

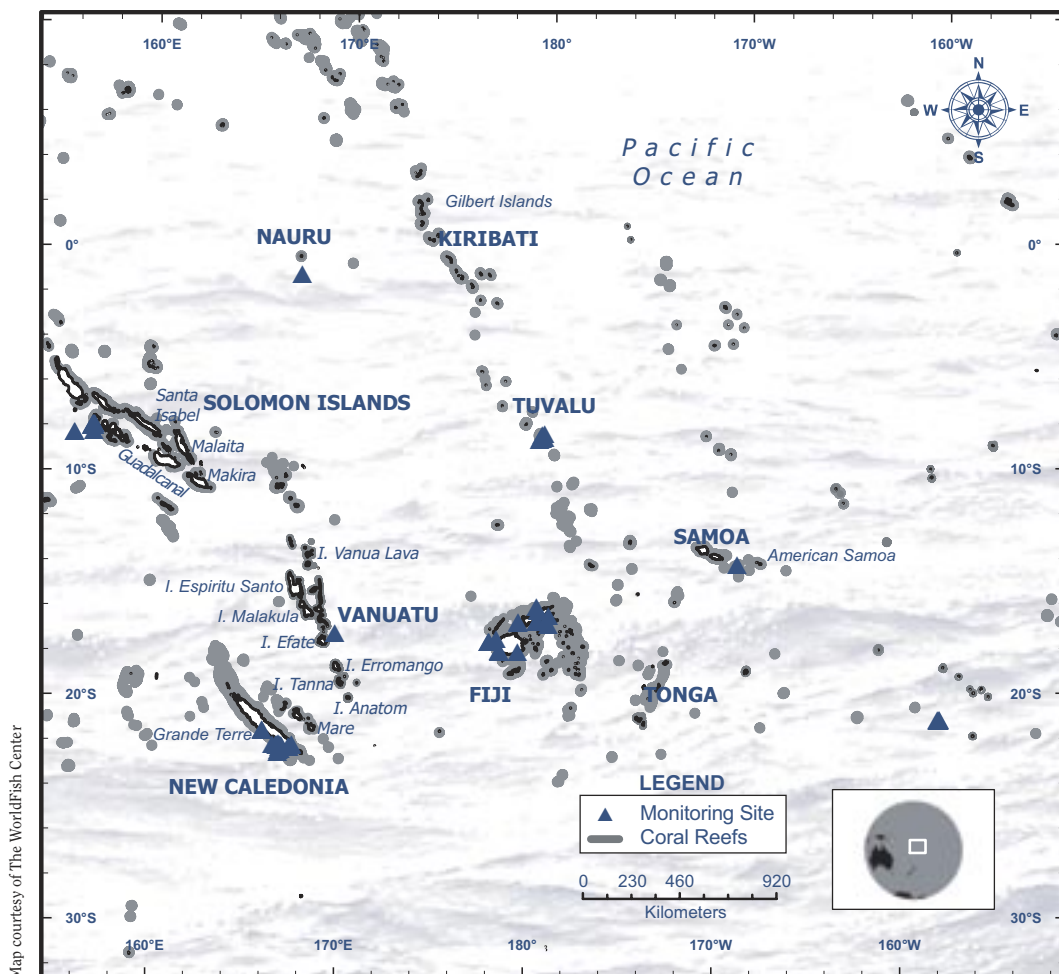
12. STATUS OF CORAL REEFS IN THE SOUTH WEST PACIFIC: FIJI, NAURU, NEW CALEDONIA, SAMOA, SOLOMON ISLANDS, TUVALU AND VANUATU

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ABSTRACT

Coral reefs in the Southwest Pacific are generally in good condition. There was extensive coral bleaching during 2000-2002. Since then coral reefs have shown highly variable recovery with some reefs recovering fully to pre-bleaching levels of live coral cover, whereas others have shown virtually no recovery. Nauru experienced coral bleaching and mass fish kills in October-December 2003, possibly due to unusually high sea surface temperatures. The greatest threats to coral reefs of the region continue to be human activities and cyclones, with reefs of New Caledonia, Samoa, Solomon Islands and Vanuatu having been damaged by cyclones since the 2002 status report. Cyclone Erica in 2003 destroyed 10-80% of live coral cover on New Caledonia. Cyclone Heta struck Samoa in 2004, damaging 13% of the coral reefs, and in mid-2004 an unprecedented number of seabirds were found dead on Nauru; the cause is unknown. The momentum in the protection and conservation of coral reefs in the region has been boosted by increased participation of governments, NGOs, scientists, volunteers and local communities, especially in the implementation of resource management strategies to mitigate human pressure. A series of damaging bleaching, crown-of-thorns starfish, disease and cyclone events in the past 10 years has generated a greater awareness of the need to conserve coral reefs. The SW Pacific Node has established an important network and conducted training, which will contribute greatly to coral reef management in the Pacific. However, these initial investments and initiatives could be seriously compromised after 2004 without ongoing financial support for coordination and monitoring. Monitoring surveys are only useful if they are conducted on a regular basis and tied to relevant issues such as over-fishing, MPA establishment and coral reef management. This report summarises the status of coral reefs of the SW Pacific region and has been compiled from the national reports of the 7 member countries. These national reports will be published in their entirety in December 2004; more information is on: www.usp.ac.fj/imr

100 Years ago: Coral reefs in the Southwest Pacific were in pristine condition around islands with low human populations. Exploitation of reef resources was for subsistence and governed



Map courtesy of The WorldFish Center

by traditional practices. The only destructive practices were occasional use of poisons and fish stampeding to catch fish for traditional feasts.

In 1994: The coral reefs were still in good condition, however, human populations were growing which resulted in over-exploitation of coral reef resources near population centres. The remote coral reefs were healthy. Some MPAs had been established but there was no coordination of coral reef activities in-country and across the region, and virtually no coral reef monitoring. There was little awareness of the potential problems facing coral reefs.

In 2004: Most coral reefs are healthy, while others are recovering after coral bleaching in 2000 and 2002. The major signs of reef stress are around the major towns due to over-exploitation and pollution from sediments and nutrients. Global climate change is recognised as a major threat to the coral reefs, and awareness of the problems facing coral reefs is increasing, but more political will is needed. Coral reef monitoring is expanding, but lacks sustainable funding and support.

Predictions for 2014: Large areas of coral reefs will remain healthy, with only those around the larger towns damaged. However, as populations increase, so will the pressures, and when combined with climate change increased damage to many coral reefs of the region is likely. Effective management will ensure that most coral reefs will be in good condition, but where conservation management is not applied, the reefs will be damaged and coral bleaching will exacerbate the decline. The allocation of resources will increase and there will be stronger political will, but still probably not enough to prevent some reef damage and local extinctions.

INTRODUCTION

The Southwest Pacific Node consists of 5 mostly high island countries (Fiji, New Caledonia, Samoa, Solomon Islands and Vanuatu), the limestone island of Nauru and the 9 coral reef atolls of Tuvalu. Coral reef monitoring in the SW Pacific has made good progress since the last Status of Coral Reefs of the World report in 2002. This has been made possible through the support of many organisations, governments and donors mentioned in the Acknowledgements.

The need for increased training within the regional node was detailed in the 2002 status report, and recent training activities for the region include:

- Reef Check training in Vanuatu in mid-2002, and early 2004;
- A train-the-trainers workshop for 13 participants from the region in Fiji in September-October 2002, funded by Canada, France and New Zealand;
- In-country training in the Solomon Islands in March 2003; in Nauru in May 2004; and in Tuvalu in July 2004.

This complemented in-country training for Fiji, New Caledonia and Samoa held earlier in 2000-2002. To date more than 80 participants have been trained in coral reef monitoring methodologies through national and regional training.

The major challenge for the SW Pacific Node is to continue this important role of coordinating training, monitoring, data analysis and reporting. Whilst funding has enabled the building of capacity within the countries, the salient role of assisting the members and coordinating activities nationally and regionally has been predominantly voluntary. The SW Pacific Node is grateful to the Canada-South Pacific Ocean Development Program Phase II (C-SPODP II) for support over the last 3 years. Funding will conclude in December 2004. IFRECOR (French Coral Reef Initiative) is providing funds for GCRMN activities in New Caledonia for 2003-2005. However, there are no concrete funding offers to continue the coordination of the SW Pacific Node, and such assistance is urgently needed.

