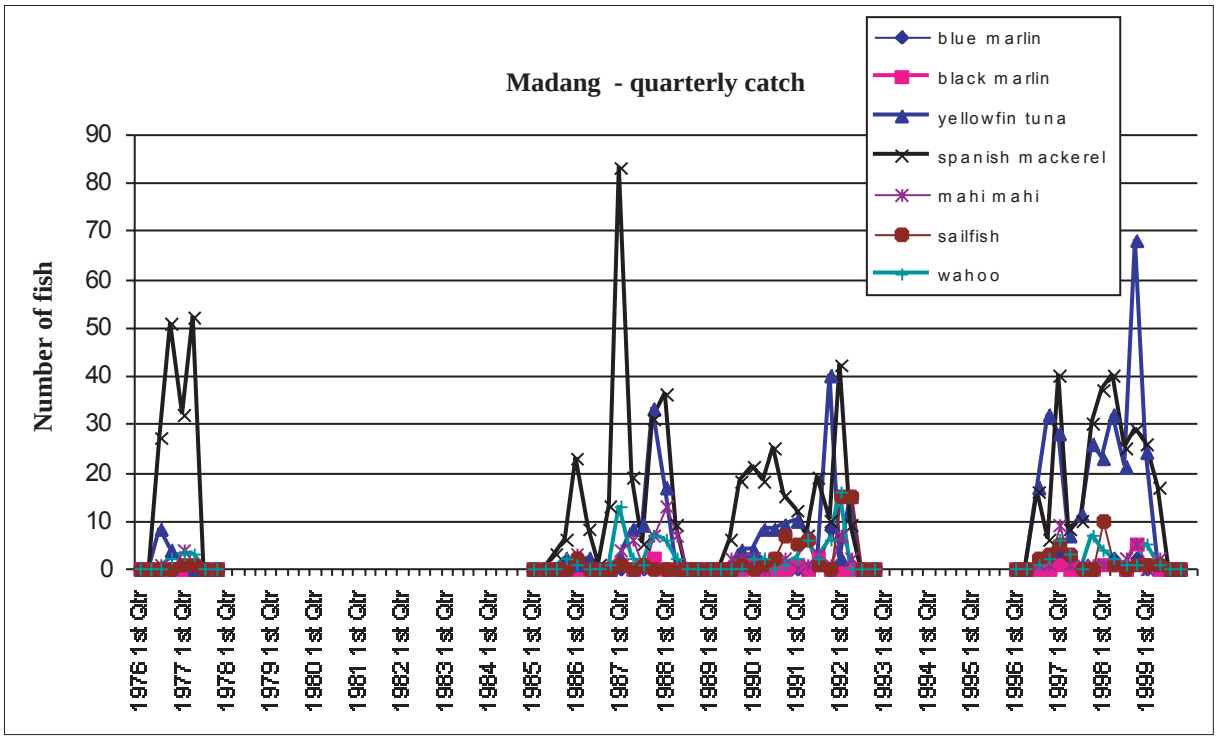
Wade Whitelaw (SPC billfish biologist) recently visited PNG to initiate a review of the billfish and gamefish resources of the country. This review is the second of its kind and follows on from the original compiled for the Kingdom of Tonga.

Wade visited Port Moresby where he spoke with representatives from the National Fisheries Authority (NFA) and the Port Moresby Gamefishing Club. He also visited Madang, Rabaul and Lae, speaking with local gamefishing clubs, to provide information on what is happening to main target species, especially marlin, but also to obtain information, data and comments on game-fisheries in these areas. The intent, in regard to the gamefishing, is to improve knowledge of what is being caught and what effort is being expended to achieve these catches.

The gamefishing in PNG is very good. The game-fishery itself, however is quite underdeveloped with only a few charter vessels operating. While marlin are an important component of the gamefish catch, the main species caught are Spanish mackerel, yellowfin tuna and wahoo. There is also a seasonality to the catch of these species (as seen by the figure on page 14) which shows the catch by species for the Madang Gamefishing Club with time. Large blue and black marlin are also caught in PNG waters and it is these species that the international game-fishermen come to catch.

Wade Whitelaw

The view while gamefishing in Rabaul



Wade is also in the final stages of producing a 'Country Guide to Gamefishing in the Western and Central Pacific'. Further information on gamefishing in the Pacific and the SPC gamefish catch and effort database can be found at the OFP web site http://www.spc.int/oceanfish/ or by contacting Wade at wadew@spc.int.

Wade Whitelaw

Gamefishing in Rabaul is "different"

Gamefishing boats at the Madang Gamefishing Club

Wade Whitelaw

A VERY BUSY 107TH MEETING IN HONOLULU, HAWAI'I

The 107th Council Meeting took place from 28 November to 1 December 2000 at the Ala Moana Hotel in Honolulu. Dr Judith P Guthertz, from the College of Business and Public Administration of Guam, chaired the meeting and led the discussions between the 10 Voting Council Members (six appointed members, three designated State officials and the US National Marine Fisheries Service (NMFS) Regional Administrator). She was strongly supported in this difficult task by Kitty Simmonds, the WESPAC Executive Director.

WESPAC meetings are open to the public, who are invited to comment before the end of each session. Sessions of the meeting normally take place in the following order:

1. preliminary or final results of a study are presented (e.g. stock assessment, environmental impact, and observers reports);

2. a list of recommendations or alternative measures to be taken, following the results of the study, are presented;

3. as required, the Voting Council Members ask the speaker(s) for clarification;

4. the public is invited to comment; and

5. Voting Council Members discuss and eventually adopt a series of decisions or recommendations.

During WESPAC meetings, most discussions translate smoothly into policy decisions. Many questions have already been discussed extensively prior to the meeting, and eventual problems have been identified. However, discussions can become more controversial when the Council has to react to unforeseen actions, such as the decision by President Clinton to declare the Northwestern Hawaiian Islands (NWHI) a Coral Reef Ecosystem Reserve. According to the Draft Executive Order issued on 4 December 2000, this reserve would be established for ten years, but many believe it would be a permanent institution.

This was probably the most important topic discussed outside of the plenary sessions during the Council Meeting. The NWHI represents 83% of the coral reefs and two thirds of the near-shore federal waters surrounding the state of Hawai'i.

This decision will mostly affect the Hawaiian bottom and lobster fisheries, but it would also end the prospects for starting a precious coral fishery. There has been anxiety about this decision since May 2000, when WESPAC was approached by the US Department of Commerce and Department of the Interior to develop recommendations for the preservation and sustainable use of the NWHI coral reef ecosystem. WESPAC recommendations to keep the NWHI opened to highly-regulated fisheries were not taken into account.

Consequently, one of the recommendations arising from the meeting was: "Council requests NOAA General Counsel to explain the process by which the President and Secretary of Commerce can ban fisheries in the NWHI outside the Council process, as suggested by the Draft Executive Order".

Before the final decision was made concerning the NWHI Reserve, WESPAC had to continue with its fishery management initiatives in the NWHI, even if some of the decisions may soon become irrelevant. Some of the important measures to be taken included:

- **Closing the commercial lobster fishery** in the NWHI at the three primary banks (Necker, Maro and Gardner) through 2001 and all other banks through 2002.

- **Setting criteria for a bottomfish fishery** by approving a weighted points system to determine the eligibility of a commercial bottomfish vessel to enter the NWHI Mau Zone limited entry fishery. Mau Zone permits are non-transferrable and can be kept only by vessels making five trips each year and landing 500 lbs (≈ 250 kg) of bottomfish per trip. Since less than ten boats were expected to comply with these requirements, some mechanism to allow new entries in the fishery had to be found.

- **Better protection for seabirds and sea turtles** that are caught incidentally by the Hawai'i longline fleet by issuing a set of measures or recommendations, including:

- allowing fishermen to transport protected seabird and turtle specimens to shore for research purposes.

- making it compulsory for Hawaiian longline vessels fishing north of 23°N to thaw their bait (so it sinks faster) and dye it blue (as it is has been proven to be less attractive to seabirds and possibly turtles). Vessels making shallow sets to target swordfish will be required to set their lines at night, while vessels targeting deep-swimming tunas must employ a line shooter and weighed branch lines.

- fitting any short-tailed albatross taken alive with satellite tags when released in the wild, in order to further understand the distribution of the species.

- undertaking new studies to identify the requirements for achieving and maintaining recovery of green sea turtle populations in the Hawaiian Islands, American Samoa, Guam and the Commonwealth of the Mariana Islands.

- **Developing stricter screening processes when recruiting observers**. This request was aimed at NMFS, the agency responsible for the observer recruitment, as longline operations had often been badly affected by seasick observers (following the turtle litigation and the court decision by Federal Judge David Ezra in early 2000, 20% of Hawaiian longline vessels must carry observers).

- **Placing the issue of interaction between large pelagic vessels and offshore handline vessels** at the Cross Seamount on the next Council's meeting agenda. With the area and seasonal closures placed on the longline fishery by Judge Ezra, interaction between fisheries may increase at the Cross Seamount.

- **Noting the importance of accounting for all fish catch** in the event that quotas are generated by the international fishery commission for the Central and Western Pacific. Quotas will be established under the Multi-lateral High Level Conference (MHLC) series (presently recreational fisheries in Hawaii are not required to provide catch reports).

