

■ REEF FISHERIES OBSERVATORY

Staff of the coastal component of the EU-funded Pacific Regional Oceanic and Coastal Fisheries Development Programme (PROCFish/C) and the Coastal Fisheries Development Programme (CoFish) began fieldwork in the Cook Islands, with two sites surveyed in the first quarter. In addition, the Live Reef Fisheries Trade Specialist was involved in several projects, including fieldwork in Kiribati, a global IUCN grouper meeting, and training of an attachment from Tuvalu.

Fieldwork and surveys in the Cook Islands

Finfish, invertebrate and socio-economic surveys were conducted in two locations in the Cook Islands (Palmerston and Aitutaki atolls, Fig. 1) during February 2007. The PROCFish/C and CoFish team consisted of Kim Friedman and Kalo Pakoa (invertebrates), Silvia Pinca and Pierre Boblin (finfish), and Mecki Kronen (socioeconomics). The PROCFish/C and CoFish team acknowledges and thanks the following people who assisted and/or worked with the team at one or both locations: Ian Bertram, Secretary for Fisheries; Kori Koroa, Head of Coastal Fisheries Section; counterparts from the Cook Islands Ministry of Marine Resources, Richard Story, Ngatamaroa Makikiriti, Nooroa Roi, Ngametua Atingakau, Dorothy Solomon; boat operators and guides, Mataio Mareko (aka Captain Nemo), John Noovao, and Bill Marsters; Jo Akroyd, Cook Islands Marine Resource Institutional Strengthening Project; and the elders, community members, and fishers from the two survey sites.

Aitutaki

Aitutaki Atoll comprises a high island (16.3 km² in area), a shallow lagoon (75 km² in area to approximately 10 m depth), and a typical atoll barrier reef formation with reef islets or 'motus', the majority of which lie to the east

and south. Aitutaki's shallow lagoon (Fig. 2) is closed off by the barrier reef, except for one cut through the passage in the west, and two shallow passages in the east and northwest. Circulation inside the lagoon is slow, and coastal waters around the mainland suffer heavy rates of sedi-

mentation. Reefs in the lagoon were predominantly dead and fragile, and often covered by epiphytes and silt. Coral conditions improved with distance from the mainland, especially towards the southwest. On the barrier reef top and drop-off, reef conditions were generally good.

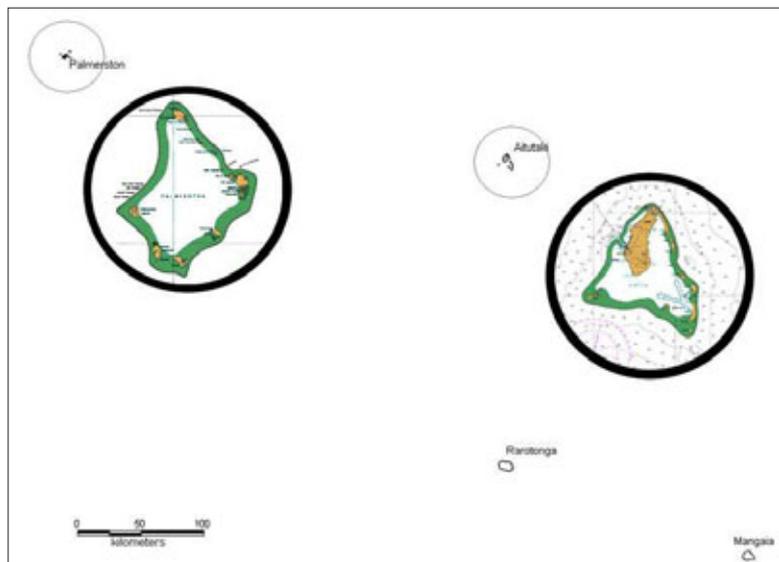


Figure 1: The two survey sites: Palmerston and Aitutaki atolls in the southern Cook Islands.

Figure 2: Aitutaki invertebrate survey coverage, with survey stations noted.

Invertebrate surveys were conducted in many locations around the reef and lagoon (Fig. 2). Preliminary results revealed that the elongate clam, *Tridacna maxima* was the most common giant clam, although *T. squamosa* was present, but rare. *T. maxima* stocks have been largely overfished, with dead shell piles evident on most 'open' reefs. Also noted in the reserve were large sized, healthy *Tridacna gigas*, *T. derasa* and *Hippopus hippopus* (translocated species). These present an excellent resource for Cook Islanders, as large sized *T. gigas* and *T. derasa* are becoming rare around the Pacific.

