



Australian Government



AUSTRALIAN INSTITUTE  
OF MARINE SCIENCE

Long-term Reef Monitoring Program -  
Annual Summary Report on coral reef condition for  
2017/18

## ***Great Barrier Reef suffers multiple, regional-scale impacts***

### ***Summary***

- Coral cover on the Great Barrier Reef (GBR) has continued to decline due to the cumulative impacts of multiple, severe disturbances over the past four years, including coral bleaching, cyclones and crown-of-thorns starfish outbreaks.
- Reefs in all regions of the GBR (North, Central and South) were affected by different disturbances at different times.
- Trends in mean hard coral cover on reefs in all three regions now show a steep decline; this has not been observed in the historical record.
- This summary is based on [manta tow surveys](#) of coral reefs, mainly on the mid- and outer-shelf. The most recent surveys of 50 reefs were conducted from September 2017 to May 2018.
- The AIMS survey reefs in the [Northern GBR](#) have lost about half of their coral cover, reflecting the cumulative impacts of two severe cyclones and two episodes of severe coral bleaching over the period 2014 to 2017.
- Reefs in the [Central GBR](#) sustained significant coral loss due to coral bleaching and the continued southwards spread of the current wave of crown-of-thorns starfish outbreaks. Mean coral cover declined from 22% in 2016 to 14% in 2018.
- While some reefs in the [Southern GBR](#) continued to recover during the survey period, many of the southern Swain Reefs suffered intense crown-of-thorns starfish outbreaks. Mean coral cover on reefs in the Southern region declined for the first time in seven years, dropping from 33% in 2017 to 25% in 2018.
- **Each reef is surveyed by AIMS every two years. Reef in the Northern region and in the Whitsunday area were not visited this year, which means that the impacts of Tropical Cyclone Debbie and coral bleaching in the Northern Region in 2017 are not yet fully represented in the results.**

With AIMS' reef surveys extending over more than 30 years, the [AIMS Long-Term Monitoring Program](#) provides an invaluable record of change in repeatedly surveyed coral reef communities over a large area of the Great Barrier Reef.

This annual summary update of trends in coral cover across the whole GBR is based on surveys of coral cover on the perimeters of reefs using [manta tows](#). [Detailed reports](#) on the condition and trends of individual reefs are updated immediately after completion of each survey trip.

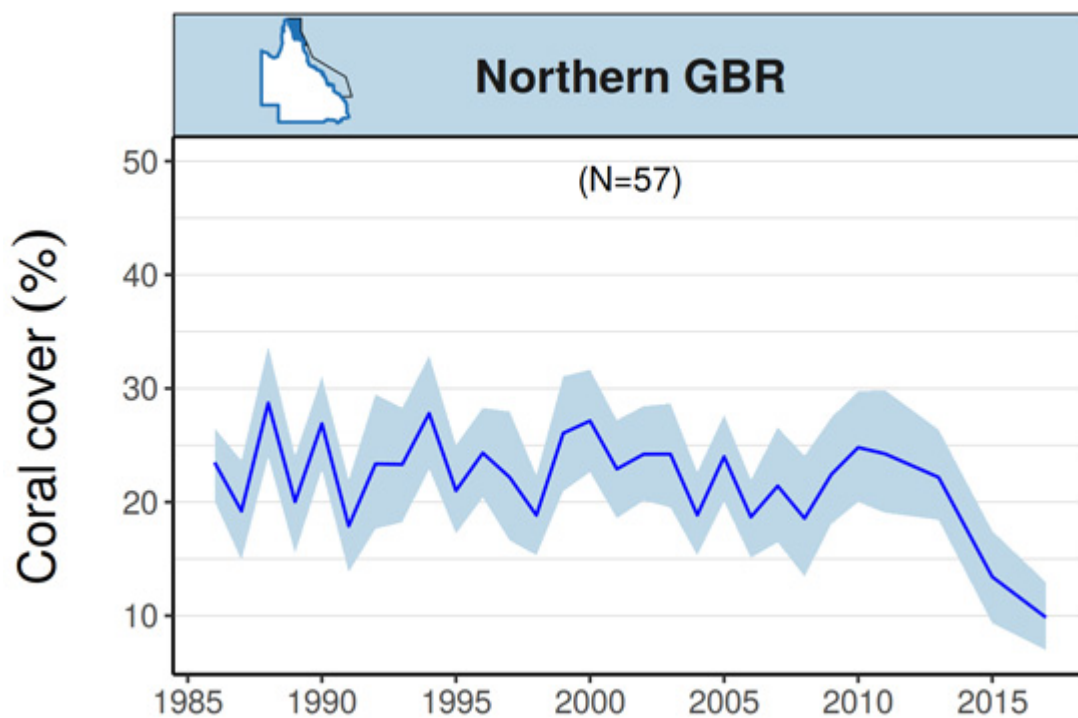
The dynamic nature of the GBR coral reefs, and the considerable variation between regions in the rates of decline and recovery of coral cover, are clearly apparent in the long-term record. For the annual updates, the GBR Marine Park is divided into three regions, each showing different trajectories of change in coral cover over time in response to the cumulative impacts of severe tropical cyclones, outbreaks of the crown-of-thorns starfish and coral bleaching.

