



Australian Government

Department of the Environment, Water, Heritage and the Arts

Marine and Tropical Sciences Research Facility (MTSRF)
March 2007 Milestone Report

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 report on indicators and thresholds of concern identifies a number of indicators related to reef health that have been collected by reef monitoring programs, and the strategies for their interpretation. While possible indicators vary in their usefulness, the large geographic scale and short initial time frame of the MTSRF Integrated Report Card enterprise means that the choice of indicators for GBR reef health will likely be determined by the data that are already available.

Surveys of status of and trends in condition of fishes and corals on reefs of the GBRWHA are on track to be completed on schedule. A sub-project to look for aggregations of adult crown-of-thorns starfish in the region between Cairns and Cooktown where waves of outbreaks are thought to originate found no such aggregations. On this basis, new outbreaks of starfish in the Cairns region are unlikely within the next two years.

For reference: Milestone extracted from Project Schedule

Description

- Final Report describing appropriate reef health indicators and thresholds of concern (objective a). [AIMS]
- Report defining status and trends and ecosystem health of key taxa/habitats as indicators of biodiversity (fish and corals) of coral reef environs in the Great Barrier Reef World Heritage Area. [AIMS]
- Progress report on objective a field work: sites visited, schedules for sites still to survey. [AIMS]

Summary

Description of the results achieved for this milestone

1. Schedule of fieldwork completed by 31 March 2007

Survey cruise 1 Cairns and Cooktown-Lizard Island sectors: 27th September– 23rd October 2006

Manta tow surveys were completed on 19 reefs in the Cooktown/Lizard Island sector and an additional nine reefs in the Cairns sector on the Great Barrier Reef (GBR). Detailed surveys of benthic organisms, visual census of fishes and surveys for agents of coral mortality (SCUBA search) were completed on eight reefs in the Cooktown/Lizard Island sector.

For names of reefs and summaries of manta tow and scuba search data see:

<http://www.aims.gov.au/pages/research/reef-monitoring/lm/lm20060910.html>

Survey cruise 2 Swains, Pompey and Capricorn-Bunker Sectors 27th September– 23rd October 2006

Manta tow surveys were completed on six reefs in the Swain sector, four reefs in the Capricorn-Bunker sector, and two reefs in the Pompey sector of the Great Barrier Reef (GBR). Detailed surveys for benthic organisms, visual census of fishes and surveys for agents of coral mortality (SCUBA search) were completed on six reefs in the Swain sector and four reefs in the Capricorn-Bunker sector. Bad weather and mechanical problems with the ship hampered the surveys.

For names of reefs and summaries of manta tow and scuba search data see:

<http://www.aims.gov.au/pages/research/reef-monitoring/lm/lm200611.html>

Survey cruise 3 Cairns and Innisfail sectors 2nd January– 23rd January, 2007

Twenty-two reefs in the Cairns sector, nine reefs in the Innisfail sector, and one reef in the Cooktown Lizard sector of the Great Barrier Reef (GBR) were surveyed using manta tows. Detailed surveys for benthic organisms, visual census of fishes and surveys for agents of coral mortality (SCUBA search) were made on 10 reefs in the Cairns sector.

For names of reefs and summaries of manta tow and scuba search data see:

<http://www.aims.gov.au/pages/research/reef-monitoring/lm/lm200701.html>

Survey cruise 4 Cape Upstart and Whitsunday sectors: 13th March – 1st April 2007

Intensive surveys were made at nine reefs, plus manta tow surveys of an additional seven reefs. Initial report is in preparation – check www.aims.gov.au/reef-monitoring for names of reefs and summaries of manta tow and scuba search data in the near future.

Schedules for sites still to survey

Survey cruise 5 to the Townsville sector is scheduled for 18th May –4th June 2007 and will complete the scheduled surveys.