STATUS OF CORAL REEFS AND MARINE RESOURCES

Coral reefs in the SW Pacific are generally in good condition. Some coral reefs that were bleached during 2000-2002 have recovered to just 10% of pre-bleaching levels, while others are fully recovered. Unfortunately, some have not recovered especially those subjected to cyclones, crown-of-thorns starfish (COTS) and *Drupella* outbreaks, and direct human destructive and over-exploitation activities. Nauru experienced coral bleaching and mass fish kills in October-December 2003, possibly due to unusually elevated sea surface temperatures. In 2003, Cyclone Erica destroyed 10-80% of live coral cover in several areas of New Caledonia. Cyclone Heta struck Samoa in 2004, causing damage to 13% of the coral reefs and in mid-2004 an unprecedented number of seabirds were found dead on Nauru; the cause is unknown.

Coral reef resources form the basis of the subsistence and artisanal fisheries in the SW Pacific region. The economic value of these resources was estimated at US\$71.04 million in 2002. Harvesting of the reef resources using traditional methods and materials is rapidly being replaced by more modern methods, e.g. the use of motorised boats. Fishers can fish longer, fish more efficiently and exploit areas beyond traditional fishing grounds. This is increasing pressure on the fisheries stocks and the coral reef environment. Most of the countries, except New Caledonia, have reported overfishing, especially around urban areas.

Fiji

Serious coral bleaching occurred in 2000 and 2002, with 40 - 80% coral mortality on many reefs. Inshore and deep-water corals were less affected than those on the outer-reef slopes. Many reefs are now improving, and monitoring before the 2000 bleaching event is showing that half of the sites monitored are now within 3% of the pre-bleaching hard coral cover in shallow areas (< 5 m) and 7% in deeper areas (> 5m). This illustrates strong levels of new coral recruitment and growth. Recovery is slow in some damaged areas, such as Beqa Barrier Reef and the western Astrolabe Reef.

Coastal developments continue to be a major stress on Fiji's coral reefs. Coastal pollution such as excessive nutrient load from tourism facilities and rural dwellings is compounded by the lack of adequate waste disposal facilities and sewage treatment systems. In urban areas, industrial pollutants continue to flow directly onto the reef. Poor agricultural practices, logging, land clearing, and building of marinas in mangrove areas add to the stress on near-shore coral reefs.

Over-fishing and the use of destructive methods continue to deplete the resources and damage coral reef habitats. The increasing coastal population and the high urban migration exacerbates this over-exploitation. The use of duva (Derris root) is now complemented with the use of chemical poisons, such as chlorine and fertilisers. Night spear-fishing using scuba and poaching from MPAs are an increasing problem. Bomb fishing has also been reported, although it is generally not considered to be widespread.

The task of reversing the degradation of coral reefs and resources is the responsibility of the Government of Fiji, through the Departments of Environment and Fisheries. The Worldwide Fund for Nature (WWF-South Pacific) in partnership with the Wildlife Conservation Society is promoting marine conservation using an eco-regional approach. The Fiji Locally Managed Marine Areas (FLMMA) works with indigenous communities to manage marine resources. Partners for Community Development - Fiji works on reef conservation and restoration activities with the tourism industry and villages. The University of the South Pacific through the Marine Studies Program, the Institute of Marine Resources and the Institute of Applied Science provide education and training in marine science for Fiji and most other countries of the Node. The Marine Aquarium Council (MAC) has developed a certification program for the aquarium trade, and to develop sustainability and socio-economic assessments. The Reef Check program is active in coral reef assessment and has developed the Marine Aquarium Trade Coral Reef Monitoring Protocol (MAQTRAC - Box p 97). UNEP and the International Coral Reef Action Network (ICRAN) have teamed with FSPI to develop the Coral Gardens Project. The Canada International Development Agency (CIDA) through Phase II (C-SPODP II) sponsored a 3 year (2002-2004) project of coral reef training and surveying and established a long-term reef monitoring program.

The perceived threats and the relative severity of those threats to some of the coral reefs of Fiji have been assessed on a scale showing the level of pressure from non-existent to very high.

Reef Area	INTEGRATED THREAT INDEX					Overall
	Coastal Development	Pollution	Sediment Damage	Over-fishing	Destructive Fishing	
Taveuni Somosomo	None/ Low	Medium	Low	Low	None / Low	Low
Taveuni Waitabu	Low	None/Low	Low	None / Low	None / Low	Very Low
Savusavu	Low/Medium	Medium	High	High	Medium	Medium
Namena	None / Low	None / Low	Low	Low	None / Low	Very Low
Lomaiviti	None / Low	None / Low	Low	Medium	None/ Low	Low
Suva	Medium	High	High	High	Medium	Very High
Kadavu	Medium	None / Low	Low	High	Low	Medium
Beqa	Medium	None / Low	Low	High	Low	Medium
Coral Coast	Medium	None / Low	High	High	High	High
Momi Bay	Medium	Low	Medium	High	Low	Medium
Mamanucas	Medium	Medium	Medium	High	Low	Medium
Lautoka	Medium	High	High	High	Medium	High
Yasawas	Medium	None / Low	Medium	High	Medium	Medium
Vatu-i-Ra	None / Low	None / Low	Low	Low	Low	Very Low
Rotuma	Low	None/Low	None/Low	Low/ Medium	None/Low	Low

Nauru

The Nauru Coral Reef Monitoring Network (NCRMN) was established following scuba training in early 2004, and has established 7 long-term monitoring sites. The task of the NCRMN is to address the limited amount of available information on the structure and distribution of coral communities. Recent surveys showed high mortality of *Acropora* colonies on Nauru, whereas massive and encrusting (non-*Acropora*) coral species have now become dominant. The most common species were *Porites australiensis*, *P. heronsis*, *Fungia* spp., *Pocillopora eydouxi* and *Millepora* spp. *Acropora spicifera* and *A. palifera* were relatively common. Reef development is generally poor and coral communities are either sparse or contain mostly dead corals, especially near the populated and developed coastal areas of Nauru. Small encrusting colonies grow on the reef slope and live coral cover is 0-20% in areas from Uaboe District to Gabab Channel and Boe District.

Most fisheries in Nauru are either subsistence or small-scale commercial, but the status of the fisheries and the fish stocks remains unknown. There is anecdotal evidence that some species are now rare or locally extinct and there are declines in most fish stocks and fish sizes. Results from an underwater visual census in 2004 have not been analysed. Continual monitoring of the fisheries, including performing market and household creel surveys, is important for future assessments and to develop management regimes.

A MASSIVE FISH KILL ON NAURU

One morning in September 2003, the people of Nauru were surprised to find a thin black line of dead fish along the beach...probably tons of dead fish. Some of the older folks recalled a similar event more than 50 years earlier. There were fish from many families (Balistidae, Scaridae, Serranidae and even moray eels); but no sharks were found. Staff from the Nauru Fisheries and Marine Resources Authority were even more surprised when they saw tons of dying fish, floating helplessly from the surface down to 20 m depth. The fish appeared intoxicated as they floated into the divers' faces. The water was warm, clear and bright, and the corals were beginning to bleach. Divers reported that there were warm up-welling currents containing large air bubbles down at 30 m. The fishes swam upside down with their mouths gaping as they drifted across the reef at low tide. The tuna were not affected and feasted on the stunned fish, and the local fishers feasted on the tuna. There were no other signs of damage to the fish, except the swim-bladders were inflated and the internal organs were covered with mucous. Other than that, they appeared fat and apparently in good condition. Cautiously the locals checked to see if the dying fish were poisonous. They were safe to eat and there was no evidence of ciguatera poisoning, and no red tides or *Trichodesmium* blooms had been seen. These weak and dying fish became an important food supply from September-December 2003. A search of the US Government websites showed that there were unusually elevated sea surface temperatures around Nauru at that time, and combined with the strong warm upwelling suggested decompression or major drops in dissolved oxygen concentrations in the water. The Nauruans could find no satisfactory explanation, many suggested that it was 'manna from heaven'. From: Margo Deije, GCRMN country coordinator Nauru

New Caledonia

The reefs of New Caledonia are generally satisfactory, but the diversity and density of invertebrates and fishes (especially the commercially important species) are higher inside MPAs than outside. Live coral cover averaged 27.5% (range 6% to 75%) with many different corals making up the communities. Non-living substrates were dominant in all stations. Only 3 stations could be described as having medium status: Akaïa station in the Bourail site; Récif intérieur station in the Thio site (high-sedimentation and fishing); and Luengoni1 in Luengoni site (tourism, fishing, sandy sites selected as a result of random selection of monitoring sites). The most recent coral reef survey was conducted between October and December 2003 covering 32 stations at 11 sites.