- **Assisting the development of a pilot Native Observer Program** in each island area; the program would support the training and employment of indigenous people as observers on fishing vessels.

Some of the other interesting topics discussed during the meeting included the discovery of an 8000 km chlorophyll transition front — an oceanic feature that seems to define migration and foraging habitat for marine resources in the North Pacific — and the presentation of an experimental project in which approximately 50 tonnes of pure liquid carbon dioxide (CO_2) will be injected into the deep ocean (≈ 900 m), in order to look at ways to solve the greenhouse effect problem.

The 108th Council Meeting will take place from 15 to 18 February 2001 at the same venue in Hawai'i.

For more information on the Western Pacific Regional Fishery Management Council, check their website at:

www.wpcouncil.org

(Source: First-hand observations by Aymeric Desurmont, SPC Fisheries Information Officer, and extensive use of press releases issued by Sylvia Spalding, WESPAC JT Media Specialist)

Aymeric Desurmont

Judith Guthertz (left), from Guam, chaired the 107th WESPAC Meeting, assisted by WESPAC Executive Director, Kitty Simmonds

BREEDING AQUARIUM ORNAMENTALS ON THE ISLAND OF O'AHU, HAWAI'I

The North Shore of O'ahu, Hawai'i, is known around the world for its fantastic surfing waves, but it is also home to some aquaculture ventures that passionate entrepreneurs have established.

Betting on aquarium ornamentals aquaculture, Richard J. Masse has set his business, "Mangrove Tropicals", at the very tip of the North Shore, on what used to be an army airfield strip during WW2.

Fifteen years ago, a big oyster aquaculture farm was built there. The operation failed but all the gear was left on the spot. It was followed by a shrimp aquaculture project that also failed. When Richard leased the place from Campbell Estate, in 1998, some of the basic aquaculture gear – dock, pumps, pipes, tanks – was still there, ready to be used.

One of the features that captured Richard's attention was the seawater system. The water is pumped from a 30-m-deep well. Before getting to the well, it is naturally filtered by half a mile (the distance to the ocean) of limestone.

It is crystal clear and, more important for aquaculture, almost totally free of parasites. Hence, no further filtration is needed, just a lot of aeration to raise the pH. According to Richard, the quality of the water is the main reason for the excellent growth rates they obtain with the species they breed.

Well established now, the company employs four persons. It sells captive bred aquarium ornamentals to Hawai'i, the US mainland, Canada and Europe. It breeds seven different species of fish: three dottybacks (*Pseudochromis springeri*, *P. flavivertex* and *P. fridmani*), and four clownfish (*Amphiprion ocellaris*, *A. percula*, *A. melanopus* and *Premnas biaculeatus*). It also sells three species of giant clams (*Tridacna maxima*, *T. squamosa* and *Hippopus hippopus*) and one species of algae (*Taxifolia caulerpa*).

The common clownfish (*A. ocellaris*), the one with three white stripes, is definitely the best seller of the company. "We can never produce enough to meet the market demand," says Richard.

The giant clams are imported from another aquaculture company in the Marshall Islands and kept until they reach a marketable size. A few have been kept as broodstock but are still too young to reproduce. Here again, the demand far exceeds the offer and the company is looking for new suppliers.

Since no corals can be taken from the wild in Hawaiian waters, Mangrove Tropicals had to get some pieces of third-generation captive-bred corals from the Wai'kiki Aquarium. The company is just starting to grow them with some excellent results.

On top of the quality of the seawater, the company has another big asset: the half-a-mile stretch

Aymeric Desurmont

Richard Masse, President of Mangrove Tropicals, in the broodstock room, sharing some secrets.

of land that separates the main facilities from the ocean is perfect for developing other aquaculture projects. Some huge basins (60 x 40 m) are already there, remnants from the oyster and shrimp aquaculture times. And Richard Masse, a passionate man, has plenty of ideas to explore, when time and money permit. The place has many well-kept secrets, not least of which are Richard's ideas for future experiments.

For more information on Mangrove Tropicals, check

http://www.mangrovetropicals.com

or contact Richard at <mangrovetrop@att.net>

Aymeric Desurmont

Some of the PVC tanks used to breed the aquarium fish

Aymeric Desurmont

Which type of aquarium ornamentals could you breed in a 40 x 60 m basin?

SOUTH PACIFIC FISHING COMPANY (SPFC) RENAMED "PORT OF PALEKULA"

The South Pacific Fishing Company (SPFC) has a new name – Port of Palekula. The port was born after the signing of a six-month agreement between the National Fishermen's Cooperative Ltd (NFC) and Vanuatu Lampa Company (VLC) Group Ltd. NFC and VLC have agreed to work as a joint venture with 50% of the shares held by each. Managing Director Ray Chitty says that the slipway has now been repaired and ships are using it. Mr Chitty says that at the end of the month another agreement will be signed providing for the repair of houses, storage and other facilities at the Port of Palekula and they will start building aluminium boats.

The plan provides for 50 aluminium boats a year to be built over three years, giving a total

of 150 fishing boats. Each boat will have six crew and a captain, who will stay at sea for two weeks before returning to port. Mr Ray Chitty, manager of the joint venture project, says they will use the same system as Samoa. He says Samoa has been using this system since 1996 and so far they have earned USD 20 million (2 billion vatu).

Mr Chitty says that 20% of the revenue from sales of the catch will go to the company to repay costs of the boat. A written agreement to follow this system must be signed. Once the boat has been repaid in full, then all the money from the catch will belong to the fishermen because their account will have been paid and the boat will belong to them.

Boat building will start in March 2001. By 2003 Vanuatu will have the strongest-ever fishing fleet since independence. The total of 150 boats with six crew each means there will be 900 fishermen, plus those working on shore, so over a thousand people will be employed.

Mr Chitty says the system used in Samoa is good. Fishermen get money every two weeks from sale of their fish.

In another development, Jacques Bernard, Chairman of northern region fishermen, expressed concern over the agreement signed by the Minister of Public Utilities, Stanley Reginald, and the Minister responsible for fisheries, Albert Ravutia. Bernard said that Government should not have signed this agreement with the Ming Dar company of Taiwan, because of its poor working conditions. He pointed out that Government should have asked NFC for its views on the company.

However, the office supervisor in the Ministry of Public Utilities, Silas Aru, said the agreement signed between the Government and Ming Dar is quite straightforward. The aim of the agreement is to register ships that will be flying the Vanuatu flag in the Indian Ocean.

So far 10 ships have been registered under this agreement.

(Source: adapted from *Vanuatu Weekly*, 18/11/00)

■ POHNPEI FISHERIES PORT CONSTRUCTION UNDERWAY

The groundbreaking ceremony for construction of the first phase of the new fishing port facility at Deketik took place under sunny skies at the end of September 2000. The facility's first phase, which will cost about USD 6.2 million, is scheduled for completion in March 2001. It is the first of the two-part Japanese government grant for the FSM Project Improvement of the Deketik Fishing Port that totals more than USD 12 million.

The first phase will consist of an office and storage area, toilets, marine surveillance office, and tuna transshipment building. The contractor is Penta-Ocean Construction Co. Ltd.

During introductory remarks, Willy Hawley, Chairman of the Pohnpei Port Authority Board of Directors, said he was "excited about the project and the benefits it could gain from it."

Epel Ilon, Secretary of the FSM Department of Foreign Affairs, who also spoke at the ceremony said, "This project is a tangible affirmation that our relationship with Japan is more than just words."

Shigeatsu Nakajima, Japanese Consulate to the FSM Charge d'affaires, spoke to the future as well as to the present when he said the project would guarantee freshness of fish from Pohnpei so the price at auction in Japan will increase.

The chargé d'Affaires added that the port promises to contribute largely to Pohnpei's income and that he hoped the farmers would also increase export of Pohnpei pepper and other commodities to Japan.

He said that while Brazilian pepper is five times cheaper that Pohnpei pepper, it was Pohnpei pepper that Japanese prefered to purchase.

The Chargé d'affaires went on to speak about the 30 million Japanese tourists who spend USD 30 billion annually. He said infrastructure projects like this could assist the state to attract these tourists.

(Source: *Marianas Variety News and Views*, Friday 04/10/2000)

STUBBORN MIDDLEMAN PAYS USD 173 200 FOR TUNA

A Japanese seafood distributor put pride over prudence to bid up a 202 kg bluefin tuna to USD 173,200 at an auction Friday, doubling the record price paid for the popular fish in Tokyo.

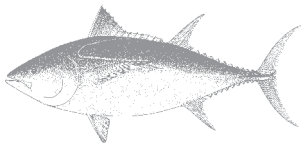
The final price tag, which put the fish at USD 857 per kilogram, broke the previous all-time high in 1998 of USD 385.93 for a tuna, said an official at Tokyo's Tsukiji fish market, the world's biggest.

"I was being stubborn and didn't want to give in to the other bidders," the unidentified distributor, whose clients include top-notch Tokyo restaurants, told TV Tokyo. "I can't profit from it."

Market experts said the tuna was caught off Aomori prefecture in northern Japan and was the best on the block at Friday's auction, the first of the year. The price, however, was probably unwarranted, they added.

