2008 STATUS OF THE CORAL REEFS IN THE SOUTH WEST PACIFIC

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ABSTRACT

Fiji, New Caledonia, Vanuatu, Solomon Islands, Samoa and Tuvalu report monitoring data for this report; Nauru has not conducted recent monitoring. The Coral Reef Initiative for the Pacific (CRISP) has provided funding for monitoring activities in the region.

A broad range of observers (scientists, students, dive guides and communities) assist with reef monitoring. Substrate cover changes from 2003 to 2007 were due to effective management or local disturbances, coral predation and natural disasters. Average coral cover at monitoring sites were: 45% in Fiji; 27% in New Caledonia; 43% in Samoa; 30% in Solomon Islands; 65% in Tuvalu; and 26% in Vanuatu. Densities of edible fish and invertebrates remained generally low (0-10/100m2) in 4 countries reflecting high subsistence and commercial fishing pressure. Butterflyfish, parrotfish, surgeonfish and damselfish were generally most dominant. High densities of parrotfish were reported from 4 countries.

There are multiple stressors, including coral predation, temperature variation, coral bleaching, cyclones, tsunamis and earthquakes. An earthquake and tsunami in April 2007 damaged reefs and other coastal habitats in the Solomon Islands.

The major human disturbances are over-fishing, pollution, sedimentation, eutrophication and coastal development. In response, communities and resort owners are managing local marine areas such that coral health and fish populations are improving.

A network of temperature loggers has been established within the Node to collect long-term data on temperature relationships with coral bleaching.

There is a need for long-term monitoring to understand the changes in reefs. Most monitoring is coordinated by Fisheries Departments, without sufficient resources, capacity or funding. The non-participation of Nauru in an example.

INTRODUCTION

Importance of reefs and how they are used: Reefs continue to play an integral part in the lives of the people of the South Pacific where coastal communities depend on them for subsistence, coastal protection and income generation. Most of the South West Pacific economies are dependant to a large extent on coral reefs, especially through the tourism sector, as detailed in the ESCAP, statistical yearbook for Asia and the Pacific, 2007[1].

The inshore fishery is primarily carried out within coral reefs and lagoons. It is a complex, multi-species, multi-gear fishery and 70-100% of Pacific Islanders participate in reef harvesting. At least 100 to 400 species of fish, invertebrates and seaweeds are often harvested, and fish consumption is high ranging from 25-113 kg per head per year with an average of 45 kg per head [2].

Men, women and children of coastal communities are involved in harvesting marine resources for food and cash income. However, commercial pressures and opportunities are overwhelming customary tenure of inshore marine resources and greater number of ‘outsiders’ (people who have no traditional connection to these resources) are increasingly harvesting coral reef resources. These include other coral reef users from the tourism industry, aquarium trade and commercial fisheries. This information is summarized in ReefBase Pacific (http://pacific.reefbase.org).

Figure 1. Map of the South West Pacific Island Countries.
Source: ReefBase Pacific website: http://pacific.reefbase.org
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The scattered nature of islands in the South West Pacific Node provides a characteristic challenge in monitoring and conservation for the countries. Therefore, it is particularly difficult to extrapolate observations from a limited number of monitoring sites to report the status of the reefs across entire countries. For example, the reports from the Solomon Islands represent the Western Province only. Fiji, New Caledonia, Vanuatu and Solomon Islands reported monitoring results by region whereas Samoa and Tuvalu report status was based on one monitoring location. Often the results from several monitoring teams are reported by national coordinators.

From 2003-2007, there were slight changes in the substrate cover in Node countries mainly due to local impacts. For example, 2 islands with high coral cover included managed sites e.g. North Efate in Vanuatu and Namena in Fiji. Regions with low coral cover included sites which were affected by predation of the crown-of-thorns starfish, e.g. Maitre in New Caledonia and Mamanuca in Fiji.