The commercial topshell 'trochus' (*Trochus niloticus*) fishery was the invertebrate highlight on Aitutaki. Trochus are harvested only when there are sufficient numbers on the reefs to ensure the quota can be reached sustainably, and har-

vests are valuable enough to warrant fishing. The last harvest was in 2001, and the current survey suggests that the trochus stock density (Fig. 3) is sufficient to allow fishing.

The density of urchins (*Echinothrix diadema*) was very high in some areas, especially on the reef platforms. Infaunal species were of little importance in the Aitutaki system due to limited habitat, although the Pacific asaphis (*Asaphis violascens*) is present. Aitutaki's beche-de-mer resource was unusual: although habitat conditions looked very suitable, the full complement of species expected for a high island lagoon system (such as Aitutaki) was not present. The three most commercially valuable species were *Actinopyga mauritiana*, *Stichopus chloronotus* and *Holothuria atra*, which according to local knowledge, have not been harvested for many years. Deeper

water species, such as prickly redfish (*Thelenota ananas*) were recorded, but at low densities. Other species such as *Stichopus horrens* (collected for subsistence use) were recorded in very low numbers. *Holothuria leucospilota* (edible gonads are consumed) was present in moderate to high densities. Brown sandfish (*Bohadschia vitiensis*) was absent, and only a single tigerfish, *B. argus*, was recorded. In addition, high-value black teatfish, *H. nobilis*, were also absent from records.

Finfish surveys are normally conducted at six locations in each of four reef types: outer reef, back reef, coastal reef and intermediate (lagoon) reef. However, a total lack of reefs along the coast and the murky water conditions within Aitutaki Atoll in the eastern lagoon area imposed a limit to the assessment of the coastal reef. Therefore, 18 dive locations in the outer, back and lagoon habitats were assessed with the following preliminary results.

Outer reefs: In general, fish density was high but diversity was very low. Most fish hid in pools in very shallow water and could not be reached due to the surf. There were fair numbers of large carangids (e.g. *Caranx melampygus* and *C. ignobilis*), *Chanos chanos*, *Scomberoides lysan*, and few average-sized *Cheilinus undulatus* (Fig. 4). Very high concentrations of *Cephalopholis argus* (ciguatoxic), and *Melichthys niger* and *M. vidua* were sighted. Parrotfish were the most abundant fish, with *Chlorurus frontalis* the main species.

Surgeonfish were represented by many *Ctenochaetus striatus*, as well as some species of *Acanthurus*. Very few *Acanthurus lineatus* and a few large schools of small *A. triostegus* were observed. *A. achilles* were rare. Higher level carnivores were frequent, such as *Lethrinus atkinsoni*. The fish were not wary of divers, most probably because carnivores are not targeted

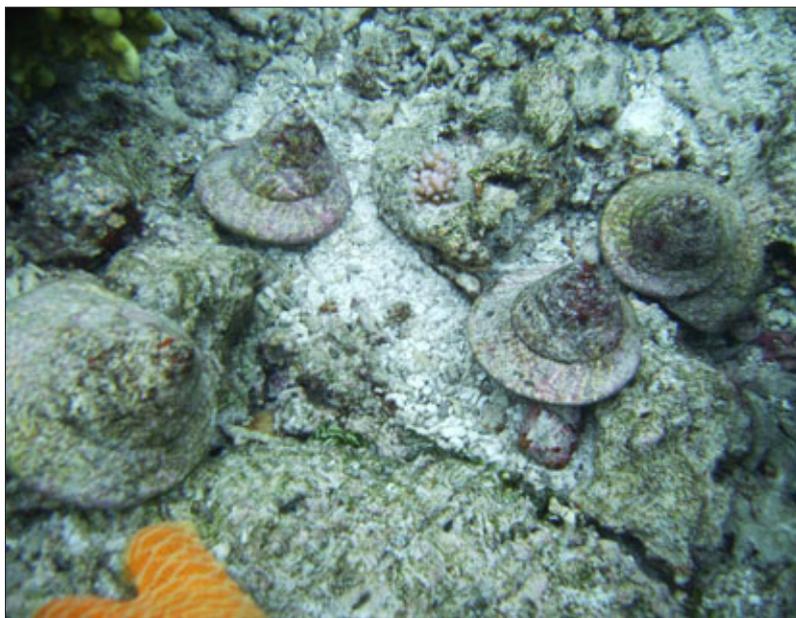


Figure 3 (above): Large broodstock shells in abundance (sizes 110 mm +) in parts of Aitutaki