"Everyone, even the auctioneer, was surprised," said another official at the market. Japanese are voracious consumers of tuna, which is usually served raw in sushi or as sashimi.

(Source: Reuters, 5/01/01)



NEW STUDY SAYS RAIN AND CLOSED AREAS ARE GOOD FOR AKULE

Known as **atule** in American Samoa, **atulai** in Guam and **akule** in Hawaii, bigeye scad (*Selar crumenophthalmus*) is abundant and popular in the Pacific Islands. Nevertheless, serious studies on the species have been conducted in only a few places

Pioneering work by the Hawaii Division of Aquatic Resources (HDAR) included a tagging study in the 1960s rearing akule caught in the wild and establishing a captive brood stock for aquaculture. Now, adding to this knowledge of akule biology and population dynamics, are analyses of more than 30 years of catch data assembled by HDAR.

The results indicate that both akule and the related round scad *(Decapterus* spp.) known in Hawaii as **opelu,** are not overfished in Hawaii. They also suggest that **akule** abundance may be influenced by rainfall. Harvests of **akule** in the state over the past two decades have varied from 170,000 lb to 850,000 lb annually (≈ 77,000 kg to 385,500 kg).

Runoff from rainfall would fertilise the relatively nutrient poor waters around Hawaii, which in turn may have a beneficial effect on **akule** recruitment, suggests researchers Kevin Weng. The University of Hawaii School of Ocean and Earth Science and Technology MSc candidate developed the dynamic production models developed from the HDAR database and performed the analyses. The work constitutes the basis of his successfully defended thesis, *Analysis of the fisheries for two pelagic carangids in Hawaii* (1999).

Another important result of the analyses shows reduction of **akule** catch rates is related to the areas receiving the highest fishing effort. **Opelu** catch rates showed no such relationship. The results suggest that **akule** schools in particular bays and harbors have a higher site fidelity than the more mobile **opelu** schools.

Hence, closed areas may afford a strong measure of protection for **akule** schools if future management measures become necessary.

The recent Hawaii study will likely be of considerable interest elsewhere in the Western Pacific region. In American Samoa, **atule** can form a dominant fraction of the inshore fish catch in the territory.

The season for fish is highly variable, extending from March to July. In Guam, **atulai** forms an important part of the inshore hook-and-line catch. Fishers assemble in large numbers around harbours and along causeways to catch them with fishing poles between August

Akule Stats & Facts

- Grow to about 10 inches in length
- Life span about three years
- Same family as jacks and **ulua**
- Juvenile, called **halalu** or **hahalalu** appear in small schools as far as 40 miles offshore July–December in Hawaii but eventually find refuge in bays and harbours
- Adult **akule** move inshore February–August in Hawaii to spawn.

and November. The fish is also popular in the Northern Mariana Islands.

The impetus for the study was a request from the Council's Pelagics Advisory Panel in 1997 concerning the effect on the population gene pool resulting from the catching of **akule** schools with seines. Subsequent discussion suggested that an initial step would be an investigation of the current status of **akule** stocks in Hawaii with respect to exploitation.

Although **akule** is not a pelagics management unit species, the Council noted the advisory panel's concern and arranged for the study to be conducted.

(Source: *Pacific Islands Fishery News*, Fall 1999)

IN GALÁPAGOS, CLASHES BETWEEN FISHERS AND MANAGERS JEOPARDISE CONSERVATION EFFORTS

Dozens of fishers in the Galápagos Islands, angered by resource managers' refusal to expand a lobster quota, rioted in mid-November 2000, looting and destroying buildings including the administrative building of the Galápagos National Park. Eventually halted by military personnel sent from mainland Ecuador, the clashes signaled the continuation of episodes among Galapagueño fishers to use violence to oppose conservation efforts.

Conservation scientists in the Galápagos Islands face the challenge of implementing several initiatives — including a zoning plan to create a network of no-take areas (MPA 1:7) — in an island society that is increasingly trying to benefit from valuable fisheries.

Gold-rush fisheries

Although industrial fishing is banned within the 140,000 km^2 Galápagos Marine Reserve, "artisanal fishing" by locals is still allowed in most of it. The reserve was created in 1998 by the Special Law of the Galápagos, which placed the reserve under the jurisdiction of the National Parks Service. The National Parks Service also oversees the Galápagos National Park.

The mid-November unrest is the latest in a string of serious conflicts dating back to 1992, coinciding with the development of sea cucumber fishing in the archipelago. Efforts by park officials to place restrictions on the sea cucumber harvest in the mid-1990s led to the shooting of one park official and threats to other officials working for the park and for the Charles Darwin Research Station.

Owing to the islands' sea cucumber fishery and a growing, yet illegal, shark-fin fishery, the gross income of the Galápagos fishing sector has skyrocketed in the past few years. The sea cucumber fishery is worth USD 3.5–4.0 million to Galápagos fishermen per annual two-month season, and shark fins are reportedly earning USD 100 per shark.

With the money to be made, these are boom times for Galapagueño fishers. The number of registered pepinos (sea cucumber fishers) in Galápagos rose more than 70% from 1999 to 2000 alone. Many locals with limited experience in the fishing sector have declared themselves to be fishers, and some fishing cooperatives have accepted them.

What partly sparked the riots in November was a price spike in the value of spiny lobster, which attracted the burgeoning fishing effort to target that fishery. By some reports, it was possible in the 2000 lobster fishery to earn USD 500/day, compared to perhaps USD 100/day in 1999. Some officials have questioned the USD 500/day figure as an exaggeration; nonetheless, the number of registered divers for lobster in Galápagos jumped from 200 in 1999 to 450 in 2000.

Amid this surge in fishing effort, the national government's quota of 50 metric tons of lobster tails for the four-month season (September to December) was reached by the end of October. Fishers appealed to the local Participatory Management Board — composed of local authorities and representatives from the tourism, fishing, and conservation sectors — but the board reconfirmed the closure in early November.

Following this, from 13–17 November, groups of fishers mobilized and engaged in a number of disruptive activities, including seizing local government and research institutions, kidnapping giant tortoises from a tortoise raising center, and even ramming tourists' dinghies with fishing boats. The private home of Park Director Juan Chavez was invaded and destroyed; gifts of toys and clothes intended for his children were stolen and distributed in the streets.

Reactions

The recent rioting saddened conservation officials and scientists, who have teamed with

local stakeholders in the past half-decade to conduct research and define a marine zoning scheme.

Rodrigo Bustamante, former head of marine research and conservation for the Charles Darwin Research Station during the marine zoning process, placed blame for the violence on a number of factors. He expressed his personal thoughts on the violence — including reasons for, and possible responses to — in an essay, which MPA has excerpted (see boxes in this article).

Jerry Wellington, a University of Houston (USA) coral biologist who has assisted in Galápagos marine planning since the 1970s, said he has observed episodes of violence against Galápagos park wardens dating back decades. He had hoped, however, that a corner had been turned with the recent participatory management efforts. "I had great expectations six months ago," he said. "Then it all of a sudden blew up."

Two years ago, a Galápagos Islands census counted 16,000 people. Although this is widely considered an underestimate in light of recent fishing-related immigration, the size of the community is nonetheless relatively small, and this has led to enforcement difficulties, said Wellington. "The rule of law is weak in the islands, because the law enforcement authorities are so closely tied to the population," he said. "It's a closed community. It's hard to punish your uncle or your grandfather." He said this was why the riots in mid-November lasted for several days, eventually necessitating military intervention.

Roberto Troya, director of the Ecuador program for The Nature Conservancy, said there is also low credibility for the Ecuadorian government's commitment to enforcement of the Special Law for the Galápagos. With low credibility, there is little public fear of government-led crackdowns, he said.

Troya added that for violence to be averted in the future, locals must be incorporated more effectively in the tourism industry so that they may generate alternative sources of income. It

Factors That Led to the Violence

What factors led to November's conflicts in the Galápagos Islands? Rodrigo Bustamante, former head of marine research and conservation at the islands' Charles Darwin Research Station, says the answers are complex. In an essay describing his personal thoughts on the recent situation, Bustamante describes in one passage the primary factors that played formative roles in the clashes. Below, is reprinted, with permission, that passage from his essay:

"First, the participatory management process requires that decisions agreed during the process must be respected. Law enforcement is then needed, and in the case of Galápagos, has been inadequate. This inadequacy has reinforced the impression among fishers (and some Galápagos politicians) that mobilizing masses for pressure and violence is an acceptable way of achieving outcomes.

"Second, the closure of the lobster season provided a 'good' excuse for some sectors of the fishing community to pressure local authorities about other recent fishing restrictions that attempt to reduce increasing and unregulated impact of fishing on marine species. These restrictions are the banning of the use of long-lines and prohibition of all shark fishing (all species banned or restricted until ongoing negotiations and technical reports are completed).

"Third, not all fishers and fishing communities in Galápagos are the same, nor behave the same. The majority of the most aggressive and belligerent ones are newcomers (1-5 years in Galápagos), attracted by the 'gold rush' of fisheries for sea cucumbers and shark fin, with no long-term goals or commitments toward conservation and sustainable development. Some are larger and older, others are relatively small and new; but in both cases, unscrupulous seafood dealers and shrewd but shortsighted politicians and community leaders influence and lobby against management and conservation provisions as their political platforms, depicting the authorities as 'oppressors' of the poor fishing communities (with the hope that this will secure them votes for next election!).

