Assessing possible coral reef damage in the Arnavon Community Managed Conservation Area (ACMCA) as result of the April 2, 2007 Earthquake and Tsunami

The ACMCA – photo by Rudi Joachim

A report for The Nature Conservancy

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April 2007

Introduction

A deadly tsunami hit the Western and Choiseul provinces on the 2nd April 2007 following an earthquake measuring 8.1 on the Ritcher scale. Other parts of the pacific, including Australia and Papua New Guinea, also received Tsunami warnings. The tsunami caused a lot of damage to properties and loss of lives in the two provinces. A number of communities The Nature Conservancy (TNC) is working in partnership with in Choiseul province have been badly affected.

Between April 10 – 13, Willie Atu (Program Manager, Solomon Islands Program) and Paul Lokani (Director, Malanesian Program) visited Choiseul to (a) conduct a quick assessment of the extent of damage to the TNC project sites of Arnavon Islands, Zinoa and Parama and (b) to evaluate the extent of damage to partner communities so as to determine what TNC can do to help. Based on this assessment trip, it was recommended that a more intense assessment be undertaken in the ACMCA to see if any damage was done to corals.

This report presents the findings of an assessment conducted in the ACMCA by a team of TNC staff following the earthquake and tsunami on the 21st and 22nd April 2007. The location of the ACMCA is given in Figure 1.

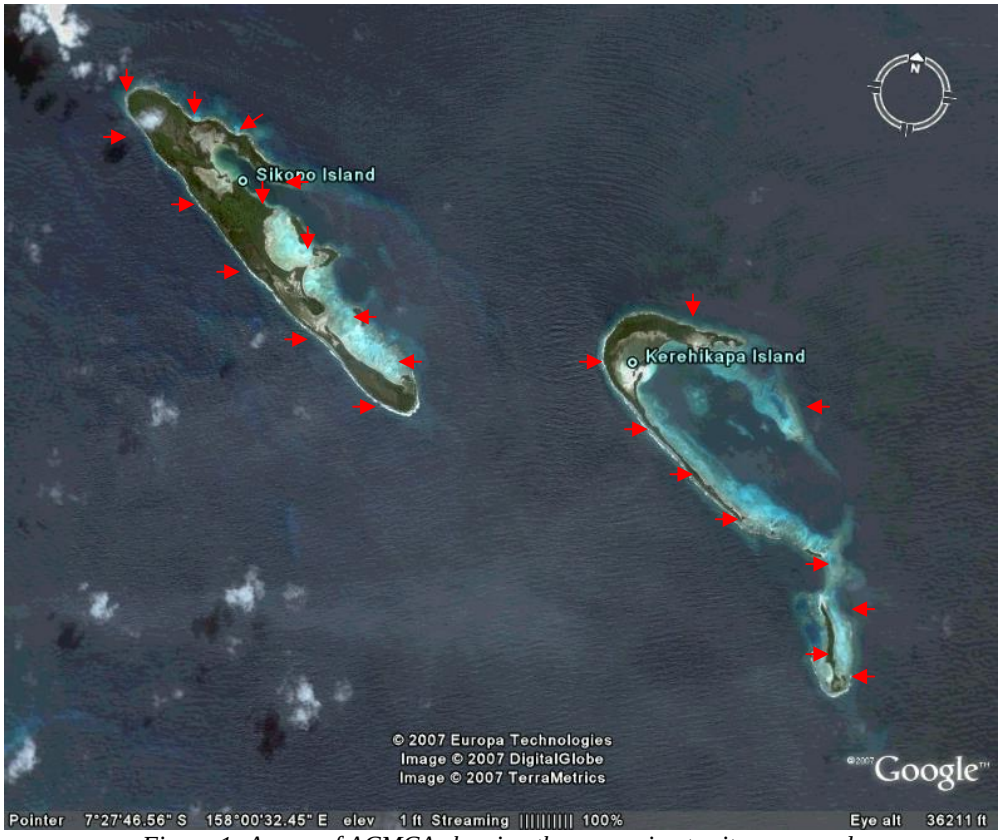

Figure 1: A map of ACMCA showing the approximate sites assessed.

Aim

The primary aim of this study is to make direct underwater observations so as to determine if coral reefs (coral species and reef structure) in the ACMCA have been damaged or affected by the earthquake and tsunami that struck the Western and Choiseul provinces on April 2, 2007.

Methodology

A total of 23 sites were assessed around the main islands of Sikopo, Kerehikapa, small and big Maleivona. Sites were randomly selected by running the boat (40hp Yamaha outboard motor) at full speed for 2 minutes. At each site a pair of divers on snorkels would enter the water where the boat stopped and swam along the reef (parallel to the coastline) for 5 minutes making observations on (i) physical damage to individual coral colonies and reef structure (uplift or sink) (ii) substrate movement (rocks and rubbles) (iii) sea water condition relating to visibility and (iv) fisheries coral reef resources (Figure 2). The assessment was undertaken within approximate depths of 1-10m. In addition to these underwater observations, adjacent coastlines were also assessed for coastal erosion or destruction. An underwater camera was used to take the pictures used in this report. Corals have been identified according to their life form according to the AIMS manual (English *et.al.,* 1997).