Figure 4 (left): Napoleon wrasse on the outer reef of Aitutaki.

because of problems with ciguatera, especially *Caranx argus*, *Lethrinus xanthurus*, *C. melampygus*, *C. ignobilis*, *Lutjanus fulvus* and *L. monostigma*. There was also a total absence of sharks and only one turtle was seen at the surface by the west pass.

Intermediate reefs: These were very rare in the lagoon and located in very shallow murky waters (Fig. 5). The eastern reefs were not sampled due to very low visibility. Hard substrate was mainly found in the southwestern part of the atoll, where elongated thin reef structures were found.

Back reefs: The east side of the atoll has no back reef, which is

Figure 5: *Acropora* coral in the lagoon.

only present on the west and south sides of the atoll. This habitat is represented by a mix of dead coral rock and pockets of sand and rubble, inhabited by many small surgeonfish, and a few other fish assemblages.

Socioeconomic surveys on Aitutaki covered 30 households, including 129 people (~7% of the total number of 435 households and current population of 1871). Household interviews focused on the collection of general demographic, socioeconomic and seafood consumption data. In addition, individual interviews



were conducted with finfish fishers (26: 22 men, 4 women) and invertebrate fishers (22: 13 men, 9 women). The most important socioeconomic parameters are presented in Table 1 for both Aitutaki and Palmerston atolls.

Survey data for Aitutaki suggest that the community is less

Table 1: Fishery demographics, income and seafood consumption patterns on Aitutaki and Palmerston atolls

		Aitutaki (n=30 HH)	Palmerston (n=10 HH)
Demography	% of HH involved in reef fisheries	80	90
	Nb fisher per HH	1.93 (±0.53)	2.40 (±0.52)
	of which % finfisher men	25.9	16.7
	of which % finfisher women	5.2	0
	of which % invertebrate fishermen	0	0
	of which % invertebrate fisherwomen	6.9	0
	of which % finfish and invertebrate fishermen	39.7	33.3
	of which % finfish and invertebrate fisherwomen	22.4	50
Income	% HH with fisheries as 1st income	6.7	40
	% HH with fisheries as 2nd income	23.3	0
	% HH with agriculture as 1st income	16.7	0
	% HH with agriculture as 2nd income	6.7	0
	% HH with salary as 1st income	56.7	50
	% HH with salary as 2nd income	13.3	20
	% HH with other source as 1st income	33.3	20
	% HH with other source as 2nd income	10	30
	Expenditure USD/year/HH	5,239.13 (±788.81)	7,784.32 (±1,502.36)
	Remittance USD/year/HH *	1,068.09 (±584.44)	826.36 (n/a)
Consumption	Quantity fresh fish consumed (kg/capita/year)	57.71 (±7.31)	111.52 (±26.48)
	Frequency fresh fish consumed (time/week)	3.35 (±0.33)	5.30 (±0.42)
	Quantity fresh invertebrate consumed (kg/capita/year)	2.52 (±0.90)	4.25 (±3.70)
	Frequency fresh invertebrate consumed (time/week)	0.25 (±0.10)	0.30 (±0.25)
	Quantity canned fish consumed (kg/capita/year)	20.37 (±5.24)	0.00 (±0.00)
	Frequency canned fish consumed (time/week)	1.64 (±0.37)	0.00 (±0.00)
	% HH eat fresh fish	100	100
	% HH eat invertebrates	63.3	70
	% HH eat canned fish	73.3	0
	% HH eat fresh fish they catch	73.3	90
	% HH eat fresh fish they buy	36.7	0
	% HH eat fresh fish they are given	66.7	100
	% HH eat fresh invertebrates they catch	63.3	60
	% HH eat fresh invertebrates they buy	6.7	0
	% HH eat fresh invertebrates they are given	6.7	20

* average sum for households that receive remittances

dependent on fisheries than it may have traditionally been. The traditional dependency is evident from moderate to high per capita fresh fish consumption.