"Fourth, despite the advances for conservation in Galápagos, some unresolved issues still remain that are critical for the long-term success of marine conservation. The most important is the lack of detailed regulations of artisanal fishing within the Galápagos Marine Reserve (GMR), overdue since 1998. Because of its slow nature, the participative process has so far failed to define the limits for fisheries growth of numbers of boats and people, nor has it detailed technical specifications and/or dimensions of boats and fishing arts. These are still under ongoing assessments and further negotiations."

[Note: Bustamante's full essay is on the web, at http://depts.washington.edu/mpanews/bustamante.htm.]

should be noted that the zoning plan includes provisions to develop such economic alternatives, including preferential access for former fishers to new permits for marine tourism activities.

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(Source: *MPA news*, Vol. 2, No. 6, Dec/Jan 2000-01)

Preventing Future Clashes: What Needs to Be Done?

In his essay, Bustamante describes several measures as necessary in order to prevent fisher/manager conflicts from continuing to occur in the Galápagos. These measures are reprinted below, with permission:

- Strengthen and consolidate the participatory management, including renewed efforts to support the weak basis of the stakeholders and to make a real connection between bottom-up and top-down decision-making for management and conservation.
- Help and facilitate the Ecuadorian authorities to publish and implement the special regulations for fishing and its development within the marine reserve.
- Promote and expand the incipient research and understanding of the economic and social drivers that are affecting conservation, with the objective to incorporate the relevant factors into an integrative model for human development guided by the protection and conservation goals for the Galápagos Islands.
- Expand the marine education and awareness programs to all four inhabited islands, with special attention to local leaders and politicians in order to find a common vision for long-term conservation.
- Initiate a broad-base communication campaign aimed to all fishers to realize that increasing numbers of fishers on cooperative books is not in their interest at all but is only in the interest of the leaders because of the expanded power base.
- Strengthen the fisheries and fishing-independent management of single-species fisheries based on sound demographic approaches incorporating economic and social parameters, and at the same time initiate multispecies approaches to understand the consequences of fishing on other components of the marine ecosystem.
- Increase the protection and monitoring of the no-take area network as the most important management tool for conservation of Galápagos marine biodiversity.

[Note: Bustamante's full essay is on the web, at http://depts.washington.edu/mpanews/bustamante.htm.]

WE LOVE FISH

Cardiologists have long known that eating fish helps protect against heart disease. What they don't know is why fish are beneficial. For years they figured it was a simple question of substitution: folks who replace red meat with fish are naturally cutting down their intake of saturated fat, which the body easily converts into artery-choking plaques. But a growing body of evidence collected over the past 30 years suggests there 's something special about fish. In particular, fish contain nutrients called omega-3 fatty acids (especially abundant in species like sardines, salmon and mackerel) that seem to promote cardio-vascular health.

One group convinced of the benefits is the American Heart

Association (AHA), which released new dietary recommendations. For the first time, the AHA has recommended that everyone eat two 3-oz servings of fatty fish a week. But the AHA's expert panel wasn't ready to declare that taking omega-3 all by itself in pill form, will protect your heart. It's just too easy to get more omega-3 than you need from pills, and the panel was worried that an excess could trigger serious side effects, such as internal bleeding.

Now it's the Food and Drug Administration's turn to consider the question. As the result of a lawsuit brought by alternative-medicine advocates, the FDA is supposed to decide before the end of this week whether the manufacturers of omega-3 pills and fish oils can advertise the fat's heart benefits. If the FDA agrees, omega-3 will join a select group of nutrients, including psyllium, soy and whole oats, that is cleared for similar health claims. The agency was keeping mum in advance about which way it was leaning, but the evidence provided some clues about how it might rule.

First some background. Omega-3 fatty acids belong to a group of compounds known loosely as polyunsaturated fats (Omega-6 fatty acids make up the other major type of polyunsaturated fats). These fats serve as the raw material for a whole host of essential structures in the body, from brain cells to molecules that regulate inflammation, blood pressure and blood clotting. Since our bodies cannot manufacture their own supply of omega-3s, we have to get them from the food we eat, mostly from fish but also from such plant sources as flax, soybeans and walnuts. Indeed, many European countries supplement their infant formula with various omega-3 fatty acids.

What does science tell us? The earliest studies simply reported that populations that traditionally eat a lot of fish — think Greenland Eskimos, Native Americans of the Northwest and the Japanese — have relatively low rates of heart disease. Then laboratory analyses showed that omega-3 fatty acids lower the risk of clots developing in the blood — a common trigger for a heart attack — while reducing the level of triglycerides, another fatty compound that has been linked to heart disease, and decreasing the number of irregular heartbeats. All pretty good circumstancial evidence, but not enough to support a health claim.

The weight of the evidence really started to tip last year with the publication in the British research journal *Lancet* of one the largest and most rigorous studies to date. Doctors in Italy randomly divided 11,000 heart-attack patients into four groups. All were given standard medical care, but some took a fish-oil capsule every day, while others received 300 mg of vitamin E, or vitamin E and fish-oil, or just a placebo pill. After two years, only those patients who took fish-oil supplements reduced their risk of dying from a second heart attack, by an average of 17% Vitamin E had no effect.

To many researchers, that's strong evidence that fish-oil supplements work. "I don't know how they can avoid a health claim," says Dr William Cooper, a professor of endocrinology at the Oregon Health Sciences University in Portland. "There will be court action, I'm sure, if they don't."

Still, some important issues haven't yet been addressed. While omega-3s do indeed lower the level of triglycerides in the blood they have a tendency to raise the level of LDL, or "bas cholesterol". No one knows if that's a healthy trade-off or for whom. Pregnant women in particular should be careful about fish-oil supplements. Taking cod liver oil, for examples can lead to an overdose of vitamin A, which can in turn cause birth defects. Some nutritionists speculate that omega-6 fatty acids — found in corn and many other vegetable oils — may limit the health benefits of omega-3 fatty acids. But here again, the evidence is incomplete. "We have a long way to go before we understand the minimal amount of omega-3 needed by the body and whether the ratio of omega-3 to omega-6 is critical", says Alice Lichtenstein, a professor of nutrition at Tufts University School of Medecine.

One thing is clear whether you get your omega-3s from pills, oils or fish: they are not panaceas. You still have to eat a well-balanced diet that's lower in calories and total fat than most Americans currently consume. Otherwise, you're fishing for trouble.

Show me the omega-3s
(in grams per 100 g of raw fish)

Sardines (in their own oil)	21.1
Atlantic mackerel	2.5
Herring	1.7
Lake trout *(not rainbow or brook)*	1.6
Salmon	1.2
Striped bass	0.8
Tuna	0.5
Pacific halibut	0.4
Channel catfish	0.3
Shrimp	0.3
Dungeness crab	0.3
Swordfish	0.2
Red snapper	0.2
Sole	0.1

SEAWEED'S NUTRITIONAL VALUE

Seaweed draws an extraordinary wealth of mineral elements from the sea that can account for up to 36% of its dry mass. This percentage offers a wide variety of minerals, i.e. macronutrients such as sodium, calcium, magnesium, potassium, chlorine, sulphur and phosphorus, as well as trace elements essential for avoiding deficiencies, such as iodine, iron, zinc, copper, selenium, molybdenum, and many other elements such as fluoride, manganese, boron, nickel and cobalt.

Two of these elements are particularly valuable, i.e. iodine and calcium, both of which are sorely lacking in the world's population. The all-time champion for iodine content is brown algae, with dry kelp ranging from 1500 to 8000 ppm (parts per million) and dry rockweed from 500 to 1000 ppm. In most instances, red and green algae have lower contents (100 to 300 ppm dry), but remain high in comparison to "standard" sources.

The nutritional implications are obvious: daily adult requirements, i.e. 150 µg/day, could be covered by very small quantities of seaweed. It is clear that seaweed would be useful as an occasional food additive or supplement.

Seaweed is one of the richest plant sources of calcium, with content sometimes reaching 7% of dry matter in macro-algae and as high as 25 to 34% in encrusting red algae (*Lithothamnion*).

Protein content in seaweed varies somewhat. It is low in brown algae at 5–11% of dry matter, but comparable in quantitative terms to legumes at 30–40% of dry matter in some species of red algae. Green algae, which are still not harvested much, also have a significant protein content, i.e. up to 20% of dry matter. *Spirulina*, a micro-alga, is well known for its very high content, i.e. 70% of dry matter.

Seaweed contains a rich cocktail of all the vitamins. The main ones are provitamin A in the form of beta- and alpha-carotene found in red and brown algae, with contents of 2 to 17 mg/100 g dry; vitamin C in red and brown algae, with contents ranging from 50 to 300 mg/100 g dry — equivalent to the tomato; and vitamin E in brown algae. B-group vitamins are generally well represented. An unusual feature is that seaweed contains B12, which is not the case for land plants.

Seaweed's lipid content is very low, ranging from 1 to 5% of dry matter, although seaweed lipids have a higher proportion of essential fatty acids than land plants.

