



Australian Government

Department of the Environment, Water, Heritage and the Arts

Marine and Tropical Sciences Research Facility Milestone Report, June 2009

Program 1: Status and trends of species and ecosystems in the Great Barrier Reef

Project 1.1.2: Condition and trend of the Great Barrier Reef ecosystem: Indicators, thresholds of potential concern, and ecological influence of the Great Barrier Reef Zoning Plan on mid and outer shelf reefs

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Summary

The AIMS Long-term Monitoring Program (LTMP) completed the surveys that were scheduled for the year. Notable changes included storm damage on some Capricorn-Bunker reefs and some reefs near Townsville, some bleaching on inshore reefs between Townsville and Cairns due to inundation with flood waters and particularly, damage from Tropical Cyclone *Hamish* that particularly affected outer reefs in the Whitsunday and Pompey sectors.

Agreed Project Outputs / Milestones

Targeted Activity

- Report on areas surveyed for Objective (b) including summary of salient results for surveys undertaken in 2008/2009 (with appropriate attribution of MTSRF funding);
- Data transferred to the e-Atlas ([Project 1.1.5](#)); and
- Report on contributions from the AIMS Long-term Monitoring team to MTSRF projects related to Integrated Reporting for the Great Barrier Reef.

Project Results

Description of the results achieved for this milestone

The survey cruises by the AIMS LTMP are summarised in Table 1. Results from the first four cruises have been reported in the [March 2009 project milestone report](#), including results of the crown-of-thorns starfish (COTS) early warning surveys.

The last two cruises took place after Tropical Cyclone *Hamish* had passed over the outer reefs of the central-southern Great Barrier Reef in early March 2009. This cyclone was unusual in that it was very intense (Category 4-5 for a considerable period) and also in that its track passed down the length of the Reef rather than across the continental shelf. The LTMP surveyed core reefs in the Whitsunday sector and some manta tow reefs in the Pompey sector two to four weeks after the cyclone, though the trip was affected by bad

weather. While there was little identifiable damage on inshore reefs and on midshelf reefs in the Whitsunday sector, some Pompey sector midshelf reefs (notably Creal Reef) and the outer reefs in the Whitsunday sector that were surveyed all showed extensive damage (Table 2). Several of these reefs had high coral cover prior to the storm. As is commonly the case with storm damage to reefs, slight changes in aspect of the reef edge can provide significant protection and allow colonies with more delicate growth forms to survive. In all cases much of the damaged reef surface was covered with filamentous algae/ cyanobacteria (Figures 1 and 2).

Surveys of reefs in the Townsville and Innisfail sectors generally found slight increases in coral cover, though there was evidence of minor storm damage at Pandora, Middle, Davies and Rib Reefs, presumably from Cyclone *Ellie*, a category 1 storm in February 2009. There was some bleaching in inshore areas that was presumed to be due to freshwater inundation in February 2009.

Table 1: Dates and regions covered for each LTMP survey cruise.

Date	Survey region
25 October – 13 November 2008	Cooktown to Lizard Island sector (inc. COTS early warning)
18 November – 4 December 2008	Swain and Capricorn-Bunker sectors
2-9 January 2009	Cairns sector (1) (inc. COTS early warning)
2-12 February 2009	Cairns sector (2) (inc. COTS early warning)
23 March – 9 April 2009	Whitsunday and Pompey sectors
28 April – 17 May 2009	Townsville and Innisfail sectors

Table 2: Percent cover of living hard corals recorded in manta tow surveys on mid-shelf and outer reefs in the Whitsunday and Pompey sectors in 2008-09 and in previous years. Note that the cover on mid-shelf reefs in the Whitsunday sector declined from 2006-07 to 2008-09, but few signs of recent damage were evident in 2008-09 and coral cover already decreased by 2007-08 on 19-138, the only reef that was surveyed in all three years.

Sector	Shelf	Reef	2006-07	2007-08	2008-09
PO	Mid	Creal Reef	68.5		15.6
PO	Mid	Briggs Reef			17.5
PO	Mid	21-074			17.7
PO	Mid	21-137			17.3
WH	Mid	19-131	19.3		15.9
WH	Mid	19-138	28.9	22.3	23.0
WH	Mid	20-104	26.1		20.8
WH	Outer	Slate Reef	40.2		14.2
WH	Outer	Hyde Reef	35.8		9.1



Figure 1: Extensive growth of filamentous algae / cyanobacteria near Site 1 of Transect 1 at Hyde Reef, about one month following Tropical Cyclone Hamish, 4 April 2009.