The fishery resources of New Caledonia do not appear to be seriously over-fished. The increasing level of fishing in parallel with the expansion of the population and the planned development of industrial and mining activities in new areas are all causes for concern for environmental and resource management. The fishing effort is concentrated predominantly in the SW lagoon around Noumea, and the greatest concern is for targeted benthic species.

There are 3 types of reef fisheries in New Caledonia: small-scale full-time artisanal fishers; recreational fishers and traditional fishers. The **small-scale full-time artisanal fishers** use 386 registered vessels and target inshore species. Total weight of the landed catches for inshore

fisheries in 2001 was 1212 metric tons (mt). The catches are sold at the local markets, stores and restaurants. Fishes are the main target group (57% or 690.5 mt), followed by spiny lobsters and mud crabs (23.1 mt combined). The lobsters are fished from the barrier reefs, whereas the crabs are taken from mangrove areas around the main island and constitute a substantial income for some traditional villages. Sea cucumbers are fished and exported (69 mt dry weight exported in 2003), as well as trochus (100 mt exported in 2003) and aquarium fish (7.3 mt in 2001). The level of fishing has remained relatively stable since 2000, but the fishing pressure has increased around urban centres due to increases in human populations. Artisanal fishers now need to target new areas to maintain or increase their yields. This is resulting in an increasing number of trips to Chesterfield Islands (more than 700 km from Noumea).

Recreational fishers are concentrated around the major cities, whereas traditional fishing is widespread around the islands. A survey in 2000 found that more than 99% of the people were engaged in traditional fishing; 50% reported that they fished 1 to 3 times a week and 70% fished from boats. The main gear used were hand lines and spear guns. The local population consumed 95% of the catch; 60% being given to their family or relatives, 10% of the catch is exchanged and 25% sold in the local markets.

Samoa

Coral reef assessment and monitoring has been sporadic over the past 20 years. Some monitoring has been conducted under short and medium term projects. Recently, monitoring activities have been coordinated in 3 major programs: the Community Based Fisheries Management Plan Program of the Fisheries Division; the SW Pacific Global Coral Reef Monitoring Network; and the Samoa Marine Biodiversity Protection and Management, an IUCN project.

Monitoring data from 2003-2004 showed that live coral cover was reasonably high. The average live coral cover in 2003-2004 at the permanent monitoring sites within MPAs and selected sites around Samoa was 34.5%. Live corals were dominant on the reefs of Savai'i (47.5%) and Manono (32.6%) Islands, whereas sand, rubble and rock dominated the substrate of Upolu Island. The high dead coral cover was a result of coral breakage from storms. An insignificant number of bleached corals were recorded; this was probably due to COTS or other localised causes, rather than warm water bleaching. Algal cover on Upolu was high with *Sargassum* spp., dominating. Observations during rapid surveys show coral diseases appear to be increasing, but this needs to be assessed further.

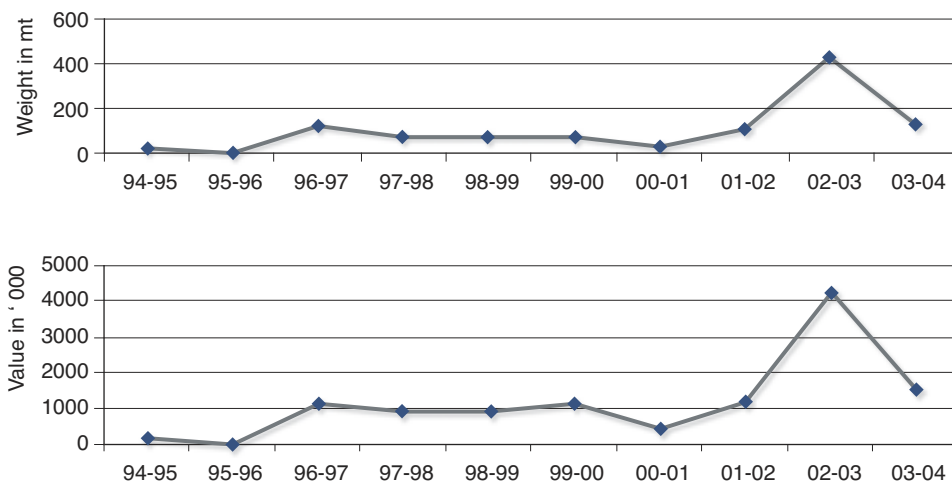
These summary data on corals and other life-forms indicate that the reefs of Samoa are predominantly healthy with reasonable levels of coral cover and little incidence of bleaching.

Islands	Live Coral %	Dead Coral %	Algae %	Abiotic %	Other %	Corals Bleached %
Upolu	23.2	9.2	21.5	41.2	0.6	3.9
Savai'i	47.5	15.6	7.1	27.4	2.0	0.4
Manono	32.6	6.0	15.1	26.9	0.0	0.0
Mean	34.5	10.3	14.6	31.8	0.9	1.4

More than 70% of Samoan villages are located on the coastal fringe of the islands, with inshore subsistence fisheries being one of the main activities. A household fisheries survey in 2000 found that each person caught an average of 2 kg of fish per hour. Based on these data, average seafood consumption was estimated at 57 kg per person per annum, and landings from the subsistence fishery were estimated at 7000 metric tons per annum, valued at SAT\$45 million (US\$16 million). The official statistics on the landed fisheries estimate that 134.4 mt of inshore fishery products valued at SAT\$1.51 million (~US\$0.5 million) were landed during 2003-2004; 72.5% of this was traded locally and 27.5% was exported either for commercial purposes or for the personal use of overseas relatives. Finfishes from the reefs and lagoons were the dominant product within the total inshore fishery, especially unicornfish (*ume*), parrotfish (*fuga*), surgeonfish (*pone*, *alogo*) and mullet (*anae*).

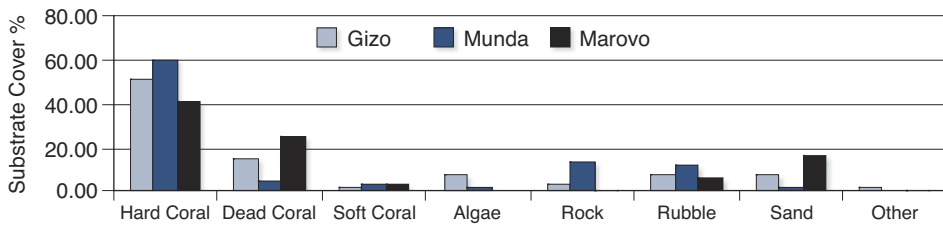
Solomon Islands

The Solomon Islands Coral Reef Monitoring Network is a partnership between the Department of Fisheries and Marine Resources (DFMR), Department of Environment and Conservation (DEC) and the SW Pacific Node of the GCRMN. Funding for the SICRMN is provided by C-SPODP II and WWF Solomon Islands. In 2003, WWF and DFMR trained 20 representatives from the Government (DEC), NGOs and dive shops in standard GCRMN survey techniques: line intercept transect; underwater visual census; Reef Check methods; and basic coral reef organism identification. Three monitoring sites, Munda, Gizo and Marovo, were established following recommendations from WWF, DFMR, DEC, WorldFish Center, and several dive shops. These surveys showed higher coral cover in Munda and Gizo, than in the Marovo lagoon.



Top: Inshore landings from 1994-2003; Bo Hon Value of inshore landing from 1994-2003 in Samoan SAT 1000

The graphs illustrate variations in inshore fisheries landing and value over ten years. The general trend fluctuates over the years, with a huge rise to 463.71mt valued at USD\$1.6 million in 2002-2003 because of the increased fishing effort coupled with improved fishing technology, before a drop to 134.4 mt valued at US\$0.5 million in the 2003-2004. Overall, there is still an increase in fish landings today compared to 10 years ago.