Green algae, whose fatty acid make-up is the closest to higher plants, have a much higher oleic (C 18 : 1) and alpha linoleic (w3 – C18 : 3) acid content, the latter being essential to man along with linoleic acid.

Red algae have a high 20-carbon polyunsaturated fatty acid content, particularly the famous EPA (w30 – C20 : 5), which is most unusual, as these fatty acids are basically found in animals. Arachidonic acid (w6 – C20) is also well represented. They also contain 18-carbon polyunsaturated fatty acids (linolenic or linoleic).

In brown algae, fatty acid distribution is fairly comparable, with a higher linolenic acid concentration.

Seaweed has a high total dietary fibre content (32% to 50% of dry matter).

Among the insoluble fibres, there is a low percentage of cellulose and Floridean starch, particularly in red algae. Insoluble fibres are usually associated with reducing passage times through the colon.

The soluble fibre fraction accounts for 51% to 56% of total fibres in green (ulvans) and red algae (agars, carrageenans and xylans) and for 67% to 87% in brown algae (laminarans, alginates and fucans).

Soluble fibres are generally associated with hydration performance, i.e. absorption, retention and swelling, which affect the food bolus's passage through the stomach and small intestine, and can have cholesterol-lowering and hypoglycaemic effects.

Agars, carrageenans, ulvans and fucans are hardly broken down by contact with human intestinal bacteria; xylans and laminarans are fully and quickly broken down, producing a large amount of short-chain fatty acid; alginates are partly broken down. Oligomers produced in this manner have displayed bifidogenous effects in rats both in vitro and in vivo, opening up possibilities for prebiotic applications.

Close up on Japan

Japan is the world's largest seafood producer, importer and consumer. Annual seafood expenditures totalled 36,425 yen per capita in 1998.

In 1998, total fresh seaweed production was 623,286 tonnes for all types of seaweed.

It would appear that seaweed production has been levelling off since 1980, with 1988 standing out as the peak production year.

Today, Japan is the leading importer of seaweed, whilst Korea is the premier exporter — with Japan as its main customer.

In 1998, imports stood at a total of 71,800 tonnes of fresh produce valued at over USD 150 million. It consisted of 40,900 tonnes of Undaria from China and Korea worth USD 65.3 million plus other varieties worth USD 38 million.

Exports stood at 1214 tonnes of miscellaneous seaweed, i.e. processable raw seaweed, dried kombu and yakinori-ajitsuke nori worth USD 11.892 million plus 59.1 million dried *Porphyra* sheets worth USD 4.6 million. It should be noted that exports are mainly sold to the USA and Taiwan.

Market Overview

The largest outlet for seaweed in Japan is the human food market. Some 21 seaweed species are used daily in food preparation in Japan. The Japanese consume an average of 4 kg per capita every year. There is also a phycocolloid industry built around the three common compounds, i.e. agar, alginate and carrageenan.

The agar industry started in Japan over 400 years ago in mountainous regions where, in cold winters, agar would set into a gel. After being the leading agar producer in the 1970s, Japan now imports the raw material, *Gracilaria* and *Gelidium*, from Chile and South Africa for a yearly output of 1000 to 1500 tonnes in 1994.

Alginate extraction in Japan is carried out using *Ecklonia* and *Durvillea* imported from Chile and South Africa. The alginate obtained is high-quality material and is used in specific biotech applications. The use of *Laminaria* spp. for kombu, moreover, has resulted in the import of another raw material so as to extract alginates, resulting in a high end-product price. Overall production is about 1000 to 1500 tonnes per year (1994 figures).

The carrageenan industry is mainly based on direct imports (1718 tonnes in 1994). Carragenophytes are also imported from Southeast Asian aquafarms (*Eucheuma* / *Kappaphycus*) and from wild stocks in North and South America and Europe (*Chondrus* / *Gigartina*).

Seaweed farming in Japan

Seaweed farming is highly developed in Japanese coastal areas. The main species grown there are *Porphyra* (**nori**), *Laminaria* (**kombu**) and *Undaria* (**wakame**). These alone have accounted for 98% of overall Japanese seaweed production since 1984. The balance is made up of minor traditional (*Monostroma*, *Enteromorpha*, *Cladosiphon*) or experimental (*Meristotheca*, *Grateloupia*) crops or wild stock harvests.

Nori

Nori is a traditional food used, for example, to make sushi, which has been a highly profitable crop over the past century. Since the reproduction cycle's summer phase was discovered by Dr Kathleen Drew-Baker (this discovery has been celebrated on 14 April each year since 1963), farming has become easier and more lucrative – so much so that no imports have occurred since 1976. *Porphyra* cultivation is the largest subindustry in Japanese aquafarming, employing 16,800 workers. In 1998, output stood at 10,326 million **nori** sheets, i.e. equivalent to 396,615 tonnes of fresh produce.

Kombu

Kombu is the most widely sold seaweed in Japan. It is an 'all-purpose' product although it is most commonly used for bean-curd soup with kombu.

Wild stock still accounts for a major share of output. Several species of the genus *Laminaria* are used in the Japanese food industry. *Laminaria japonica* takes the lion's share of **kombu** production with a raw-material tonnage of 141,875 in 1998.

Wakame

Undaria pinnatifida cultivation is a relatively recent development on the Japanese seaweed scene and **wakame** is served as a luxury food on Japanese and Korean tables. It is highly sought after for bean-curd soup or salads. Raw-material production, standing at 73,508 tonnes, is unable to meet Japanese demand for **wakame.**

Prospects and Development

For some years now, the industry has tried to brighten up product images by creating new ones to boost consumption.

The gambit seems to have pulled off, if Japanese seaweed market trends over the last 50 years or so are any indication, particularly as exports have risen at roughly the same rate over this time period.

The problems which the seaweed market faces would be mainly organisational in nature, as a result of frequent clashes between the many stakeholders in the product chain. Coastal water pollution is, however, the most serious threat to the future of local production.

(Source: *Algo Rythme*, no. 51, 3rd quarter 2000)

THE COMMISSION ADOPTS A COMMUNICATION ON FISHERIES AND POWERTY REDUCTION

The European Commission has approved a Communication on European development co-operation policy in fisheries and aquaculture. The Communication stresses the importance of this sector for many developing countries and describes how the EU can contribute to sustainable management and development of aquatic resources for the benefit of the poorest people in the developing countries in order to help alleviate their poverty. Poverty reduction is the main objective of the Community's development activities*.

The adoption of the Communication ties in with the European Commission's commitment to improve consistency between development policy and other Community policies, such as fisheries and trade. Mr Poul Nielson, the Member of the Commission with special responsibility for development cooperation and humanitarian aid, stated: "At a time when the European Union is reviewing its entire development aid policy, the Commission wishes to launch a major examination of this sector, which is of vital economic and social importance to the developing countries and also to Europe. In proposing the adoption of a number of guidelines for development, trade, society and environment in the context of fisheries, the Communication is making a contribution to this examination."

Fisheries is an essential sector for developing countries' societies. The text of the Communication underlines this fact, referring to its vital contribution to food security, major impact on employment and the substantial role it plays in world trade, since 50% to 60% of the fish marketed in international trade comes from developing countries. In the developing countries, however, the poorest communities which depend on these activities are increasingly faced with the risk of a decline in the resources of the oceans, seas, lakes and watercourses. Overall, at world level, fishing activities have reached, not to say exceeded, the maximum viable level. If the necessary measures are not taken, and this trend is allowed to continue, the economic, social and ecological situation of some of the least developed countries could deteriorate further.

The European Commission points in the Communication to the international commitments which the EU has already made on this matter, reflecting its development co-operation policy and the external component of its common fisheries policy; the right to fish involves the obligation to fish responsibly, and local communities which live off fishing must be made aware of their responsibilities, and the importance of the contribution of artisanal fishing to employment and food security must be recognised.

In order to implement these commitments effectively, the Commission is advocating action on three levels:

- at the level of European co-operation policy, the activities, which will be targeted on certain partner developing countries, will concern: the strengthening of the role of people in civil society concerned with fisheries and aquaculture; aid for the introduction of policies on the sustainable management of resources; promotion of regional and international co-operation on this matter.
- at the level of other European policies which have an impact on the development of fisheries in the developing countries (common fisheries policy, consumers, trade, environment, research) greater consistency with the objective of the development policy will be sought on a country by country basis. In practical terms this means ensuring that these various policies contribute, or at least do not create any obstacles, to better living conditions for the poor communities who depend on fisheries and aquaculture.
- the third level involves greater dovetailing between the activities of the Member States and those of the EU. An overall document was needed to give a common view of what has to be done for fisheries and aquaculture in the development context. On a country by country basis the EU's co-operation strategy will be worked out in the light of each partner's positive contributions.

* See COM (2000) 212 final Communication from the Commission on the European Community's development policy; IP/2000/410 of 26 April 2000.

The Communication also makes a contribution to preparations for the review of the common fisheries policy which will be carried out in 2002. The European Commission intends in this way to draw the attention of the Council and Parliament to the development aspects of this policy, which are directly linked with alleviating poverty in the developing countries.