Some scheduled manta tow reefs will not be surveyed because of time lost due to bad weather. One site on No Name (an outer reef in the Cooktown-Lizard Is sector) could not be surveyed for the same reason and a contingency plan fell through for the same reason. PLEASE SEE ATTACHMENT FOR LIST OF SITES SURVEYED FOR CROWN-OF-THORNS STARFISH BY REEF CHECK

Report on findings of 2006-07 surveys so far

The field surveys for the current year are in progress (60% completed) and, due to the resignation of three staff in the past year, the processing of the benthic field data (video / digital images) is behind schedule. Replacement staff should be recruited within the month.

Proposed format for reporting

The aim is to produce a Status Report by the end of the calendar year, based closely on the format of Status Report 7, see:

<http://www.aims.gov.au/pages/research/reef-monitoring/ltm/mon-statrep7/statrep7.html>

The report will include some special topic pages on COTS on the GBR, particularly the COTS early warning surveys, possibly also the impact of coral diseases, particularly white syndrome, on the GBR.

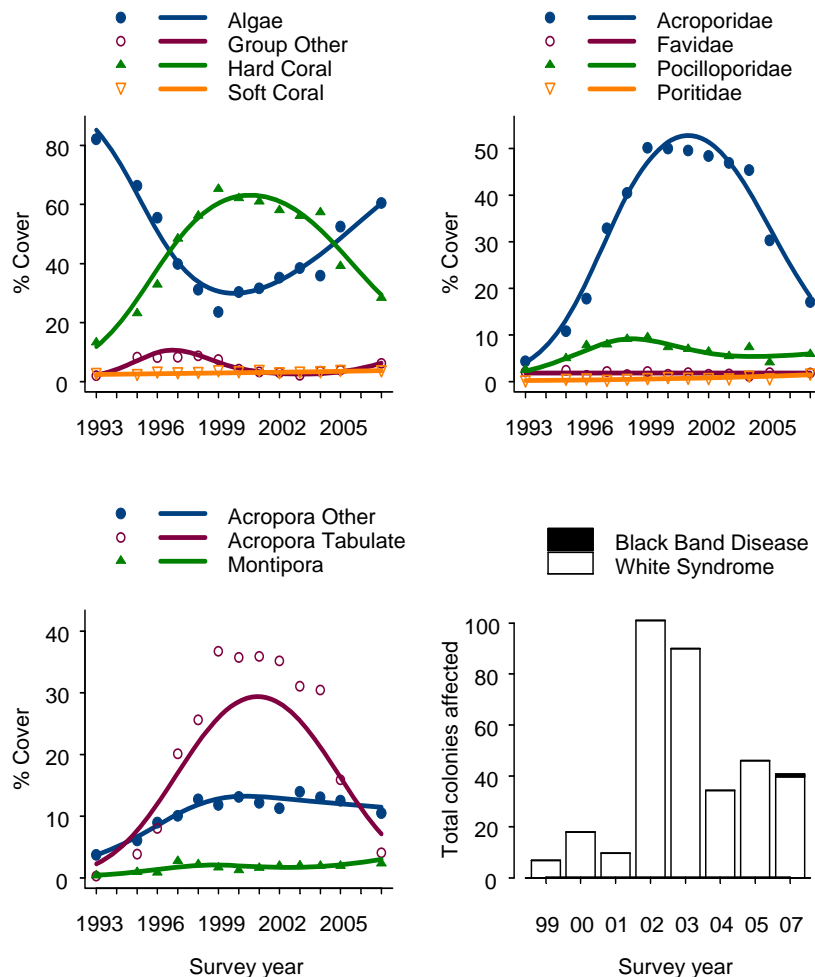


Figure 1 Summary plots for benthic organisms at Carter Reef, an outer reef in the Cooktown-Lizard Is sector. This format is used in Status Reports and in Reef Pages on the website.