Live hard coral dominates bottom cover at the 3 sites surveyed in 2003/2004 in the Solomon Islands.

In June 2004, The Nature Conservancy (TNC) collaborated with a range of community, government, and NGO partners to conduct broad scale rapid ecological assessment of the biodiversity and status of the marine ecosystems of Solomon Islands (Box p 35). The biodiversity of the Solomon Islands was similar to that found within the 'Coral Triangle' of Indonesia, the Philippines and PNG. The focus of the study was biodiversity of corals, fishes, and key invertebrates especially those targeted for the local and export fisheries. Several areas were recommended as high priority targets for conservation, and the data collected, especially on the bottom cover, will contribute to a national baseline for long-term monitoring of the coral reef communities of the Solomon Islands.

Pressure on the marine resources has increased due to the growing demand in urban and semi-urban areas of the Solomon Islands. The ethnic crisis of 1999-2002 caused the closure of prawn, poultry, pig, and cattle farms, increasing the pressure on marine resources as people went in search of food for subsistence and income. The most serious human threat to coral reefs in the Solomon Islands is over-fishing, especially to generate a cash income. The Department of Fisheries and Marine Resources have yet to carry out proper stock assessments of the commercially important species within the country, however anecdotal reports from fishing communities are indicating that over-fishing is a growing problem.

Bomb fishing was previously a problem in Langa Langa lagoon and in the Ngella Islands region; however this practice has slowed with increasing awareness, although a few isolated incidents are occasionally reported. The rise in population in provincial centres has resulted in an increase in coastal development. This usually has direct effects on the reef systems from coral mining, sedimentation and sewage outfalls into reef waters. The lack of planning from provincial development divisions has seen much of this development go unchecked. Mangrove forests have been cleared to create more land for urban development and this is now a growing problem in provincial areas. The result has been an increase in turbid waters during rainy seasons and resuspension of sediments during rough weather. In areas where there has been rainforest logging, such as Marovo and Vella Lavella, a loss of coral cover and fishing grounds has been reported due to the effects of sediment running off deforested lands. There also has been an increase in coral bleaching due to the added stresses on the coral colonies. These logging companies are also big consumers of marine products and purchase large quantities, including species which are prohibited such as turtles, dugongs, giant clam, plus popular reef fish species such as snapper, grouper, lobster, bumphead and humphead wrasses. These species are in decline at locations in Marovo lagoon where there is significant logging activity.

Coral bleaching from global climate change has rarely been reported in the Solomon Islands. However, during 2000 there was widespread bleaching around Gizo, Marovo and Ngella. There

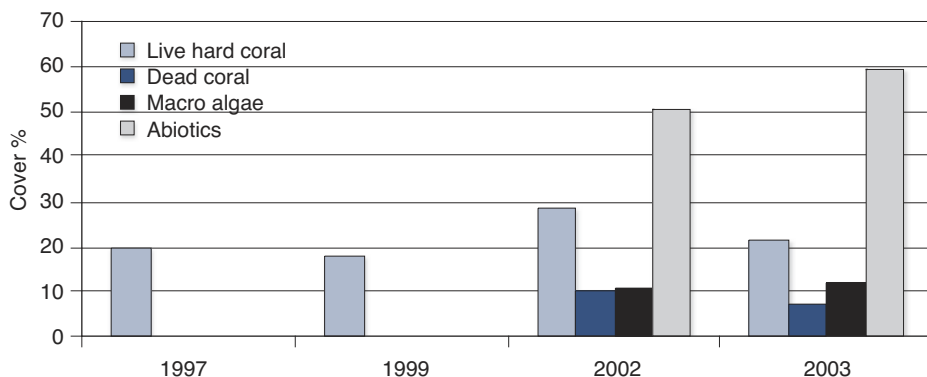
is a growing problem of COTS outbreaks in the western Solomons, parts of Guadalcanal, Ngella and parts of Malaita, with the outbreaks probably occurring at more frequent intervals. This has raised concerns among the local conservation organisations and tourism dive operators.

Tuvalu

Coral reef monitoring is conducted by the Departments of Fisheries and Environment, and the Funafuti Conservation Area. Recent surveys revealed live coral cover to be very variable (0-70% cover). The highest coral cover occurred outside managed reserves, compared with low coral cover in the Tefala Reserve and Fualopa Reserve (6.5% and 6.2%, respectively). Good coral cover can be found on the western side of the atoll and reef slopes possibly due to the presence of several deep channels into the lagoons.

Branching *Acropora* spp., were the most common coral species followed by table *Acropora*, usually on the slope and floor areas of the reef. Massive corals (*Porites* spp.) were sparsely distributed on reef flats and gentle reef slopes. There was a significant cover of blue coral (*Heliopora*) at Fuafatu and Teafualiku. Total algal cover was generally low except at Fualopa and Tepuka, with *Halimeda* species growing on the reef flat, sandy areas and among corals. The coral cover has declined by 9% since the last surveys. This may be due to strong wave action created by stormy conditions in late 2002, and destructive fishing. The overall trend shows considerable variation between the sites. The trends in coral cover since 1997 show reasonable stability between 20 and 30% average coral cover with a large component made up of sand, dead coral and coral rock. Predation of table *Acropora* species by coral eating molluscs (*Coralliophila radula*) is evident, but COTS were uncommon with only 2 individuals collected inside the Reserve.

Reef fishes are targeted by both subsistence and commercial fishers on all islands. Subsistence fisheries contributed 5.5% of the GDP in 1998, with the majority of these based on Funafuti (44 artisanal fishers). The National Fishing Company also on Funafuti owns and operates 3 launches, each about 9 m long. These launches are prohibited from fishing inside the Funafuti lagoon because of their large fishing capacity. There are now cold storage and processing facilities on all the islands, and both fresh fish and fish products from the outer islands are supplied to the main market at Funafuti.



Live coral cover at monitoring sites on reefs of Tuvalu appear to be relatively stable around 20% to 30% over the 6 year monitoring period.

Among the most sought after fishes are the snappers (Lutjanidae); which are found all year round and are most abundant on the atoll islands. Heavy fishing has threatened some snapper stocks, in particular *Lutjanus kasmira* and *L. gubbus* inside lagoons, especially on Funafuti. In addition, some pelagic species such as trevally and scads are also favourite food fish, but they are not always available. Lobster and some molluscs including giant clams are also highly favoured, but are specifically reserved for special feasts. Longer search times and severely limited catches are some of the anecdotal evidence indicating that populations of these species have been significantly reduced, especially in reefs around Funafuti.

Vanuatu

Monitoring was initiated in 2002 with 2 sites being established on Efate, at Malapoa Point and Hat Island. There was an increase in monitoring in 2003-2004 with the support of the South Pacific Community ProcFish Project, the Marine Aquarium Council and Reef Check Australia. This increase was in response to a request for assistance, from Vanuatu, to develop a management plan for the aquarium industry. Surveys were conducted on 3 islands, Efate, Epi and Santo, with 80% of the effort at 22 sites on Efate. These data provide baseline information for future assessments.

The coral reefs of Efate have low live coral cover, averaging 25%. Cyclone Danny damaged coral reefs on the western side of Efate, reducing the coral cover from 80% to 25%. The recovery is slow, but because the reefs are exposed to good oceanic circulation it is anticipated that recovery will increase. Although the reefs of Efate show signs of damage, there is a need for more data to determine their long-term status. At other sites such as Bukura, Devils Point, Pango and Pele there is excellent coral growth with no evidence of damage or stress. Live coral cover in these areas is high (60-75%), comparable to Nikaura Reef on Epi Island (63%). In Santo, a recent COTS outbreak has killed 15% of hard corals in Luganville Harbour. The recent COTS invasion could cause more damage on South Santo Reefs in the future. The assessment of water quality at Luganville Harbour and Port Vila indicated high coliform bacterial concentrations (between 5-50 per 100 ml), but the Harbour waters are still considered safe for recreational use.