However, people also consumed canned fish at a significant rate, suggesting a change in lifestyle from fresh fish to processed fish, and a higher availability of cash, which helps to substitute subsistence fishing activities with purchased meals. A comparison of the current 2007 results with those reported by Adams et al. (1996)¹ in 1996, reveals that: 1) Aitutaki's total population has decreased from 2300 to 1800, 2) the average household size has also decreased (from 7 to 4 people), and 3) the frequency and quantity of fresh fish has decreased from 4.7 to 3.3 meals/week, and 100 to 58 kg/per capita/year. In addition, salaries are the most important source of income, whereas only 7% of households rely on fishing as a primary source of income, and 23% of households with a complementary secondary source of income. One reason for the suggested lifestyle change may be tourism, which brings at least 10 times as many visitors to Aitutaki per year as there are residents.

Palmerston

Palmerston Atoll has an extensive lagoon area (51 km²) that is 32% smaller than Aitutaki's, but is much deeper. There were six islets (or motus) on the barrier reef whose total land area was less than 2 km² (Fig. 6). The lagoon is closed off by the barrier reef except for one very shallow reef crossing (in the west, and with a depth of 2 m) and a second shallow cut, traversable at high tide, in the northeast. Circulation inside the lagoon was minimal, with the main water exchange occurring over the reef. Patch reefs were common

throughout the lagoon, often reaching up from a fine sediment benthos of 20–30 m (total inshore reef area was approx 10.2 km²).

Invertebrate surveys were conducted in many locations around the reef and lagoon (Fig. 6). Preliminary results revealed that *Tridacna maxima* was the most common giant clam species, and *T. squamosa* was present, but rare. Many dead shell piles were evident on most suitable reefs, indicating that the resource was being overfished. Small numbers of good sized adults are still present to ensure the flow of recruitment in the lagoon, but they are widely spaced and attention is required to ensure sustainability of the existing stock. The bulk of the female population is found in the larger sized clams (clams are protandric in their development), and therefore some stocks need to be protected in areas of medium

to high density. There was some mantle bleaching of clams in the lagoon (a similar reaction to coral bleaching), and no clams were found at depth on pinnacle patches, indicating that these habitats are affected by episodic periods of poor water quality.

Movements of trochus (*Trochus niloticus*) to Palmerston have been recorded for 1973, 1981, and 1982 (> 3000 shells transported), with just a single 1.5 tonne harvest in 1997 of poor quality shells. There is currently a moratorium on trochus harvesting, and there is some anecdotal evidence that the presence of trochus is limiting the return of giant clam stocks. Palmerston's outer reef (approximately 34.4 km lineal measure) was extensive, but most shells were recorded in the lagoon and near the 'draining' passages in the east and north of the lagoon. The cur-

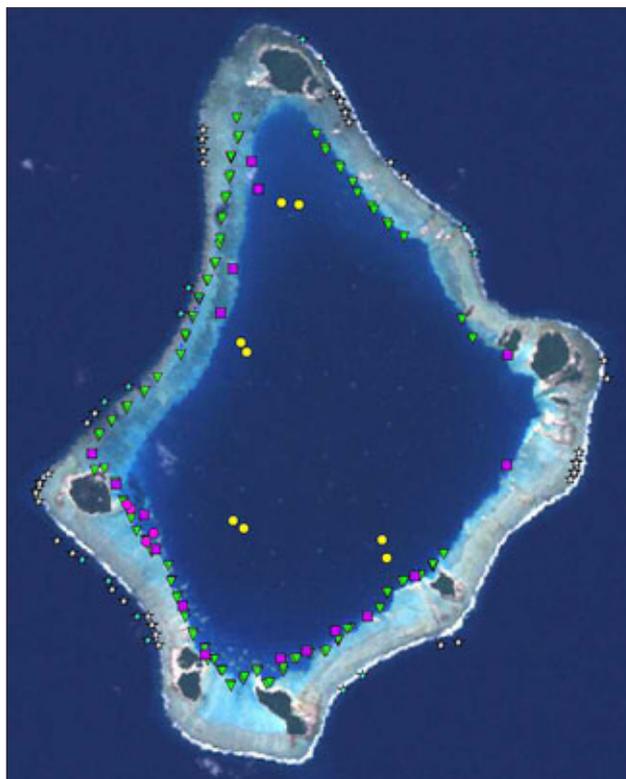


Figure 6: Palmerston Atoll invertebrate survey coverage, with survey stations noted