Reported coral cover in Fiji and Samoa was similar. The range across 13 sites in Fiji was from 18-62% with an average of 45%; cover at 8 sites in Samoa ranged from 20-66% with an average of 43%. Similar results were obtained from Vanuatu and New Caledonia. A range of 2-50% with an average of 25% was found in 11 sites in Vanuatu; and in New Caledonia the average was 27% (range 5-48%) at 10 sites. Coral cover in Tuvalu was similar to that of Fiji and Samoa with an average of 65% (range 55-98%), although cover was lower in the Solomon Islands (average 30%, range of 20-38%).

Figure 2. This graph presents average coral and algal cover from all the core survey sites on reefs deeper than 10m across Fiji. There is a clear trend of recovery following losses from bleaching and crown-of-thorns starfish, although the large standard deviations reflect the considerable variation in reef types. The line is a polynomial statistical analysis of coral cover and the number of sites monitored each year are presented in parentheses below the year.

Figure 3. Coral cover in New Caledonia show considerable variations since 1997 at 6 sites around Nouméa, although coral cover remains generally healthy between 20% and 40%. One site at Maitre, however had much lower coral cover.
These data from 57 survey sites in all 11 regions of Vanuatu in 2006-2007 show that coral cover varies considerably from a low at Luganville of less than 5% to more than 50% at North Efate. The number of monitoring sites is: Aneityum-3; Mele Bay-3; N. Efate-13; Malekula-7; Maskelyne-2; Matasso-2; Epi-3; Luganville-1; Malo-2; Mota Lava-3; Gaua-19.

There were high densities of parrotfish herbivores in 4 countries: 388/100m² in Samoa; 36/100m² in Tuvalu; 32/100m² in Solomon Islands; and 25/100m² in New Caledonia. Fiji and Vanuatu reported low densities of 10/100m² and 1.8/100 m² respectively. However, overall, densities of edible fish remained generally low in all Node countries, although the most dominant indicator fish families included butterflyfish, parrotfish, surgeonfish and damselfish.

Edible invertebrates (sea cucumbers or beche-de-mer, giant clams, trochus) were also generally low across all countries reflecting the high fishing pressure for subsistence and commercial purposes. Invertebrate density was 0-1/100m² in New Caledonia and Vanuatu (with the exception of a region in Vanuatu), 0-3/100m² in Fiji and Samoa and 1-10/100m² (with the exception of clams) in Tuvalu. No data were available from Solomon Islands.

Monitoring has attempted to correlate the sea surface temperatures and the extent of coral bleaching events in Fiji from 1999 to 2007. The longest periods with consecutive days of temperatures over 29°C were during the years, 2000, 2002 and 2005 which corresponded with the years where fully bleached and partly bleached corals were observed (2000, 2001, 2002 and 2006).

Reefs remain under human pressures (over-fishing, pollution, sedimentation, eutrophication, coastal development) as well as natural events (cyclones, tsunamis, earthquakes, coral bleaching and predation). A catastrophic event hit the Solomon Islands on 2 April 2007, when a large earthquake lifted reefs out of the water and the subsequent tsunami waves caused varying degrees of damage and disruption to coastal communities in the western Solomon Islands. The most dramatic effect was the lifting of some islands by 3m including some major fringing reefs and also mangroves and seagrasses. These resources are no longer available to these communities.

Recognition of damage to coral reef habitats has led to establishment of locally managed marine areas by communities and resort owners. All countries reported an increase in the number of protected areas since 2004 and monitoring has shown that coral health and fish populations have increased in some managed areas. Vanuatu presents an interesting case study on monitoring of managed areas which revealed that both permanent and periodic closures had a higher biomass of indicator fish inside than outside the reserve. This suggests that small-scale, village-based reserves are effective resource management tools and that opening a reserve temporarily for harvest following community needs may be compatible with conservation goals.