Figure 2: A living small massive coral that was removed from the reef surface, sitting on recently-turned rubble with extensive filamentous alga / cyanobacteria growth. Photograph taken near Site 1 at Hyde Reef, 4 April 2009.



Figure 3: The first few metres of Transect 4 at Site 1 on Rebe Reef, an outer reef in the Whitsunday sector, photographed 24 March 2007. Arrows indicate coral colonies for reference (see Figure 4).

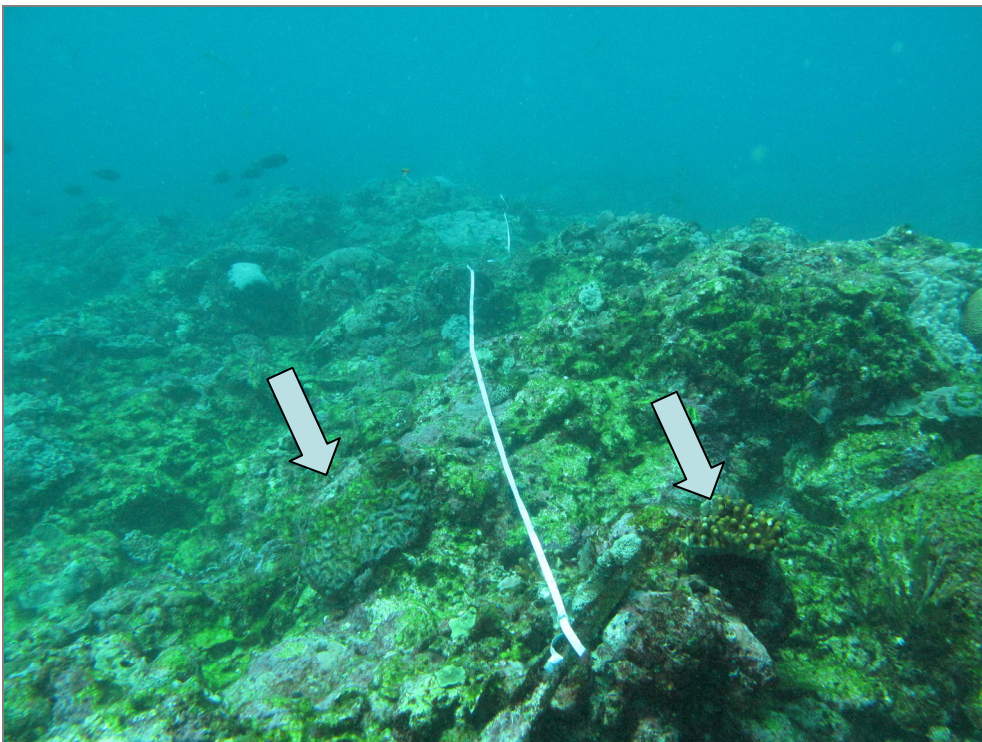


Figure 4: The same site as shown in Figure 3, photographed 5 April 2009 following Tropical Cyclone *Hamish*. Arrows indicate coral colonies for reference. Note at least one substantial colony of massive coral is missing following the cyclone's passing.

The following maps based on AIMS LTMP data are available in the [e-Atlas](#):

- LTMP-Manta tow: Density of crown-of-thorns starfish (long-term average)
- LTMP-Manta tow: Long-term average probability of COTS outbreaks
- LTMP-Manta tow: Long-term average coral cover
- LTMP-Manta tow: Long-term average dead coral cover
- LTMP Fish species richness (long-term average)
- LTMP Fish species abundance (all species, long-term average)
- LTMP Fish species abundance of benthic feeders (long-term average)
- LTMP Fish species abundance of benthic plankton feeders (long-term average)
- LTMP Fish species abundance of herbivores (long-term average)
- LTMP Fish species abundance of planktivores (long-term average)
- LTMP Fish species abundance of predators (long-term average)

Communications, major activities and events

Press release coinciding with the publication of: Bruno, J. F., Sweatman, H. P. A., Precht, W. F., Selig, E. R. and Schutte, V. G. W. (2009) Assessing evidence of phase shifts from coral to macroalgal dominance on coral reefs. *Ecology* 90(6): 1478-1484.

AIMS is planning a media release about the surveys of damage from Tropical Cyclone *Hamish*.