¹ Adams T.J.H., Bertram I., Dalzell P., Koroa M., Matoto S., Ngu J., Terekia O. and Tuara P. 1996. Aitutaki Lagoon Fishery, Fisheries Resources Survey and Management Plan, SPC, Noumea, New Caledonia.

rent survey suggests that trochus stocks are patchy and, within the best aggregations, occurring at low density. The outer reefs are a good habitat (high topography and complexity) for adults, but the low production of juveniles in the lagoon means less export of shells to these reefs.

The density of urchins (*Echinothrix diadema*) was not as high as on Aitutaki. In fact, the community at Palmerston is clearing out some of these urchins (dumping them on the beaches). Infaunal species were of more importance in the Palmerston system due to the available habitat, but Pacific asaphis (*Asaphis violascens*) was the main target, and this species does not lend itself to surveying as it is found in the stony benthos. Anecdotal records show lobster abundance to be low to moderate.

Palmerston's beche-de-mer resource consisted of slightly more species than Aitutaki's. The sea cucumber resource comprised mainly *Stichopus chloronotus*, although *Holothuria atra*, *Actinopyga mauritiana* and several specimens of *Bohadschia argus* were also recorded. In addition, black teatfish, *Holothuria nobilis* and a single specimen of white teatfish, *Holothuria fuscogilva* were also recorded. Other species such as *Stichopus horrens* and *Holothuria leucospilota* were also present, although brown sandfish (*Bohadschia vitiensis*) was absent. There was undoubtedly an opportunity to fish small amounts of greenfish (*S. chloronotus*), which were ubiquitous in the lagoon and recorded in high densities. Surf redfish (*A. mauritiana*) also has limited potential.

Like Aitutaki, Palmerston's finfish surveys were restricted to the outer reef, back reef and intermediate reef, as the coastal

reef area was all but missing, due to the atoll's particular topography and the total lack of terrigenous influence from the small motus. The following preliminary results are drawn from the 18 dive locations surveyed across three habitats.

Outer reefs: The eastern side of the atoll was not sampled due to poor weather conditions. In the northwest and northeast areas, high densities and large sizes of *Hipposcarus longiceps* (Fig. 7), *Chlorurus microrhinos*, *C. frontalis*, *Scarus altipinnis* and *Lethrinus xanthochilus* also formed large schools, and some of the sizes observed were quite exceptional. Since fish were not scared by the presence of divers, it can be assumed that spearfishing is not practiced. Large *Plectropomus laevis* were found everywhere due to the fact that they were ciguatera-toxic and therefore not caught by fishers. The abundance of apex predators (especially *Carcharhinus amblyrhynchos* and *Triaenodon obesus*) was fairly good, but not exceptional.

During the sampling period, the water at the northern tip of the atoll was very milky, probably because of spawn, and the fish were actively mating (especially surgeonfish and parrotfish, Fig. 8). Abundant small sized and juvenile fish, especially *Scarus sor-*

didus, were recorded on the flat outer reef area, but many large sized fish were found on the shallower coastward part of the reef. Poorer fish fauna of smaller size was recorded at the southeast sites. Several sharks, both *Triaenodon obesus* and *Carcharhinus amblyrhynchos*, along with one turtle, were sighted in these areas.

Intermediate reefs: The inside of the atoll is dominated by a sandy floor dispersed with several small columnar-shaped pinnacles and small patch reefs that displayed fairly good coral coverage and fish biomass. Two pinnacle dives in the northwest area of the atoll displayed high numbers of good-sized *Scarus altipinnis*, *Hipposcarus longiceps*, *Cephalopholis argus* and *Lethrinus monostigma*. A site located on a patch reef directly in front of the main island had fairly good coral cover and diverse fish biomass, with one Napoleon wrasse and a large school of rabbitfish.