Figure 2: Two divers on snorkel checking the coral reef on Sikopo Island.

Results

Corals

No physical coral damages were observed at any of the 23 sites surveyed during this assessment. Individual coral colonies and the reef structure as a whole around the islands

remained intact and unaffected (no broken coral colonies, uplifted, collapsed or sunken reef structure). There was no coral bleaching events or major outbreaks of the crown of thorns starfish (*Acanthaster plancii*) infestation. Overall, there was no indication or evidence that the coral reef habitat in the ACMCA has been affected by the earthquake and tsunami (Figures 3 –6).

Fisheries Resources

A general observation made on fisheries resources such as fish and commercial invertebrates such sea cucumbers, giant clams and gastropods showed that these resources were not affected. The fish life was abundant with large schools of parrotfishes (Scarus genus), surgeon fishes (Acanthurus genus) and many other coral reef species were observed feeding and swimming happily all over the reef (Figures 7 and 8). Giant clams and sea cucumber species were plentiful, colourful and seen everywhere (Figures 9, 10 and 11).

Substrate movement/disturbance

No coral damage as result of substrate movement was observed. The bottom substrate looked very settled, stable and unaffected (Figure 12). No unusual change in sea water condition was also noticed. Visibility was good and estimated at up to 20m at some sites. Although sea water temperature was not taken, this was assumed to be normal when this assessment was undertaken (based on the observation of coral conditions at the sites).

Coastal erosion or destruction

Coastal erosion is evident on all the main islands in the ACMCA. This, however, is not directly related to the recent tsunami but rather due to continuous high wave actions as result of frequent bad weather hitting the islands at different times of the year. This is a great concern because this is affecting turtle nesting beaches on the islands. Although there are no data to support sea level rise taking place in the ACMCA, should this already be happening, the long term usefulness of the ACMCA as a marine protected area is at risk. Coastal erosion should be monitored on long term basis. The figures 13, 14 and 15 show some examples of coastal erosion occurring in the ACMCA.

Conclusion

Four conclusions can be made based on the results of this assessment.

(1) The April 2, earthquake and tsunami that devastated parts of the Western and Choiseul provinces did not appear to have affected the coral reefs and fisheries resources in the ACMCA.
(2) The earthquake and tsunami did not appear to affect the sea conditions (especially the sea water quality) of the ACMCA as well.
(3) Coastal erosion is a problem in the ACMCA. This poses a threat to turtle nesting beaches and the long term importance of this these islands as a nesting beach.
(4) It is recognized that this exercise is not really a scientific study but rather an exercise to provide a clear picture of the condition of the coral reefs in the ACMCA after the April 2 earthquake and tsunami.

Recommendation

(1) It is recommended that consideration be given to the situation relating to coastal erosion in the ACMCA immediately.
(2) The ACMCA is recognized not only as an important place in Solomon Islands but also regionally and globally. Therefore, there results of this exercise should be shared with others especially TNC partners, locally, regionally and globally.
(3) A disaster evacuation standard procedure should be developed for the ACMCA.

Reference

English, S., Wilkinson, C., Baker V., 1997. Survey manual for tropical marine resources. 2nd edition, Australian Institute of Marine Science.

Figure 3: A massive coral on Kerehikapa reef.

Figure 6: An Acropora tabular colony on Kerehikapa reef.

Figure 4: A coral sub-massive (stylophora colony) on small Maleivona reef.

Figure 7: A large school of Acanthurus species feeding on Kerehikapa reef.

Figure 5: A coral submassive colony on Sikopo reef (Acropora palifera).

Figure 8: A school of bumphead parrotfishes (Scarus bolbometopon) on Kerehikapa reef.

Figure 9: A healthy giant clam species (Tridacna derasa on big Maleivona Island reef.

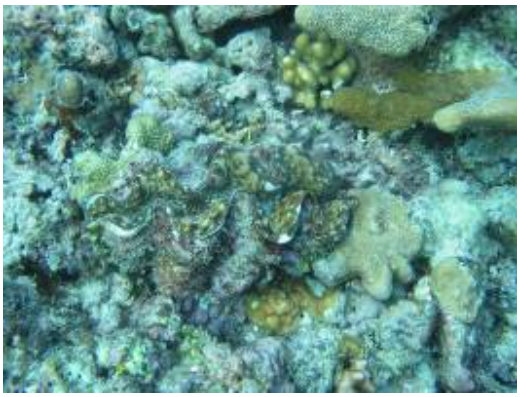

Figure 10: A giant clam species (T. maxima) on Sikopo reef.

Figure 11: A sea cucumber (Bohadschia argus) on Sikopo reef.

Figure 12: Undisturbed coral substrate on Sikopo reef.

Figure 13: Coastal erosion and destruction on Maleivona

Figure 14: Coastal erosion in the Kerehikapa bay (near the field station).

Figure 15: Coastal erosion affecting or taking place on the main turtle nesting beach on Kerehikapa.