(Source: EU)

CONFERENCE ON SUSTAINABLE FISHERIES FOR FOOD SECURITY

The Southeast Asian region is home to 12% of the world's population and is rapidly growing. This and the pursuit of economic advantage have led to heavy over-exploitation of the natural fisheries resources and a decline in the environmental integrity in the Southeast Asian region.

This negative impact threatens sustainable fisheries production. The contribution of fisheries products to local food security, employment, socio-economics, trade and the environment for future generations is a major factor in the healthy well being and economic situations of the region's nations.

The urgent requirement is to re-evaluate current fisheries practices and exploitation patterns and encourage the formulation of appropriate regional policies and strategies, to reconcile the current practices, and to promote the development of sustainable fisheries.

To this end, ASEAN in collaboration with SEAFDEC will convene a conference on Sustainable Fisheries for Food Security in the New Millennium.

This Conference will take place in Bangkok, Thailand in October 2001 and will review the situation, analyse the problems and constraints, and present strategies that will assist the formulation of resolutions to develop a common vision and purpose for the management of sustainable fisheries in Southeast Asia. The conference will bring together both technical experts and policy makers in the expectation of creating a unified endeavour in the pursuit of sustainable fisheries in Southeast Asia. At the same time, an ASEAN Millennium Fisheries Exhibition will be organised for one week to provide an opportunity for exhibitors to demonstrate new technologies in fisheries and fisheries management.

Objectives and aspirations of the conference:

1. To support sustainable fisheries and recognise their importance in food security for the ASEAN region.

2. To create a climate of cooperative and integrated efforts among member countries of ASEAN to better achieve the goals of sustainable fisheries.

3. To emphasise the importance of such efforts in dealing with issues of social development especially for the poorer people and the socially disadvantaged of the region.

Expected achievements

It is expected that the conference will adopt a Millennium Resolution on ASEAN Fisheries and Food Security and a Plan of Action for the Contribution of Sustainable Fisheries to Food Security in the ASEAN Region. It is anticipated that these two resolutions will be a further framework for national policies and be transformed into fisheries practices by the countries in the region.

The papers will also be used as guidelines for the formulation of a project package, the 5-year Programme on Contribution of Sustainable Fisheries to Food Security in the ASEAN Region. All SEAFDEC departments will implement this programme in different parts of the ASEAN region during 2001–2005 as guided by the issues defined at the conference.

For more information, please contact:

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AFA/SPC TRAINEESHIP PROGRAMME FOR PACIFIC ISLAND FISHERS

by Grant Carnie
Principal Training & Development Consultant
Australian Fisheries Academy
Port Adelaide, Australia

A joint venture training and work placement program, first conceived over a year ago between the Fisheries Training Section at SPC and the Australian Fisheries Academy (AFA), got underway in Australia in October 2000.

Based on the very successful traineeship program run by AFA for young Australian fishing crew, the pilot program would provide the opportunity for six Pacific Island fishers to expand their knowledge and gain experience in the Australian fishing industry. The participants would undertake specific training at both AFA's Port Adelaide and Port Lincoln campuses before taking a position as a crew member on Australian fishing vessels involved in a similar fishery to the one they were involved with in their own country.

The trainees who came from Tonga, Papua New Guinea, Yap (Federated States of Micronesia) and Solomon Islands, work in the tuna longline and purse seine fisheries and the PNG prawn fishery in their home countries. They arrived in Adelaide in early October during an unseasonably cold spell and after settling in to their accommodation at the nearby Fort Largs Police Academy facilities, the first port of call was a clothes shop to purchase some warmer clothes.

The trainees spent two weeks at the Port Adelaide campus and undertook training in a range of skills including rope-work, wire-work, net construction, boat handling as well as completing their Marine Radio Operator's certificate through the regulatory controlling body, the Australian Communication Authority.

The program moved to AFA's Port Lincoln campus in mid-October, which is situated on the waterfront in the fishing boat harbour. Port Lincoln is one of Australia's largest fishing ports and certainly its most diverse. As well as being home to the lucrative southern bluefin tuna fleet and tuna farms, it has fleets operating in prawn, lobster, sardine, crab, fish trawl and marine scale fisheries. It also has an abalone fishery and a rapidly expanding aquaculture industry farming species such as oysters, mussels, scallops, yellowtail, kingfish and snapper.

The trainees stayed in waterfront apartments in the marina complex, which was a five-minute walk from the campus. While the outlook might not quite have had the tranquility and beauty of their own islands, they all decided that life in a waterfront apartment wasn't a bad way to spend two weeks!

After an introductory tour of the local fishing fleets, seafood processing plants and aquaculture enterprises, the trainees

Grant Carnie

Junior Delaiverata from Solomon Islands at the helm practicing boat handling skills

Grant Carnie

Ignatius Falmed from Yap, Kami Hulape and William Tewaii from PNG demonstrating boat handling skills in Port Adelaide

began the second half of the off-the-job training. AFA trainers presented an overview of fishing methods in Australia and particularly in similar fisheries as those they were involved with in their own countries, including fishing gear construction and an introduction to electronic fish finding. They then joined with the new group of Australian fishing trainees for the regulatory sea safety training, Elements of Shipboard Safety, and an introduction to seafood handling. The rapport between the two groups was excellent and the more experienced Pacific Island trainees were able to help the new Australian trainees as they began their fishing careers.

The campus-based training ended on 2nd November with a joint graduation ceremony in Port Lincoln of the Pacific Island trainees and the previous year's Australian fishing trainees. After being presented with their certificates by the CEO of the Australian Fisheries Academy, Martin Payne, and Ms Liz Penfold, the local Member of Parliament, the trainees joined local skippers, crews, fishing company representatives and AFA staff in celebrating the completion of the first phase of the traineeship.

The following day, the trainees went separate ways, joining various fishing vessels in different parts of Australia. This included longlining tuna with the Great Barrier Reef Tuna Company out of Cairns in Northern Australia and with two private operators based in Ulladulla in New South Wales, prawn fishing on a state-of-the-art freezer trawler from Port Lincoln and purse seining skipjack tuna off the East Coast of Australia on board the FV *Maria Luisa*, owned by AFE Fisheries of Port Lincoln. The trainees remained with their designated vessels until their departure from Australia in late December, in time to be home with their families for Christmas.

The pilot program was very successful, meeting and exceeding all expectations and hopefully laying the foundation for an ongoing partnership between SPC and AFA in the ongoing delivery of a similar traineeship. AusAID is in the process of examining a proposal for the continuation of the program, and all involved are hopeful that future funding will be approved.

The success of the program can be attributed to all involved including staff from SPC and the Australian Fisheries Academy as well as host employers but most importantly to the Pacific Islanders who undertook the traineeship. Their enthusiasm, commitment and desire to learn new skills was a credit to themselves, their employers and their country but most importantly they were great fun to be with and they will long be remembered by all who came into contact with them.

Grant Carnie

Practicing navigation skills at AFA's Port Adelaide campus

Grant Carnie

Trainees in the classroom at AFA's Port Adelaide campus with Hagen Stehr, Chairman of AFA and prominent Australian fishing identity

Grant Carnie

William Tewaii from PNG receiving his graduation certificate from Martin Payne, CEO of the Australian Fisheries Academy

FISHERIES DEVELOPMENT OFFICER VISITS FISH EXPO IN SEATTLE, WASHINGTON, USA

by Steve Beverly
Fisheries Development Officer
SPC, Noumea
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Each year Seattle, Washington, USA, the largest commercial fishing port in America, is host to the Seattle Fish Expo and WorkBoat Northwest. The Expo is held annually in partnership with four of America's leading industry publications: *National Fisherman*, *WorkBoat*, *Alaska Fisherman's Journal*, and *Seafood Business*.

Fisheries Development Officer, Steve Beverly, visited the show, which ran from 16 to 19 November 2000 and was held at the Washington State Convention and Trade Center. There were over 600 exhibitors at the show, including boat builders, seafood processors, engineering firms, and vendors of deck equipment, fishing systems, electronics, and safety gear.

In addition to product displays, there were presentations, conferences, and courses during the three-day show. The Governor of Alaska, Mr Tony Knowles, gave a presentation on the controversy surrounding the state's closure of a trawl fishery to protect the Stellar sea lion.

There was also a presentation by the head of National Marine Fisheries Service (NMFS), Ms Penny Dalton, which focused on the lawsuits against NMFS that have been brought on by NGOs and environmental groups seeking to close down many of America's commercial fisheries, including pelagic longlining. A conference on Highly Migratory Species (HMS) included fisheries lawyer, Mr Peter Flournoy, Esq, Mr Jim Cook (Ocean Producers International, Hawaii), and Ms Kate Wing (Natural Resources Defense Council).

The HMS conference also touched on the issue of fishery closures and the conflict between environmentalists and commercial fishing. One conclusion from the discussion was that fishermen everywhere need to prepare themselves for battle with NGOs and environmental groups by being more pro-active in seeking solutions to environmental and by-catch concerns.

Other conferences at Fish Expo included: Fishery Cooperatives, Re-powering Your Vessel, Vessel Financing, So This is Alaska (a slide presentation), Modifications That Will Keep Your Boat Afloat, Steering Clear of Storms, Electronic Charts, and Increasing Profits. The courses held at Fish Expo included: a three-day intensive HACCP certification

Steve Beverly

course and a CPR and first aid course. The main interest, however, was in meeting people and finding out more about all of the new products and technologies available to commercial fishermen today.