Back reef: This habitat in the south and southeast had small coral patches composed of micro-atolls, which act as natural fish traps. This area is about 3.5 nautical miles long and has been seriously impacted, being located very close to the inhabited island. The northern lagoon sector is much richer although the fish, especially the dominant *H.*

Figure 7: *Hipposcarus longiceps* and *Chlorurus microrhinos* in Palmerston's western outer reefs.





longiceps, escape at the approach of boats and divers. The back reefs are very poor in corals and very poor in fish, except for a very high concentration of juvenile *Ctenochaetus striatus* (Fig. 9) found in the thousands on the southwest back reefs. Abundant numbers of trevallies (*Caranx melampygus*) were feeding and grey reef sharks hovered around the area. Rays were found feeding on the sandy bottom around the reef structures (Fig. 10).

On Palmerston, the current total population of 56 people, and all 10 households, were surveyed. Household interviews focused on the collection of general demographic, socioeconomic and seafood consumption data. In addition, individual interviews were conducted with all 24 finfish fishers and 20 invertebrate fishers (12 women, 8 men). A fish management meeting was also conducted with the Palmerston community. A comparison of the most important socioeconomic parameters of both island populations is presented in Table 1.

The Palmerston community is greatly dependent on its reef and lagoon resources due to the limited alternatives to earn income on this isolated atoll, as well as the limited agricultural potential. This fact shows in a calculated per capita consumption of ~110 kg/year, which is much higher than the figure stipulated by Preston et al. (1995)² of ~70 kg/year.

Figure 8 (top): *Chlorurus microrhinos* in mating display on Palmerston's outer reefs.

Figure 9 (middle): High concentration of juvenile surgeonfish.

Figure 10 (bottom): Blue fin trevallies (*Caranx melampygus*) and rays around back reef coral patch.

² Preston G.L., Lewis A.D., Sims N., Bertram I., Howard N., Maluofenua S., Marsters B., Passfield K., Tearii T., Viala F., Wright D. and Yeeting B. 1985. The marine resources of Palmerston Island, Cook Islands (1988). SPC, Noumea, New Caledonia.

Living costs on Palmerston are high because all goods are imported by boat from Rarotonga, and all perishable food items require freezing facilities. However, Palmerston has experienced some modernization as seen in nutritional, educational, income and lifestyle changes. Comparing data reported in the 1988 survey

(Preston et al. 1995) and the CoFish 2007 survey reveals that 1) the population has decreased from 140 (end of 1980s/beginning 1990s) to 66 (in 1996) and 56 (in 2007); and 2) the total number of motorized boats has decreased, from a reported 24 boats (and 35 outboard engines) in 1988, to 15 boats surveyed in 2007 (9 motor-

ized, 6 non-motorized). In addition there has been a slight reduction in the volume of fish exported, from a reported 80% in 1988, to an estimated 75% in 2007. There has also been a reduction in the quantity of open water fish catches (~70% in 1988) in favour of mainly parrotfish (2007).



The Live Reef Fisheries Trade Initiative

The Live Reef Fisheries Trade (LRFT) Initiative, a part of the Reef Fisheries Observatory, is a project currently funded by the MacArthur Foundation, AusAID and the Taiwanese government. The Initiative provides technical assistance and advice to Pacific Island countries and territories in managing their live reef fisheries and addresses other problems and issues relating to these fisheries in order to ensure their ecological and economical sustainability over the long term.

MacArthur Foundation approves further funding support for SPC's LRFT Initiative

In March 2007, the MacArthur Foundation Board of Directors approved the extension of the grant in support of the LRFT Initiative, with USD 350,000 being provided over the next three years. The grant will allow SPC to continue to provide the needed assistance to its member countries and territories in addressing issues and problems relating to the conservation and sustainable management of their live reef fisheries.

SPC is very thankful for this continuing support from the MacArthur Foundation and looks forward to a further fruitful three years working together in partnership with the Foundation.

Moving forward with the Kiritimati Island bonefish management plan

The Kiritimati Island bonefish fishery is a very important tourist-based catch and release sport fishery for Kiribati, with an estimated net worth of about USD 2.5 million annually. Because of concerns raised by

local bonefish guides and hoteliers on Kiritimati — in anticipation of potential problems from uncontrolled fishing efforts — the Kiribati government in 2002 requested SPC to assist in developing a management plan for the fishery. Due to a lack of information about the fishery, SPC initiated some scientific research and field experiments, which were conducted in 2003 and 2004. Most of this fieldwork went well, although some very important field experiments were vandalized towards the final stages of the survey, and so were not completed. Financial resources were short then, and the research was suspended until further funding could be found to complete the work. By 2006, with still no funds secured, the Kiribati government decided to look into internal funding options and again requested SPC's assistance.

