Declining Coral Health and Fish Diversity in the South Pacific

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Introduction

Coral reefs harbor ~1-9 million species, including 30% of marine fish species.

Reef health worldwide is declining due to many factors, e.g., pollution and silting, dynamite fishing, and global warming.

With the help of the Planetary Coral Reef Foundation (PCRF.org) and crew aboard the R/V Heraclitus, I examined coral health and fish diversity in the Solomon Islands, Melanesia.

Fig. 1. Sagharughombe reef, Solomon Islands in January 2006

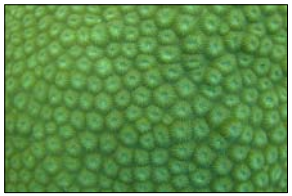

Fig 2. Healthy *Diploastrea Heliopora.*

Method

In 2006, I surveyed coral and fish on Sagharughombe reef, Solomon Islands using SCUBA and compared the results with surveys done in 2000 and 2002 (Fig. 3).

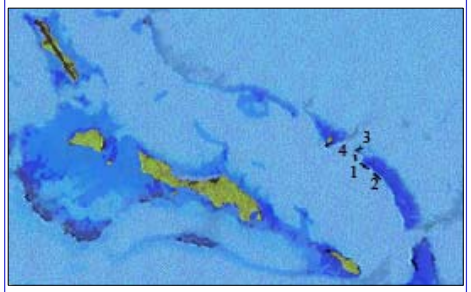

Fig. 3. Satellite image of Sagharughombe reef with locations of transects. Source for this data set was the Global Land Cover Facility, www.landcover.org.

Coral health surveys used the Vitareef method (P. Dustin, College of Charleston). Coral colonies were identified to genus & health was assessed based on a range of factors (Fig. 2, 4 and 5).

Fig. 4. Invertebrate Overgrowth.

Fig. 5. Edge Damage.

Fish surveys assessed fish species and abundances in the same areas.

Results

Coral health surveys indicated a significant decline in coral health over the six year period (Fig. 6).

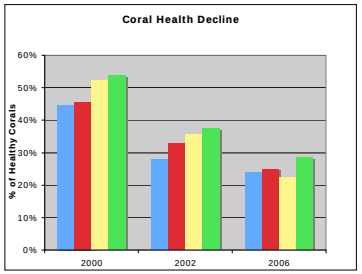

Fig. 6. Coral health in four transects surveyed in 2000, 2002, and 2006 ($p<0.001$ for 2000 vs. 2002; 2002 vs. 2006, and 2000 vs. 2006).

Fish surveys found no clear trend in species abundances and species richness, but a significant decline in fish species diversity over the years (Fig. 7).

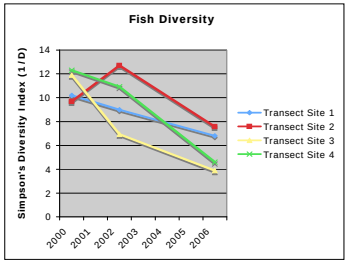

Fig. 7. Fish diversity in four transects surveyed in 2000, 2002, and 2006 ($p<0.05$ for Simpson's index).

Discussion

The decline in coral health we observed may have contributed to the decline in fish diversity. Another study by Lewis (1998) demonstrated a similar fish decline on damaged patch reefs in the Great Barrier Reef, Australia. To protect marine biodiversity, coral reefs must be better protected and declines in coral health must be halted.

Fig. 8. Crown-of-thorns starfish (*Acanthaster planci*) eating polyps of a *Pocillopora* sp. coral.

Fig. 9. Edge damage on a *Platygyra* sp. coral. Edge damage occurs when filamentous algae traps sediment on the coral's margin resulting in tissue necrosis.

Fig. 10. The clownfish (*Amphiprion ocellaris*), found hiding in an anemone, are typical residents on coral reefs of the Indo-Pacific.

Fig. 11. The barramundi cod (*Chromileptes altivelis*) is rarely seen on reefs because it is overharvested for its delicious meat. This particular one was seen near the transect sites.