Notwithstanding all the pending lawsuits and fishery closures, fishermen and those who produce the equipment and technology for fishermen were eager to show and be shown all that is new or improved in the field of commercial fishing. It would be impossible to discuss everything at the show so just a few of the more interesting products and developments will be introduced.

New generation liferaft that doesn't need to be inflated or serviced and lasts for thirty years

A Canadian company, Ovatek, Inc, has developed a unique liferaft that could have a great impact on safety at sea in the Pacific. The liferaft is solid and not inflatable like most liferafts. It is constructed of fibre-glass with a foam core, otherwise known as a foam sandwich. Because the raft is solid, it doesn't need to be inflated and it never needs servicing (inflatable life rafts need to be inspected annually). One of the big drawbacks of purchasing an inflatable liferaft in most Pacific Island countries and territories is that there are usually no in-country companies that are qualified to carry out annual inspections. Because of this, the inflatable liferafts have to be shipped elsewhere for servicing. Liferafts are inflated with compressed gas and also contain kits with distress signals (flares, smoke signals, and rockets). As such, they are classified as hazardous cargo and can not be shipped by air. Therefore, there is a long delay in getting a liferaft serviced. To maintain a fishing schedule and always be safe, a fishing boat would actually need to have two inflatable liferafts, one to be serviced in winter and one to be serviced in summer. This would be very expensive and is probably one of the main reasons why Pacific Island fishing boat owners often decide not to equip their boats with liferafts, or not to service them if the boat is already equipped. The Ovatek liferaft eliminates this problem. The only service that needs to be done is to upgrade the materials inside the raft (distress kit, food, and water).

Aside from no annual inspection, the Ovatek liferaft has several other advantages. It is virtually unsinkable, it is self-righting, it provides a safe haven, it can be boarded on deck, it offers protection from hypothermia and other elements (e.g. sun), and it will last for over thirty years. The Ovatek liferaft comes in two sizes: a seven-man model and a four-man model. The costs are initially slightly higher than an inflatable raft, but in the long run the Ovatek is much cheaper because of the savings in annual servicing costs.

Contact:

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Website: www.ovatek.com

The Ovatek liferaft comes in two sizes: a seven-man model and a four-man model

New navigation system that automatically creates its own seafloor maps

A Norwegian company, Olex AS, has developed an automatic seafloor mapping system that automatically generates topographic seafloor maps from data taken from your vessel's GPS and echo sounder. The maps show all bottom features in both two dimensions (2D) and in three dimensions (3D). The software also works in conjunction with C-Map electronic charts so can be used as a course plotter. Having a permanent record of the bottom topography would obviously be helpful to bottom and longline fishermen, but the information would be invaluable to fisheries departments who have ongoing FAD programs. In fact, the Olex software would be a great tool for conducting FAD site survey work.

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New integrated four-in-one navigator system that incorporates four separate systems (radar, GPS navigator, video chart plotter, and echo sounder) all in one waterproof unit

A Japanese electronics company, operating as Furuno USA, Inc in America, has a whole line of wheelhouse electronics that have long been favored by longline fishermen. Furuno has recently developed an integrated electronic system that will be of great interest to small-scale fishing operations in the Pacific. It is the world's first four-in-one system, called the FRS1000A, B, or C (depending on radar specifications). The FRS1000 combines radar, GPS, plotter, and echo sounder in one waterproof display unit. This is especially valuable for small vessels that have limited space in the wheelhouse.

Some of the features of the FRS1000 include: 24, 48, or 64 nm X-band color radar; GPS or DGPS capabilities; video plotter with chart cards; 50 or 200 kHz transducer for echo sounder; single or combined display of radar, plotter, and echo sounder; radar picture can overlay on plotter screen; remote displays can be added; and the whole unit can be controlled with a hand held remote control.

Contact:

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USA
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Website: www.furuno.com

New fishing lights that effectively replace chemical lightsticks for longline fishing

Lindgren-Pitman, a company that makes longline fishing systems, has come up with a revolutionary fishing light for aiding in catching broadbill swordfish and bigeye tuna. The light is called the Electralume™ and comes in five different colors: blue/green, blue, green, white, and red. The Electralume was designed to replace chemical lightsticks that have been used for years in the swordfish fishery.

Electric fishing lights have been on the market for years, however. The big difference between Lindgren-Pitman's new light and other similar electric lights is that instead of having one power consuming incandescent light bulb, there are two energy efficient LEDs, or light emitting diodes, in each Electralume fishing light. The old fashioned incandescent lights worked well but the batteries needed changing after each night of fishing. The Electralume will burn

Jean-Paul Gaudechoux

The Electralume™

brightly for up to three weeks without changing batteries. This means that one set of batteries (2 AA size) will last for an entire fishing trip, maybe two trips. The initial cost of the lights is more than for chemical lightsticks but in the long run they will result in a savings because they only need to be purchased once. After that, only batteries need to be purchased.

The best thing about these re-usable lights, however, is that they don't pollute the marine environment. One objection to the use of chemical lightsticks for fishing is that some of them ultimately end up in the sea where they do damage, especially to marine birds who mistake them for baitfish and often ingest them, resulting in death. This will not likely happen with a re-usable light.

Contact:

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Web: http://www.pop-hawaii.com

New system for controlling corrosion on hydraulic fittings

A Canadian company, Insulmatic, has developed a new type of tape for covering hydraulic and other fittings that are exposed to seawater and salt air and subject to corrosion. The new anti-corrosion tape is called PetroWrap® and is used in conjuction with another tape called PetroWrap Overlap. The overlap is actually what makes Insulmatic's system different than other anti-corrosion tapes.

Grease tape, or oil impregnated gauze wrapping, has long been used on fishing boats to protect hydraulic fittings, hose ends, pipes, and valves. The problem is that the grease wears away or ends up on the fishermen's gloves and clothing.

Eventually the tape works its way loose and seawater reaches the hydraulic fitting and corrosion sets in. In the past, fishermen tried to overcome this problem by wrapping the grease tape with insulating tape or duct tape. Normal tape, however, will not stick to grease tape. PetroWrap Overlap will do just that, however. The unique combination of an inner layer of grease tape and an outer layer of waterproof tape that has the ability to stick to grease tape will provide years of protection against corrosion from seawater.

According to the manufacturers, PetroWrap repels water, salt, alkalis, and acids; protects new and corroded surfaces; withstands temperatures of -40º C to 65º C; will not crack, peel, or harden; and is non-toxic and non-polluting; and can be applied to wire brushed surfaces.

Contact:

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Delta, BC, V3M 5R4 Canada
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Website: www.cansealant.com

New swivel snaps with rotary ball bearings and escape-proof snap

Hi-Liner Fishing Products, Inc, of Florida, USA, makers of Hi-Catch fishing products, has come up with a new unique design for a swivel snap. Swivel snaps are used mostly for trolling or for rod and reel fishing, but also can be used for handline fishing or deep-bottom fishing.

Swivel snaps are commonly used to attach lures to trolling lines. The swivel snap has two functions: it provides a connection between two different elements of the gear, and it allows the line to rotate without twisting. What makes the Hi-Catch swivel snap unique is the locking device that connects the swivel snap to another line.

The secret of the swivel snap is the patented Escape-Proof Snap. The snap can be opened and closed easily with one hand.

This can be done even with gloves on or with wet hands. Other types of swivel snaps, such as pigtails or interlock

snaps, work well but can make it difficult to change a lure quickly. When the fish are biting, it is important to be able to replace baits and lures as quickly as possible. The Hi-Catch Ball Bearing Escape-Proof Snap Swivel should help both sport fishermen and commercial fishermen to do just that.

Contact:

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New websites

Aside from the websites given above, there were several organisations represented at the Fish Expo that do most of their business on the Internet. The most interesting of these are described below.

www.fis.com

Fish Information & Services is a website that provides news and information of interest to everyone in the commercial fishing industry. Their website lists information in the following categories: companies and information by country, market prices, market reports, trading market, information by species, hot news, aquaculture, new technology and products, and a listing of worldwide shows and fairs.

www.onlinemariner.com

Online Mariner is a website that provides information to commercial marine professionals, including commercial fishermen, in the following areas: news, weather, law of the sea, classified advertisements, and publications.

www.worldcatch.com

Worldcatch™ is a unique website that provides an alternative seafood market. Sellers can list their products at set prices or they can be put up for auction. Worldcatch acts as a sort of a "e-bay" for seafood. Aside from providing a market for seafood with a streamlined purchasing process, Worldcatch has news stories, market reports, and offers a forum for discussing issues that affect the global seafood industry.

(The Secretariat of the Pacific Community does not endorse any of the products or services mentioned in the above article).

TUNA GRADING IN SAMOA

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An analysis of the tuna industry training needs was recently carried out by the Samoa Fisheries Division. Among the priority needs identified by the survey was tuna grading skills for the local fish export companies.