Project Results

Significant findings from the surveys so far:

1. Impact of white syndrome on coral cover on outer shelf reefs in the Cooktown-Lizard Is sector.

Survey reefs in this sector have had high coral cover in recent years, with the dominant coral life form being tabulate *Acropora* spp. The high cover of these corals has been associated with a relatively high incidence of white syndrome, a disease or group of diseases that affects tabulate *Acropora* spp. particularly. Figure 1 summarises data from Carter Reef. The top left graph in Figure 1 shows how hard coral cover on Carter reef increased from low values following Cyclone Ivor in 1990, peaked in about 2000 and has since declined. The top right graph shows that the biggest changes were due to *Acopora* spp. The bottom left graph shows that most change among the *Acropora* spp. was in the tabulate life forms, the group that is most susceptible to white syndrome. The bar chart on the bottom right shows the relative incidence of colonies with white syndrome recorded in each year since 1999.

2. COTS early warning surveys found no suggestion of an impending wave of new outbreaks.

Outbreaks of the Crown of thorns starfish come in waves which appear to originate on reefs between Cairns and Cooktown. The past three waves have occurred at 15-20 year intervals and it is now 15 years since the current wave of outbreaks was first detected. It is thought that some characteristic of the reefs in the initiation zone allows the numbers of adult starfish to build up. Once numbers reach a threshold, external fertilization becomes more efficient and huge numbers of larvae are then transported to the south and to the north of the initiation zone, where they mature and spawn and so propagate the wave of outbreaks. Starfish spawn in summer. Most COTS outbreaks occur on midshelf reefs. Surveys of 27 midshelf reefs and 14 inshore and outer shelf reefs in the initiation zone in October 2006 and January 2007 found only three adult COTS (on three different reefs) and very few feeding scars (evidence of starfish hidden in the reef).

On this basis there was no evidence of aggregations of adult COTS. The absence of such aggregations or "primary outbreaks" indicates that a new wave of outbreaks in the Cairns sector and southward in the next two years is unlikely.

3. Recovery of coral communities on inshore reefs of the Wet Tropics

A period of calm weather in mid January allowed surveys of several inshore reefs in the Wet Tropics region. These reefs suffered severe coral mortality following bleaching in 1998. The reefs cannot always be surveyed, particularly by manta tow, because the visibility is often too limited. Coral cover at Fitzroy Is and Normanby Is has increased, except on the exposed faces which were affected by Cyclone Larry. See habitat photographs on the following reef pages:

Normanby Is:

<http://adc.aims.gov.au:9555/waReefPage/servreefpagenew?fullReefID=17012A>

Fitzroy Is:

<http://adc.aims.gov.au:9555/waReefPage/servreefpagenew?fullReefID=16054S>

In summary the surveys and reporting are on track, except for the effects of bad weather.

Communications, major activities or events

During milestone reporting period

The COTS early warning surveys attracted media attention, both in prospect and when complete:

Date	Outlet	Medium / title
8 Jan 2007	Evening News WIN Tsv & Cns, Seven Cns	Interviews Hugh Sweatman & Col McKenzie (AMPTO)
16 Feb 2007	ABC Tropical North (Mky)	Radio news item interview
16 Feb 2007	ABC North Qld (Tsv)	Radio news item interview
16 Feb 2007	ABC Far North (Cns)	Radio news item interview
16 Feb 2007	ABC Coast FM (Gold Coast)	Radio interview and evening news item
17 Feb 2007	Adelaide Advertiser	News in brief: Starfish fear unfounded
17 Feb 2007	Cairns Post	Article: Thorny pest study finds numbers low
17 Feb 2007	Courier Mail	Article: Marine threat less thorny than feared
17 Feb 2007	Daily Telegraph (Sydney)	Reef safe from starfish
17 Feb 2007	Townsville Bulletin	Unfounded fear
20 Feb 2007	ABC Central Qld (Rok)	Radio news item interview
21 Feb 2007	Cairns Sun	Crown of thorns Great Barrier Reef
27 Feb 2007	ABC Far North (Cns), Ten Cns, ABC Darwin, ABC Tropical North (Mky)	News item AMPTO rebuttal (D. Windsor) mentioning AIMS surveys