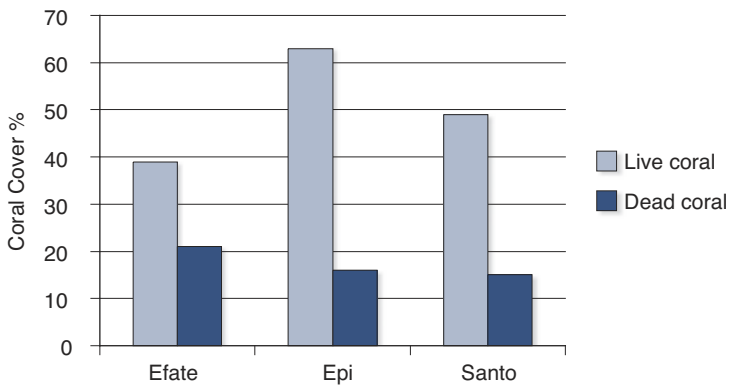
Vanuatu has recognised the potential of the aquarium industry to provide income for local communities and is exploring ways to make this fishery sustainable. Reef food fish resources are under considerable pressure from over-exploitation near populated areas of Efate, Maskelynes, Tanna and Luganville. Preliminary results from a joint fish assessment by South Pacific Community, International Marine Life Alliance and Vanuatu Fisheries Department (VFD) indicate very low stocks of food fish species. This prompted an initiative to discourage the entry of the live reef food fish trade into Vanuatu. In 2003, ProcFish found similar results. Resources in remote areas of Vanuatu are relatively stable, but many of these remote areas have limited reef resources and therefore cannot withstand heavy fishing pressures.

AQUARIUM FISH ASSESSMENT AND MANAGEMENT ON EFATE, VANUATU

Aquarium fish exports from Efate, Vanuatu increased from 20,000 to 70,000 fishes between 2001-2003, and there are plans for this trend to continue. This is a non-traditional and totally new fishery to the country, about which communities and the Government know very little. It had traditionally been a small fishery over the past 13 years so this major increase in fish exports in 2003 attracted attention. The Vanuatu Department of Fisheries recognized the potential economic benefits of this fishery for rural communities if properly managed, and the risks if not managed well. There was an urgent need to increase management capacity, but the Department had limited resources. The solution was to collaborate with the private sector and local communities to involve these communities in monitoring their resources. This allowed the Government to focus on developing and implementing sustainable management policies - the National Aquarium Trade Management Plan. A group of organisations including Efate Scuba Association, and Reef Check Australia conducted resource assessments at fish collection and dive sites on Efate, with the support of the Department and funding from Australian aid agency (AusAID). MACTRAQ was used to assess the fish populations (Box p 35) and the Secretariat for the Pacific Community conducted socio-economic assessments in the communities. These assessments were also combined with detailed training in coral and fish surveys for dive operators from the Hideaway Island Marine Sanctuary and staff from the Nguna-Pele MPA. The surveys showed that there were large variations in total fish abundance between sites, but the abundance of the major traded species ('indicator species') was not different between collection and non-collection sites. Unfortunately there were insufficient data to draw definite conclusions, and more long-term assessments are required. Some species such as flame angelfish (*Centropyge loriculus*) are highly specific to certain habitats and deserve special attention, and the information collected was sufficient to develop a policy on flame angelfish for Efate. There was no evidence of coral damage at the collection sites, which indicates that the aquarium fishermen were collecting in an environmentally sensitive manner. However, the abundance of key food and curio fish and invertebrates was low at all sites visited, which is an indication of over-fishing. The new fishery management plan will aim to guide development of the industry and ensure that impacts on other resource users and the environment is minimal, as well as continuing to build community capacity and monitoring throughout Vanuatu. From: Mike Lameien, Peace Corps - Vanuatu airwalker66@hotmail.com; Jos Hill, Reef Check Australia, jos.hill@jcu.edu.au; and Kalo Pakoa, National Coordinator for Vanuatu, kmpakoa@hotmail.com

EFFECTS OF CLIMATE CHANGE

Between 2002-2004, Nauru experienced coral bleaching and mass fish kills. There was no coral bleaching in the other member countries, however, cyclones caused damage to coral reefs in parts of Solomon Islands, Samoa, New Caledonia and Vanuatu during this period. The effects of climate change in 2002-2004 were not as severe as those in 2000-2002, when there was major coral bleaching and mortality.



Live coral cover is very high on the three sites surveyed by Reef Check-Australia on Vanuatu in 2004.

STATUS OF REEF CONSERVATION

Fiji

Coral reef conservation has largely been the responsibility of the Fiji Government. Because of the centralisation of the Government's infrastructure in urban centres, conservation in rural areas has largely been neglected. The involvement of the University of the South Pacific and conservation NGOs has led to the development of a framework for community-based reef management. Currently there are more than 100 small community-based marine managed areas on coastal fringing reefs, and mechanisms for larger protected regions are being investigated. At the community scale, the effectiveness of management plans varies with the level of community involvement and understanding. Usually the successful MPAs are those which have been prepared using extensive consultation and sound science and are provided with adequate support. The main issue is the delicate balance between conservation for the future, and the current needs of the communities. The immediate needs often outweigh conservation measures. Legislation being prepared will help in the conservation of coral reefs and marine resources.

Nauru

Awareness of coral reef conservation has increased in Nauru following a public awareness campaign during the coral reef monitoring project. The public discussed problems facing Nauru's reefs and resources, especially over-fishing of benthic organisms. There was an overwhelming interest in conservation and preservation measures and they supported establishing MPAs to manage coral reef resources. A follow-up workshop is needed to assist plans for ecological assessment of the coral reefs and socio-economic assessments on the Nauruan communities.

New Caledonia

There have been 13 MPAs declared in New Caledonia, with most concentrated in the Southwest lagoon as the 'South Lagoon Marine Park'. The major exceptions are the Bourail Reserve and the La Foa Reserve created in 2004. All MPAs are no-take zones where people can visit, with one exception, the Merlet Reserve, which is completely closed to visitors.

OVER-FISHING OF TROCHUS, GREEN SNAIL AND BECHE-DE-MER IN VANUATU.

The major marine exports from Vanuatu are shells of trochus and green snail, and dried beche-de-mer (sea cucumber). These species are in danger. The commercial trochus and green snail fishery began in the 1920s with the demand for raw material for buttons, jewellery and ornaments, and inlay work for furniture; however the shells were also a traditional source of food protein. Trochus, green snail and beche-de-mer are important income sources for remote island communities, which lack adequate transport, refrigeration, and markets for fish and agricultural products. The exports have earned the communities more than 40 million vatu (US\$3.7 million) in the last 10 years. Beche-de-mer is exported mainly to Southeast Asia; the processed shells are also exported to Asia as button blanks, rims and scrapes and cuts. The only surviving shell processing company cannot find enough raw material to remain viable, which was confirmed by recent surveys showing that shell populations have crashed. The few viable stocks in remote areas are seriously endangered. Green snail populations are also verging on localised extinction because their growth and reproduction rates are slow, and populations have not recovered from exploitation, even though there has been a ban on green snail export for 6 years. There have been attempts to transplant brood stock, but there is no evidence of success. The attempts to mariculture the trochus and release larvae on the reefs has yet to show a population boost, and green snail culture is not an option until they can find suitable natural food for the juveniles. The Government is enforcing existing management measures and developing new measures to conserve the remaining breeding stock. Support is also needed for the local communities to provide alternative livelihoods.

Marine Protected Areas (MPAs) in New Caledonia are virtually all strict “no-take” areas to conserve biodiversity.

Name	Status	Surface (ha)	Date Established
Ilot Signal	No-take zone	181	January 1989
Ilot Larégnère	No-take zone	362	January 1989
Ilot Bailly	No-take zone	314	January 1989
Ilot Canard (d)	No-take zone	50	January 1989
Ilot Canard extention	No boat-fishing or spearfishing	125	January 1989
Ilot Amédée (e)	No-take zone	154	January 1989
Grand Récif Abore (f)	No-take zone	10960	July 1981
Ilot Maitre	No-take zone	610	July 1981
Dieppoise	No-take zone	13	August 1990
Yves Merlet	Closed to all visitors	16700	May 1980
Baie du Prony (2 sites)	No-take zone	145	June 1993
Bourail (3 sites)	No-take zone	3004	June 1993
La Foa	No-take zone	3669	June 2004

THE FUTURE OF FIJI'S LIVE ROCK TRADE

The aquarium trade is booming around the world and most aquarists want 'live rock', which is dead coral rock covered with pink or purple coralline algae and other organisms. Fiji is a major exporter to the global aquarium market, shipping 800,000kg of live rock in 2001 to the USA, the industry's major customer with 1 million hobbyists. The aquarium industry is growing at 12–30% and provides a valuable alternative livelihood for coastal people, alleviating the pressure on fishing. The villagers break off slabs of live rock covered with light - to dark-pink coralline algae from the edge of the reef, and load these onto *bilibili* (bamboo rafts). On shore, they trim and grade the rock by shape, weight, and cover of coralline algae before air freighting it to the USA. Much more rock is harvested than recorded in the official figures because a lot is wasted. Large-scale removal of live rock can destroy habitats for fish and invertebrates and damage the reef structure, leading to increased coastal erosion. The trade, including live coral and fish, is crucial for some Fijian villages, where the only alternatives are low-skilled jobs on sugarcane plantations and tourist resorts. A third of the 150 people in Malomalo village, just a few hours west of Suva, harvest live rock as their main source of income. They earn US\$0.70 per kg, which is divided among the collectors (US\$0.50), the traditional custodians (US\$0.10), and the marine reserve within the traditional fishing grounds (US\$0.10). Full-time harvesters collect 150 kg to 200 kg per week, or about 7500 kg per year contributing US\$3750 to the household.