A one-week trip was made by the Live Reef Fisheries Specialist, Being Yeeting, in January 2007 to discuss a strategy for moving forward with the Ministry of Fisheries and Marine Resources Development (MFMRD). During the visit — and after consulting with MFMRD and several other government departments that have an interest in the bonefish

fishery in Kiritimati — a six-month plan of action was drafted and presented to MFMRD. The plan consists of seeking funding as well as undertaking activities necessary to develop a Kiritimati bonefish management plan up to the actual completion and submission of the plan to the government.

The plan of action was implemented on 1 March 2007, and thus far, it is on schedule. Achievements to date, which are part of the action plan, include:

1. The completion and submission of a funding proposal to government. This has resulted in funds now being available to cover all activities, including the cost of technical assistance from SPC.
2. The completion and submission of a Cabinet paper to the Kiribati government for the endorsement of the management plan and related regulations to be developed.
3. The establishment of a Bonefish Task Force within the government that would provide governmental support and coordination of efforts and contributions of the different government

stakeholders. The Task Force is headed by the Ministry of Fisheries and comprises representatives from the Ministry of Environment, Ministry of Tourism, Ministry of the Line and Phoenix Group and the Attorney General's office.

4. The first consultation workshop with Kiritimati Island stakeholders was held in mid-March. The workshop provided the opportunity to present some of the biological findings from the bonefish research to date, discuss management issues and concerns, and facilitate the development of a bonefish management framework by the stakeholders using the Ecosystems Approach to Fisheries Management. The workshop was a great success with strong positive support from the public. A workshop report has been finalized and distributed to the Kiribati government and workshop participants at the end of April 2007.
5. The next steps include an attachment training of a Kiribati fisheries officer at SPC to learn how to process biological samples (e.g. otoliths, gonads), and learn how to process and analyse data. The attachment will also be involved in writing up the draft bonefish management plan and regulations to take back to Kiribati at the end of the training. Both the plan and the regulations will be given to government and public stakeholders for finalizing before submission to the government for endorsement and implementation.

Red listing of grouper species

The red listing of fish species is done through a process developed by the International Union for the Conservation of Nature

and Natural Resources (IUCN) to check on the status of exploited fish species. IUCN uses its widely understood system to assess and classify species according to their respective level of risk of global extinction. Critically endangered species ultimately become red listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which provides some protection for trade in signatory countries.

From 7–11 February 2007, the LRFT Specialist attended an IUCN workshop at the University of Hong Kong on the red listing of groupers. The workshop was attended by a number of well-known grouper researchers from around the world. Participants brought their own databases and references from the region they work in. The SPC PROCFish/C data, and data from previous SPC technical reports, were shared at the workshop, and together with data from the French Institute of Research and Development (IRD) provided by Michel Kulbicki, it was possible to complete an assessment of grouper species in the Pacific.

At the end of the workshop, the status of more than 100 grouper species was assessed. Twenty grouper species were classified as being threatened, meaning that these species needed urgent management measures to reduce their overexploitation levels in order for them to avoid becoming globally extinct. Most of these threatened species are not from the Pacific Islands region. Two species from the Pacific that are being targeted by the Live Reef Food Fish Trade, *Plectropomus areolatus* and *P. laevis*, were listed as vulnerable and therefore are in need of management, especially the known fishing practice of targeting their spawning aggregations.

The workshop was very useful in understanding the whole IUCN red listing process and in gaining an understanding of the status of groupers globally, and specifically, in the Pacific region. An information paper describing the IUCN red listing process will be circulated to SPC member countries in the near future. Also, a press release of the recent IUCN workshop held in Hong Kong can be viewed on the IUCN website:

http://www.iucn.org/en/news/archive/2007/03/6_coral_reefs.htm

CITES update

The next meeting of the parties to CITES will be in June 2007, and the following marine species are being considered:

- Proposed for Appendix II listing: two species of spiny lobsters (Brazil population only); European eel; red coral; spiny dogfish (*Squalus acanthias*); Porbeagle shark (*Lamna nasus*); and an endemic Indonesian species of cardinal fish.
- Proposed for Appendix I listing: all species of sawfish.