While albacore tunas comprise the majority of catches and are exported frozen to the two canneries in American Samoa, the local fish exporters are starting to export fresh chilled tunas to Hawai'i and mainland USA. Yellowfin and bigeye tunas need to be carefully graded before being packed for export to sashimi markets in Japan, US or Australia.

Grading an albacore for export to Pago Pago is very simple. Freshness is the key parameter and all fish carefully chilled after landing and brought to the exporter within a maximum of two weeks will be suitable for the canning process. Many more parameters are taken into account when deciding if a yellowfin or bigeye tuna should be sent to a sashimi market overseas.

The grader should consider the meat colour, oil content, presence of burnt meat, body shape, size, freshness, external appearance, and presence of disease or parasites. But this is not all, other factors such as the market situation and the production of competitors, are taken into account, making a good communication between the grader, the company manager and the overseas buyers essential. In other words, it will take many years of practice for a green grader to become an expert.

Last November, the Samoa Fisheries Division decided to call upon the services of the Training Section to address the needs of local exporters. Section staff have acquired wide experience in running tuna handling workshops in the region but they had never conducted an in-country workshop specifically targeting tuna graders.

It was thus decided to hire the services of a professional grader and after unsuccessful attempts in Japan and Hawai'i, we contacted the most experienced tuna grader in Fiji Islands, Mr Albert Petersen from Great Pacific Seafood.

Luckily, Albert was keen to take part in this training venture and his boss agreed to release him for the duration of the workshop in Apia. During his fifteen

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Checking the temperature of a nice bigeye tuna at CJ Exports

Michel Blanc

Albert showing how to take a flesh sample near the tail of the tuna

years of employment within the Fiji tuna industry – mostly with Fiji Fish Ltd – Albert graded hundreds of thousands of tunas, if not millions… The Training Section could not find a better resource person for the Samoa workshop!

The workshop was conducted on Tuesday 12 and Wednesday 13 December. Its content combined classroom sessions at the Fisheries Division with practical grading demonstrations at the processing plants of the four Apia-based tuna exporters.

Classroom sessions included a slide show to explain the different grading parameters, the sashimi concept and tuna marketing in Japan. Sessions covering on-board handling practices were also included to provide fish exporters with a clear understanding of how the local fishers should be treating their catch from landing to unloading. Despite several workshops on tuna handling, most local fishers still do not carry sufficient ice to properly chill their catch, and because the alia catamarans are now doing two-day trips – instead of one-day trips in the early years of the fishery – the issue of fish quality and the problem of rejects by Pago canneries is re-surfacing in Samoa.

Despite improvements in 1999 — rejects from the two canneries in American Samoa were reduced from 190 tons in 1998 to 53 tons in 1999 — 94 tons of albacore tuna were rejected in Pago Pago, from January to September 2000. Fisheries Division has decided to tackle this problem of quality through training – a 3-week HACCP for tuna exporters was run in June 2000 – and legislation. A National Seafood Safety Monitoring Program will be initiated in 2001 and this will include the development of national seafood safety standards for the tuna fishing industry.

During the practical sessions, Albert was able to grade a wide range of tunas at each of the four fish exporters – CJ Exports, Albacorp, Tradewinds and Apia Export Fish Packers.

Participants were told that the best way to evaluate the colour of tunas was by comparing meat samples – tail cuts – of several fish, placed on white board and observed under natural sunlight (neon light alters colours).

At Albacorp, a company that exports small amounts of chilled albacore tunas to the US market, Albert explained that grading those fish does not require a tail cut, as colour and oil content are fairly homogeneous in albacore tunas. The key parameters are the fish's freshness (Japanese buyers require the gills and guts to be left inside the tuna so that its freshness can be quickly assessed), its firmness and external appearance.

Michel Blanc

Tuna flesh samples can also be taken using a coring tool

The best tunas were graded at CJ Exports, apparently the most discriminating company with respect to fish quality purchased from local fishers. There, only one, fat bigeye tuna was seen, a fish suitable for the demanding Japanese market, and several good-colour yellowfin tunas were graded by Albert as suitable for both the Japanese and US markets.

Overall, despite natural conditions that do not contribute to the catching of premium-grade fish - warm water equals low fat content – Samoan waters are home to yellowfin and bigeye tunas suitable for export to Hawai'i and the US mainland.

However, on-board handling procedures need to be improved to make those exports economically profitable. Local fishers, whether working on alia catamarans or larger longliners, need to apply the skills demonstrated during numerous workshops run by SPC and the Fisheries Division.

Spiking of the tuna's brain, if done properly, and if combined with the tanaguchi method, will stop all bio-chemical reactions inside the fish and thus preserve the fish's freshness and improve the colour of its meat. Bleeding is equally important and should be done immediately after killing the fish, either with the side cuts or by slitting the membrane between the gill collar and the gill cover.

Bleeding will result in a faster chilling of the fish – unlike other species, tunas are warm-blooded animals - it will assist with the ridding of blood-conveyed toxins such as the lactic acid responsible for the burnt meat or yake and importantly will improve the meat colour and appearance.

Thirdly, the tuna should be chilled in ice or refrigerated seawater as soon as the previous two procedures are applied. The bigger the tuna, the longer it will take to drop the core temperature close to 0° C – not less than 24 hours for a 80 kg tuna placed in an ice slurry! A rapid and complete chilling will preserve the fish's freshness and will reduce the risk of yake.

A total of 14 persons attended this grading workshop, including five staff of fish export companies, five fishermen, two Fisheries staff, one staff of the Samoan Quarantine and one young Fijian grader whose company – TriPacific Marine Ltd – sponsored to attend this training.

After the workshop was completed on Wednesday 12, Albert re-visited each company to grade more fish and give additional information to the local graders. The managers of these companies were pleased with the workshop content and while acknowledging that this training has given their staff the basic skills to confidently start grading tunas for export, they quickly requested the Fisheries Division to organise a tuna loining workshop early in 2001. It is likely this request will soon be

transmitted to the Training Section, which will seek the services of a professional filleter as was done in July 1999 for a workshop at Celtrock Holdings in Fiji Islands.

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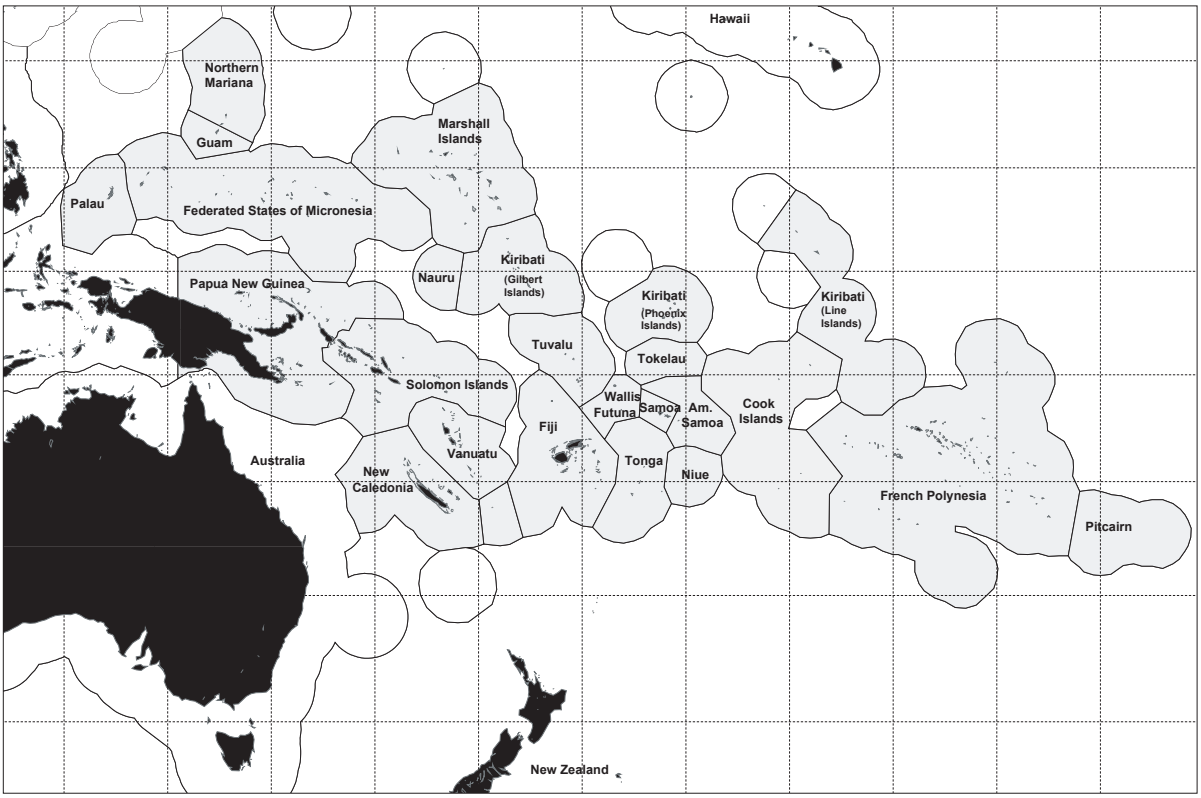
The best grading method: comparing samples by placing them on a white surface

Michel Blanc

This chunk of tuna will not be exported. It will be used for a sashimi-tasting session



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