After 9 years of live rock collecting the villagers became concerned about the long-term consequences and requested help. In 2001, the Fiji Government requested an environmental assessment to guide their policy on the trade. Simultaneously, WWF and the Marine Aquarium Council (MAC) launched a trade certification system, and started a project to:

- develop community-based processes for wise coral harvesting and management; and
- help the Government develop sound policies and legislation to support a sustainable aquarium trade.

WWF held community workshops in Malomalo to raise awareness on monitoring, evaluating, and marine resource management. The villagers agreed that the productivity of their reef areas was being damaged, and designated part of the traditional fishing grounds as a *tabu* area, where extractive use was banned. WWF scientists monitor Malomalo regularly and in October 2002 conducted the first Biological and Socio-economic Assessment of the area, looking at the status of the environment and aspects of the live rock trade. The main focus has been to develop a Collection Area Management Plan as a prerequisite for MAC certification, and raise awareness within the community of the need for management. The dialogue between those with traditional and scientific knowledge is making encouraging progress towards establishing an industry with long-term stability for the people of Malomalo. From: Aliti Susau WWF Project Officer Fiji

Samoa

The three main conservation strategies in Samoa are:

1. The Community-Based Fisheries Management Program (CBFMP) was initiated by the Fisheries Division under the Fisheries Extension Training Project in 1995-2001. The model used for the CBFMP is now used to manage the commercial fisheries. The CBFMP is well established on Upolu, Savai'i, and Manono Islands with 83 villages having developed and accepted Village Fishery Management Plans; 60 villages have established Fish Reserves (No-take Zones) in their traditional fishing grounds;
2. The Samoa Marine Biodiversity Protection and Management Project was developed in collaboration between The World Conservation Union (IUCN) and the Ministry of Natural Resources and Environment. The 5-year project focuses on the districts of Aleipata and Safata, with the aim of empowering the communities to conserve and sustainably use their marine resources through the establishment of multi-purpose MPAs; and
3. The local NGO, Matuaileo'o Environment Trust Incorporated (METI) developed the Coral Gardens Project to grow corals at selected sites where coral reefs had been damaged. Coral transplants have been successful at one site (Matautu, Lefaga). Collaboration between METI and the Fisheries Division is now under discussion so that some of the Fish Reserves under the CFBMP could also be used to grow corals. Community support will be needed to ensure that this initiative succeeds.

Solomon Islands

There is only one MPA in the Solomon Islands. The Arnavon Marine Conservation Area in the Manning Strait was established because it is a major turtle nesting ground. During the recent TNC led rapid ecological assessment, Arnavon was shown to be outstanding because of the large populations of commercially important fishery species, including reef fish and invertebrates such as giant clams and beche-de-mer. This provides a positive stimulus for MPA management activities in the Solomons as these coral reefs are amongst those with the highest biodiversity in the world. This global attention should provide the incentive to establish more MPAs. WWF is currently in the process of implementing an MPA network in Gizo with plans to have the network fully endorsed by the end of 2005.

The establishment of 17 locally managed MPA systems in Roviana and Vonavona lagoon by the Roviana and Vonavona Development Project, through the University of California was a major initiative. Biological monitoring has not been completed to determine the effectiveness of these MPAs, however there is strong general acceptance amongst the local communities of the closures, indicating promising signs for success. There are attempts to establish a Solomon Islands Locally Managed Marine Area Network, however it is currently facing constraints. It is hoped that the problems delaying the establishment will be addressed to allow greater participation of local communities in managing their own coral reefs.

More NGOs are establishing coral reef monitoring programs with the focus on different areas of the country. A meeting between government officials and NGOs is planned to discuss collaborative activities and attempt to seek consensus on the standardisation of methods. The establishment of a coral reef monitoring body has been planned to oversee monitoring activities and ensure that data are being collected across all areas of the Solomon Islands to provide a representative data set on the status of the coral reefs. This body will be responsible for assembling the summary data and for producing a status report every 2 years.

Tuvalu

Four marine reserves have been declared; Nui; Vaitupu; Funafuti; and Nukulaelae. The Island Council (*Kaupule*) administers the conservation areas jointly with traditional owners, however the direct management of the reserves varies. For example, the Funafuti and Nui Reserves forbid the taking and killing of animals without prior knowledge of the Island Council. At the Nukulaelae Reserve, the use of certain fishing gear, such as gillnets and spearfishing, is prohibited, and anchoring in areas of coral is also forbidden. Three Reserves (Nui, Vaitupu and Nukulaelae) have been successful in gaining the support of the communities. The Funafuti Reserve, an outcome of a regional project from 1995-1999, was highly successful when funds were available for enforcement and management. When the project ceased, enforcement weakened and reports of abuse increased dramatically. Because the Reserve lies close to the urban centre, there is no sense of community ownership and is therefore open to abuse.

Vanuatu

No new coral legislation has been enacted recently, except for a law maintaining the existing ban on the harvest of live corals. This ban is being heavily criticised as it is focused on controlling the human use of corals while large tracts of corals are being lost to natural disasters such as cyclones and coral bleaching. A new regulation resulting from a Ministerial Order of 2000 has been enacted to protect wild stocks of the giant clam *Tridacna crocea* and limit the harvest of other clam species. Enforcement has since been effective. Other new management measures and regulations proposed include: the establishment of maximum sizes for green snail and trochus; a moratorium on export of some invertebrates by companies; a limit on the number of aquarium operator licences; and the restriction of sale of some resources in favour of the local market only.

Marine conservation is a high priority in the country but Government commitment has been limited by budgetary constraints. With support from other stakeholders and communities, two new MPAs have been listed, Nguna-Pele and Crab Bay; the latter is being listed for the International Waters Project pilot program to establish MPAs. The establishment of MPAs is promoted by Vanuatu Fisheries Department as a mechanism to support traditional 'taboo or tabu' area practices for better conservation outcomes. Mistry Island has gained recognition, while Hat Island is pending the resolution of land ownership issues. Registration of 'Taboo' areas has increased from 15 in 1998 to 80 in 2005, indicating that people are becoming more conscious of the need to conserve and manage their resources.

GAPS IN MONITORING AND MANAGEMENT

The countries have expanded existing coral reef monitoring programs and commenced some new monitoring initiatives during the last 3 to 4 years. This has been facilitated by funding assistance from Canada (C-SPODP-II to the SW Pacific Node) as well as assistance from other donors directly to individual countries and scientists. The expansion in coral reef monitoring in some countries has not been matched in other countries. The major constraints are a lack of funding and trained people, such that much of the monitoring is focused on a few sites that are not representative of the entire country. For example, monitoring sites in Solomon Islands are concentrated in the western Solomon Islands. The SW Pacific Node has established an important network and undertaken training, which will contribute greatly to coral reef management in the Pacific, but in the absence of ongoing financial support for coordination and monitoring, these initial investments and initiatives could be seriously compromised after

LOCAL COMMITMENT TO CONSERVATION: A SUCCESS STORY IN VANUATU

Prior to 2001, artisanal fishing pressure was high around the islands of Nguna and Pele in Vanuatu, and food resources were on the decline. A Peace Corps project was established to facilitate a community-based management program to protect resources and develop additional livelihoods. These villages set up their own self-governing committees for the management of the area, and developed alternative livelihoods through tourism and the aquaculture of giant clam and trochus. The Nguna-Pele MPA was established in 2001 to protect food resources from over-harvesting and poor waste disposal, and to attract tourists to the area. Each MPA has its own staff that is selected from the local communities. These staff members conduct monthly Reef Check surveys at 40 sites, monitor the clam and trochus populations and report on their findings at monthly village meetings. The surveys indicate a 15% increase in the abundance of large food fish and a 38% increase in new coral recruits since the start of the reserves. Marketing the MPA through local tourist resorts has attracted international visitors. A team of Reef Check volunteers from Australia visited Nguna-Pele in 2004 and conducted surveys with the MPA staff. This visit strengthened community awareness and appreciation of their program. Such community participation in resource monitoring coupled with the flow-on benefits from tourism have been valuable in sustaining motivation and support for conservation. From: Christopher Bartlett, Nguna-Pele Marine Protected Area, cybartlett@hotmail.com and Jos Hill, Reef Check Australia, johill@jcu.edu.au.