SOCIO-ECONOMIC RESULTS

Fiji: Socioeconomic surveys by the Institute of Applied Science (University of the South Pacific) under the auspices of the Fiji Locally Managed Marine Area (FLMMA) network, reported average results from 29 villages with 3 people in 54 households and 312 people per village. Average monthly income for all villages was FJD636 (USD400), which was mainly from selling root crops (kava, taro etc.) and marine resources (fish, sea cucumbers), and other paid employment. Most households in the village harvested marine resources for home consumption and some for sale, whilst a small number of people in a community were predominantly commercial fishers. Major threats to fishing grounds noted in village management plans included over-fishing, resulting in the rare to non sighting of certain fish and invertebrates [Vave, personal communication].
**Samoa:** According to Valencia, S. et al. 2007, an unpublished report, a nationwide socio-economic study by the Samoan Fisheries Division in 2006 assessed the status of rural fisheries in Samoa in 939 households in 49 villages (representing 7778 people). People were interviewed about their household composition, income, education level, seafood purchasing and consumption habits, fishing preferences, catch, and whether they sell fish. Fishing contributed to 41% of household income and more than 20% of households were strongly dependent on fishing income to cover their expenses; average finfish consumption per year was 59.4 kg, (163g/ day); average consumption of tinned fish was 75 kg/year (206g/day); villages closer to Apia (capital of Samoa) ate less fresh fish, than those farther away from Apia; 66% of respondents felt that there were fewer less fish than 10 years ago.

**Solomon Islands:** The WorldFish Center and WWF-Solomon Islands (WWF-SI) combined to assess the impacts of the April 2007 tsunami and earthquake on selected villages in the Western Province. They visited 29 locations across much of the affected area between May and June 2007, approximately two months after the event. This assessment was focused on immediate effects and needs of the coastal fisheries, including environment and infrastructure, as well as assessing ongoing threats to the sustainable recovery of coastal fisheries. The assessment reported: the collapse of traditional ‘tambu’ systems in most places: a poor understanding of fisheries/resource management issues or national regulations; a loss of community control of fisheries; relatively difficult enforcement of fisheries regulations because of extensive coastlines; marine resource management needs are more long term in nature rather than related to immediate food security; and not all communities are equally dependent on the marine environment [3].

**FUTURE OF CORAL REEF HEALTH**

It is likely that the South West Pacific Node will experience several natural coral reef damaging events within the next 10 years. Localized coral bleaching and increasing crown-of-thorns starfish outbreaks are predicted for 2008 and/or possibly 2009/2010. Human impacts are likely to continue and becoming greater, particularly if political instability continues to hinder environmental management. Coastal development continues to expand, and without proper legislation and action, impacts of sedimentation, eutrophication and over-fishing are likely to degrade coral reef health along some coastlines. Uncontrolled mangrove clearing could be one of the greatest threats to reef populations in the next 10 years.

The number of locally managed marine areas has been reported to be increasing and this is probably the most effective measure in the region’s reef ‘first aid kit’. As community awareness spreads, and customary owners of fishing rights become more active in conserving their own resources, more practical protection for reefs may be achieved. Networks of marine managed areas may enable conservation of reef stocks, both for biodiversity and food security purposes, despite over-fishing and development which may continue along much of the coastlines.

**CONCLUSIONS AND RECOMMENDATIONS**

It is clear from these studies that a continuation and increase in monitoring activity is needed to obtain a clear understanding of changes in the composition of coral reef communities and to assist ongoing reef management. Monitoring over 6 to 10 years has shown recovery from a bleaching event, COTS predation, cyclones, storm damage; this provides evidence of considerable reef resilience in this region. However, it will probably take 20 to 30 years of data collection to detect any regular cycles. The value of monitoring regular sites in the South West Pacific Node has become apparent, but cannot be continued and/or expanded unless resources are secured and committed well into the future.

**REFERENCES**


Other material in this paper has been drawn from individual South West Pacific country coral reef status reports 2007 available at http://www.reefbase.org/pacific/default.aspx.