The proposed listings under CITES should have no affect on Pacific Island countries and territories. Also on the agenda for future consideration are sea cucumbers, toothfish, some other shark species, and seahorses.

There is now a memorandum of agreement between FAO and the CITES Secretariat, where FAO will provide scientific opinion and advice on all proposed CITES listings of marine species. In this regard, FAO has begun a worldwide review of sea cucumbers, covering the biology, fisheries and stock status. This will form the basis for any scientific advice provided to CITES on sea cucumbers, in the event they are proposed for listing under the convention.

Also to be discussed at the upcoming CITES meeting is the trade in giant clams, especially for the aquarium trade. CITES is concerned that some species being traded are not second generation cultured, and it appears that giant clam exports from some countries in the Pacific are under question.

Closer working relationships between SPC and SCRFA

In February 2007, the LRFT Specialist met with the Director of the Society for the Conservation of Reef Fish Aggregations (SCRFA, website: <http://www.scrfa.org>) to finalize and sign a memorandum of understanding (MOU) between SPC (through the LRFT Initiative) and SCRFA that the two organisations have been developing and discussing over the last year. In the past, SPC has worked closely with SCRFA informally, for the benefit and interest of SPC member countries. The MOU will allow a closer formal working partnership between the two organisations, so that they can assess reef fish spawning aggregations and establish management and monitoring programmes in Pacific Island countries that will ensure the sustainability of reef

fisheries in the region. There are no funding commitments tied to this MOU, but it is hoped that funding proposals will be developed for future work activities.

Tuvalu looks into the marine aquarium trade

In March 2007, Mr. Tupulanga Poulasi, fisheries officer from Tuvalu's Fisheries Department, undertook a three-week attachment training under the LRFT Initiative Attachment Training programme. Attachment training is part of a regular capacity building programme for Pacific Island countries to build local expertise within fisheries departments so that they can conduct resource surveys and analyse and interpret survey results of their live reef fisheries for management and sustainable development purposes.

This attachment training for Tuvalu is a follow-up to in-country training on field survey methodology, and a survey of the marine aquarium trade resources of Funafuti, undertaken in 2005 at the request of the Tuvalu Fisheries Department. This survey looked at the potential of Tuvalu's marine resources

for the marine aquarium trade. Unfortunately Tuvalu had to defer this part of the attachment to a later date, due to local staffing shortages.

The aim of the attachment training was to learn how to clean, enter and analyze the Funafuti survey data using RFID, a database and query programme developed by the Reef Fisheries Observatory. The fisheries officer also had the chance to interpret survey results and to write a technical report under the guidance of the LRFT Specialist. The report discussed the current status of the potential marine aquarium trade resources, the available species and stock estimates (with recommendations on how much should be considered for exploitation), and what management setups and logistical factors should be considered before starting up operations. The technical report aimed to provide the status of the resource without trying to promote or negate the possibilities of a marine aquarium trade for Tuvalu. The first draft of the technical report was completed by the end of the attachment. The report has been finalized by mid-April, and submitted to the Tuvalu government for consideration.



AQUACULTURE SECTION

Impacts of Policy and Institutional Environment on ACIAR Research in the South Pacific, USP Campus, Suva, 6-7 March 2007

According to the Centre for International Economics (CIE), policy and institutional settings are a major influence on the uptake, effectiveness and, therefore, the impact of research projects in the Pacific. This was the premise adopted by CIE when it was commissioned by the Australian Centre for International Agricultural Research (ACIAR) to review the impact of policy and institutions on its research projects in the Pacific.

To explore this issue further the CIE organised a regional workshop, involving approximately 20 representatives from industry, academia, NGOs, regional agencies and ACIAR. Country participants included Fiji, Samoa, Solomon Islands, Papua New Guinea and Tonga. The workshop was co-hosted by the University of the South Pacific (USP) Pacific Institute of Advanced Studies in Development and Governance, and was

held from 6-7 March at the USP Suva campus. SPC's Aquaculture Adviser also participated.

Policy may negatively influence the incentives of producers to undertake the investments generated by research. Distortions can also lead to situations where new production techniques may have counter intuitive and sometimes counter productive effects. Formal and informal institutions may reduce returns to invest-