2004. Experience of member countries has proven that monitoring surveys are only useful if they are conducted on a regular basis and tied to relevant issues such as over-fishing, MPA establishment, and coral reef management.

RECOMMENDATIONS

The SW Pacific Node has made good progress in the last 3 years. The recommendations made by the SW Pacific Node in the Status 2000 and 2002 reports have largely been addressed: more training and capacity building in coral reef monitoring techniques; establishing MPAs; and conducting biodiversity assessments. There is, however, considerable room for improvement and expansion.

- **Capacity building:** While the level of capacity in coral reef monitoring has improved, more effort is required, especially in data analysis, reporting and integration of data into coral reef management policies.
- **Socio-economic surveys:** The recent devolution of marine resource management from the State to the community may impose more pressure on family daily responsibilities. There is little information available on the socio-economic status of those communities that now have responsibility for marine conservation. The member countries of the SW Pacific Node urge partners, donors and supporters to assist in addressing this issue.

- **Community based MPAs:** Considerable progress has been achieved in most member countries in establishing community-based MPAs. Plans to develop similar MPAs in other countries are progressing and all stakeholders, including governments, NGOs, scientific communities, the private sector and donors are encouraged to assist. Specific research is needed on the effectiveness of these MPAs in order to develop adaptive management strategies.
- **Biodiversity Surveys:** There have been no coordinated surveys and documentation is fragmented. There has been considerable documentation of biodiversity in the Solomon Islands, Fiji and New Caledonia, but there continues to be a lack of expertise within the region, especially taxonomists. There is a continuous reliance on experts from Australia, America, France and UK. To address this, governments need to be encouraged to make this a national and regional priority through the higher education system (Universities of the South Pacific, New Caledonia, and Samoa). Biodiversity surveys remain a high priority for the SW Pacific Node, and the scientific community and politicians are encouraged to assist.
- **Pacific Islands Marine Reference Collection:** The Pacific Islands Marine Reference Collection at the University of the South Pacific remains an important repository of marine organisms from the Pacific. The Collection is a teaching reference for all Pacific Island students; however, institutions in developed countries have undermined this Collection. There is need for stronger collaboration between developed country institutions holding Pacific Island marine biodiversity collections and the Pacific Collection. Furthermore, regional and national strategies for the protection of intellectual property rights of Pacific Island communities must be developed.
- **Pacific Islands Coral Reef Network:** The three island nodes of the Pacific Islands, excluding the Hawaiian Islands, have made considerable progress since the late 1990s. There is a need to develop closer cooperation and collaboration between the different nodes in the Pacific.
- **Degraded Coral Reef Sites:** More attention needs to be focused on managing and where necessary, rehabilitating, highly stressed coral reef areas, particularly those around urban and coastal areas where anthropogenic pressures are concentrated.
- **National Policies:** The development of appropriate national coastal management plans, and policies is required. All countries should incorporate coral reef issues into national climate change strategies under the UN Framework Convention on Climate Change (UNFCCC). Legislation and regulations for the management of coral reefs need urgent upgrading, especially the incorporation of integrated coastal management and sustainable fisheries, and the enforcement of management and protection policies
- **Coral Reef Monitoring:** There is a need to find ongoing support to ensure the future of the monitoring program, without the reliance on volunteers for the monitoring and coordination.

CONCLUSIONS

The status of coral reefs in the Southwest Pacific is generally good. Coral reef monitoring and conservation has made progress, however more effort is still required. Two major factors, which will affect the coral reefs in the future, are anthropogenic pressures and climate change impacts. If proper management regimes are instituted, the condition of coral reefs should still be in generally good condition in ten years time. However, in the absence of effective management strategies, coral reefs will degrade. Support from all stakeholders including governments, NGOs, donors and communities is required to ensure the protection of coral reefs.

100 years ago: Coral reefs in the Southwest Pacific were in pristine condition, and the human population on the islands was much lower. There was no market economy, coral reef resources were harvested only for subsistence purposes, and traditional management practices were employed to manage the reef resources. There was probably some form of destructive fishing in some communities such as the use of *Derris elliptica* vines, *Barringtonia* seeds, sea cucumber intestines and other fishing techniques such as Visi and Kwarao (fish stampeding). However, the use of these practices was restricted to important, ceremonial feasts when large quantities of fish were required. These would not have had a significant effect on the coral reefs. There was some documentation about the reefs by early explorers.

In 1994: The coral reefs were in 'generally good' condition, with considerable variations between locations. The human populations were between 6000 and 500,000 in the different countries. Reefs close to urban, development and logging centres showed significant damage due to anthropogenic impacts, with localised over-exploitation of coral reef resources for subsistence and income generation. Coral reefs in more remote areas were generally in very good condition. Some MPAs had been established by some of the countries, but the only coral reef monitoring was conducted by Fisheries Departments. There were, however, many studies by different organisations and government departments on different aspects of coral reefs, but there was no mechanism for coordination or consolidation of data and information. There was no coordinated regional coral reef monitoring network. Many NGOs were engaged in coral reef work across the region, supplementing the activities of governments. Restocking and stock enhancement programs for some over-exploited coral reef invertebrate species were starting.

In 2004: Coral reefs are recovering from major losses due to coral beaching in 2000 and 2002. Most coral reefs remain in generally good condition, however the level of exploitation of reef resources around the major towns continues to increase resulting in considerable localised reef damage and the collapse of resources. Global climate change and direct human pressure are the most significant threats to coral reefs of the region. There is now more awareness of the problems facing coral reefs and increasing political will to implement corrective action. Many more organisations and stakeholders participate in coral reef conservation and management. The coral reef monitoring network established 4 years earlier is functioning well but is threatened by insufficient resources for ongoing training and monitoring. More funding support and stronger political will are required to perpetuate coral reef monitoring in the region in the future.

Predictions for 2014: Increased human populations and climate change damage will be the two most significant factors affecting coral reefs of the region. Coral reefs near urban areas will continue to become significantly degraded, and the efforts of governments and NGOs will

be partially effective in slowing and even reversing some of the degradation. If management regimes are effective, most of the coral reefs will still be in good condition, with increased coral bleaching and cyclonic storms being the major threats. However, if the conservation and management regimes are ineffective or not supported by strong political will and the allocation of sufficient resources, the coral reefs will continue to decline and there may be local extinction of some species.

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ICRAN

CORAL GARDENS PROJECT, FIJI – ICRAN DEMONSTRATION SITE

With the assistance of Partners in Community Development Fiji (PCDF, formerly FSP-Fiji) the communities of the 9 Cuvu and Tuva Tikinas villages on the Coral Coast of Fiji have taken substantial steps in managing their marine resources. The communities have developed and implemented community based coastal management plans, which have involved the establishment of 5 MPAs (including traditional Tabu areas as no-take zones), training of more than 20 Fish Wardens, clam restocking and partnerships with a resort to restore coral and mangrove habitats essential to both community and resort livelihoods.

The success of this initiative has been due in great part to the inclusion of all stakeholders; from fisher women to Chiefs, the Provincial authorities, natural resource government ministries (in particular the Fisheries Department), and the private sector (in particular the Shangri-la’s Fijian Resort). A Cuvu District Environment Committee has been established to follow through on implementation of activities. The Committee recognises the need for a healthy environment for both future generations and tourists, and aims to restore the natural resources that have been damaged to set an example for other villages in Fiji. PCDF will continue to support the initiative by providing project facilitation and technical assistance.

ICRAN recognized the Coral Gardens Project as an example site not only for other villages in Fiji but for other communities globally. This success has led ICRAN to begin the Solomon Islands Coral Gardens Initiative based on the Fiji project. The work of the communities of Cuvu-Tuva has also attracted international media attention, with the BBC broadcasting a documentary on the project’s achievements to global audiences in both radio and film formats. This initiative is financially supported by the New Zealand Agency for International Development, UK Darwin Initiative, Mac-Arthur and Packard Foundations, and the Shangri-la’s Fijian Resort.

Ecological Monitoring: Several experiments were initiated in Cuvu Bay to examine coral reef restoration, including test coral plantings for habitat enhancement, tide pool enhancement with UV and temperature tolerant corals, and coral aquaculture trials. These were initially successful until a COTS outbreak and coral bleaching resulted in the loss of the test plantings.

Socio-economic Monitoring: Community participation will begin with the establishment of an Environment Committee. The Coral Garden Project is allied with the MacArthur Foundation-sponsored ‘Learning Portfolio’ on community-managed MPAs.

Contact: Austin Bowden-Kirby (austin.bowden-kerby@fsp.org.fj)

Coral reefs are **80%** of the natural resources.

Ecological Monitoring is **occasional**.

Socio-economic Monitoring is **planned**.






ICRAN

SUSTAINABLE MANAGEMENT OF AQUARIUM HARVESTING OPERATIONS, FIJI - ICRAN DEMONSTRATION SITE

Unethical methods of harvesting, particularly the use of cyanide and other chemicals to stun fish, leads to considerable mortality of corals and fish. Such destructive methods are often used in the aquarium fish trade. Although these practices are largely confined to Southeast Asia, Pacific Island countries are becoming aware of the potential environmental problems associated with the aquarium fish trade.

In the Pacific region, Fiji is the major exporter of aquarium products. More than 500 village-level collectors are involved in the trade and in some villages it is the only source of income. However, there is minimal management of the harvest operation. For example, all species of coral can be collected and there is no limit on size, numbers, or harvesting methods. Fiji is now seeking a balance between the community benefits of aquarium animal collection and reef health with help from the South Pacific Regional Environmental Program. They have been working with the Government to ensure the future ecological sustainability of the Fijian coral trade industry. The initiative began in 2001 and helps coastal communities to benefit from a flourishing industry without damaging their ecosystems. Moreover, this Fijian project is an example case study which can demonstrate the possible benefits to other Pacific Island Countries already in the trade, such as Vanuatu, Tonga and the Solomon Islands.

Ecological Monitoring: The University of the South Pacific and local NGOs aim to implement long-term monitoring programs in collection areas to improve knowledge on impacts of coral and fish removal from reefs. Reef Check Australia recently completed a survey, with the results due to be published in the near future.

Socio-economic Monitoring: Local NGOs assist with the socio-economic aspects of this project, aiming to:

- study the aquarium trade industry in Fiji, the companies involved, the type of trade in which they are involved, the type of contracts between companies and collectors, the types of products from each area, the volume exported and wasted, the methods of coral harvesting, etc...
- analyse the economics of the industry to ensure that there is equity in the percentage of revenue paid to resource owners, the government, and the traders.

Contact: Alison Glass, (icran@icran.org)

Coral reefs are 100% of the natural resources

Ecological Monitoring is planned.

Socio-economic Monitoring is effective.

ICRAN

SAMOA MPA PROJECT – ICRAN DEMONSTRATION SITE

The 2 major islands of Samoa, Savai'i and Upolu, and many tiny islands are circled by diverse fringing reefs, as well as mangroves and some seagrasses. Over-fishing, destructive fishing and poor land management threaten the reefs and fish stocks, on which the Samoan people are heavily dependent. To counter these threats, the Districts of Aleipata (11 villages) and Safata (9 villages) established community-based, multi-use MPAs including Village Fisheries Reserves under a World Bank-IUCN initiative. Aleipata and Safata MPA District Committees are responsible for reviewing completed work, management plans, and developing future workplans. Both District Committees consist of a senior matai representing and selected by each participating village. District Officers attended the Regional Locally-Managed Marine Area (LMMA) Network meeting in Fiji and joined as an associate members.

Samoa's 2004 phone book cover features Aleipata MPA's logo and is a good example of growing private sector support for MPAs. The MPAs established a 'transparent' trust fund to support the ongoing operations and are able to receive donations. The MPA Marine Education in Schools program has benefited from 80 sets of donated snorkel gear and from Peace Corps volunteers helping with the Secondary Schools program. There are plans to expand the program, broadening MPA initiatives and further raise awareness of the MPA no-take-zones. Tourist visits to the MPAs are growing and the increased tourism levies are paid to the MPA Trust Fund by Samoan tour operators. Fees from USA university study tours resulted in a 75% profit for MPAs and the local communities, generating income and building pride for the villages.

Ecological monitoring: Community meetings and restoration activities are ongoing, with long-term sites monitored every 3 years to provide performance indicators for management plans. Community-based monitoring to provide more immediate feedback is being trialled. Baseline data from all major reef habitats (lagoon, channels and outer slopes) show that the reefs were in good health, despite many natural and anthropogenic pressures. Damage caused by cyclones in the early 1990s, COTS outbreaks 20 to 30 years ago, erosion from sea urchins preventing the establishment of new coral recruits, and dynamite fishing is still evident. There was low coral cover on the inner lagoons (10-20%), but very high cover on the outer slopes (80-100%) and outer lagoons (50-60%). Fish abundance was low, with small individuals, indicating strong fishing pressures. However, fish were more abundant and diverse in less frequented areas as were prized species such as giant clams, sea cucumbers and edible molluscs.

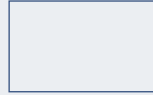
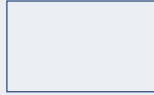
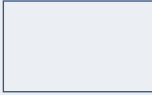
Socio-economic monitoring: Incorporation of socio-economic monitoring into the baseline assessment and community monitoring is being developed.

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Coral reefs are 80% of the natural resources.

Ecological Monitoring is effective.

Socio-economic Monitoring is planned.



EAST RENNELL, SOLOMON ISLANDS – WORLD HERITAGE SITE

East Rennell is part of Rennell Island, the southernmost island of the Solomon Islands group in the western Pacific. It is the largest raised coral atoll in the world and contains Lake Tegano, the largest lake in the Pacific islands. The Solomon Islands have a greater diversity of animal species and higher degree of endemism than almost anywhere else in the Pacific. Rennell is largely undeveloped and coral reefs occupy 12 square km. There are more than 300 coral species and these communities have not been affected by human populations. The fish populations are also rich in both diversity and abundance, reflecting low fishing pressures in spite of 10,000 tourist visits every year.

About 500 Polynesians live within the World Heritage Site and all of the land and reefs are under customary ownership. Locally, the Tegano Management and Conservation Committee establishes the rights of resource owners and users and screens business applications to ensure sustainability. The people live a largely subsistence lifestyle and a draft resource management plan is being prepared with input from provincial members, the Council of Chiefs, and the Paramount Chief. Management is based on traditional knowledge and data gathering, not on formal processes of scientific monitoring. The East Rennell Resource Management Plan focuses on local desire to generate income through ecotourism and other sustainable environmental activities.

Ecological Monitoring: Rennell has been the focus of 8 major scientific expeditions but there are currently no scientific facilities on the island. A rapid ecological assessment of the coral reefs, fishes, shellfish and other reef resources of Rennell Reefs was made in 1995 by external NGOs. There has been no scientific monitoring since this assessment, and any monitoring programs on Rennell by outside organisations would likely be viewed with suspicion and would require involvement of the Council of Chiefs and the Paramount Chief.

Socio-Economic Monitoring: Participatory Rural Appraisal (PRA) surveys have been conducted at most of the villages, with the emphasis on assessing the subsistence and cash lifestyle. Cash derived from fishing and reef resources has been very important to the economy in the past, but there are currently no marine-based industries at present.

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Coral Reefs are 10% of the natural resources
Ecological Monitoring is occasional.
Socio-Economic Monitoring is occasional.