## Coral cover summary to May 2018

### The Northern region

As of early 2017, coral cover on the AIMS survey reefs in the Northern GBR was less than half of what it was in 2013, due to mortality caused by two severe cyclones, an ongoing crown-of-thorns starfish outbreak and severe coral bleaching in 2016. [Aerial surveys by James Cook University scientists reported](#) severe bleaching again in early 2017 on inshore and mid-shelf reefs in Princess Charlotte Bay. Resulting losses in coral cover have not yet been confirmed by AIMS in-water surveys and are not included in this summary.

Mean coral cover on survey reefs in the Northern GBR was very low in 2017 (about 10%). It is uncertain how long it will take for these Northern reefs to recover, if not further disturbed, as this is the first time that coral cover this low has been observed in the AIMS 30+ year time series.

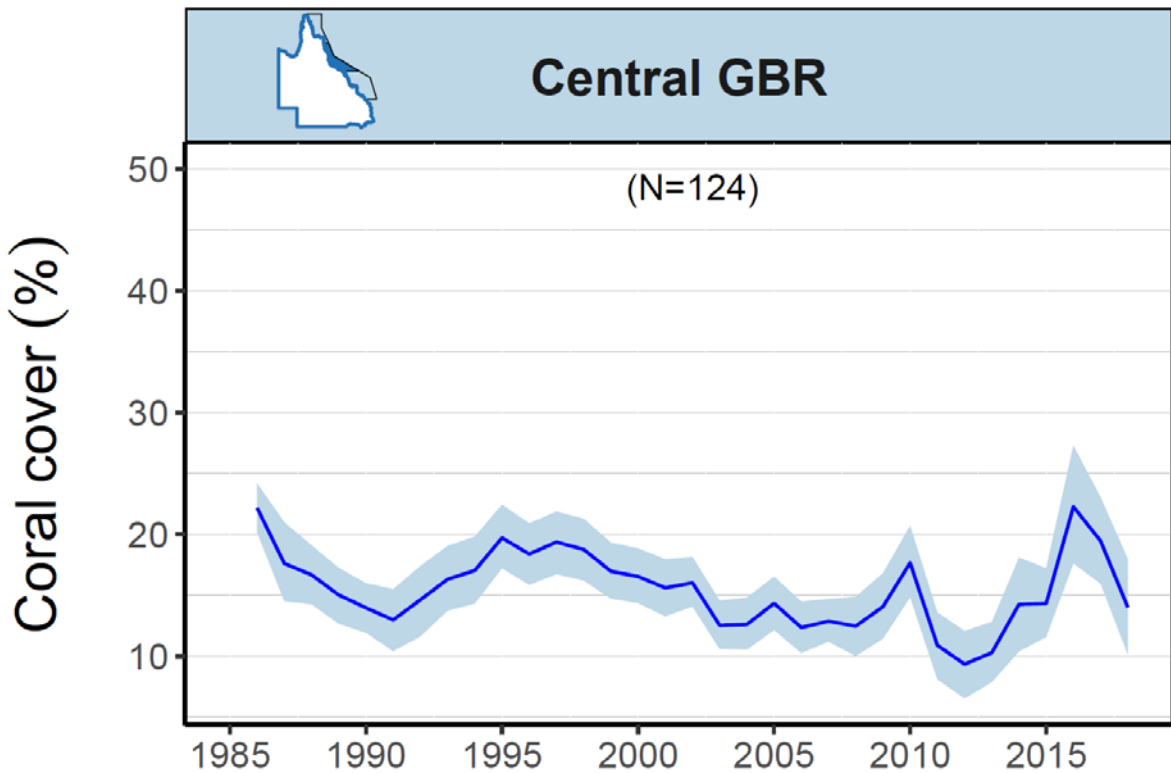


**Figure 1.** Trends in mean hard coral cover for the Northern GBR based on broadscale (manta tow) surveys to May 2017. N indicates the number of reefs contributing to the analyses; blue shading represents 95% certainty.

### The Central region

Coral cover on reefs in the Central GBR has been generally lower than in the other two regions. Cover decreased to the lowest level on record in 2012, following the impact of Tropical Cyclone Yasi in 2011. Coral on these reefs recovered rapidly up until 2016. Surveys in 2018 found coral cover had declined to 14% due to coral bleaching in 2016

and again in 2017 and increasing activity of the crown-of-thorns starfish as the current wave of outbreaks moves south.



**Figure 2.** Trends in mean hard coral cover for the Central GBR based on broadscale (manta tow) surveys up to May 2018. N indicates the number of reefs contributing to the analyses; blue shading represents 95% certainty.

### The Southern region

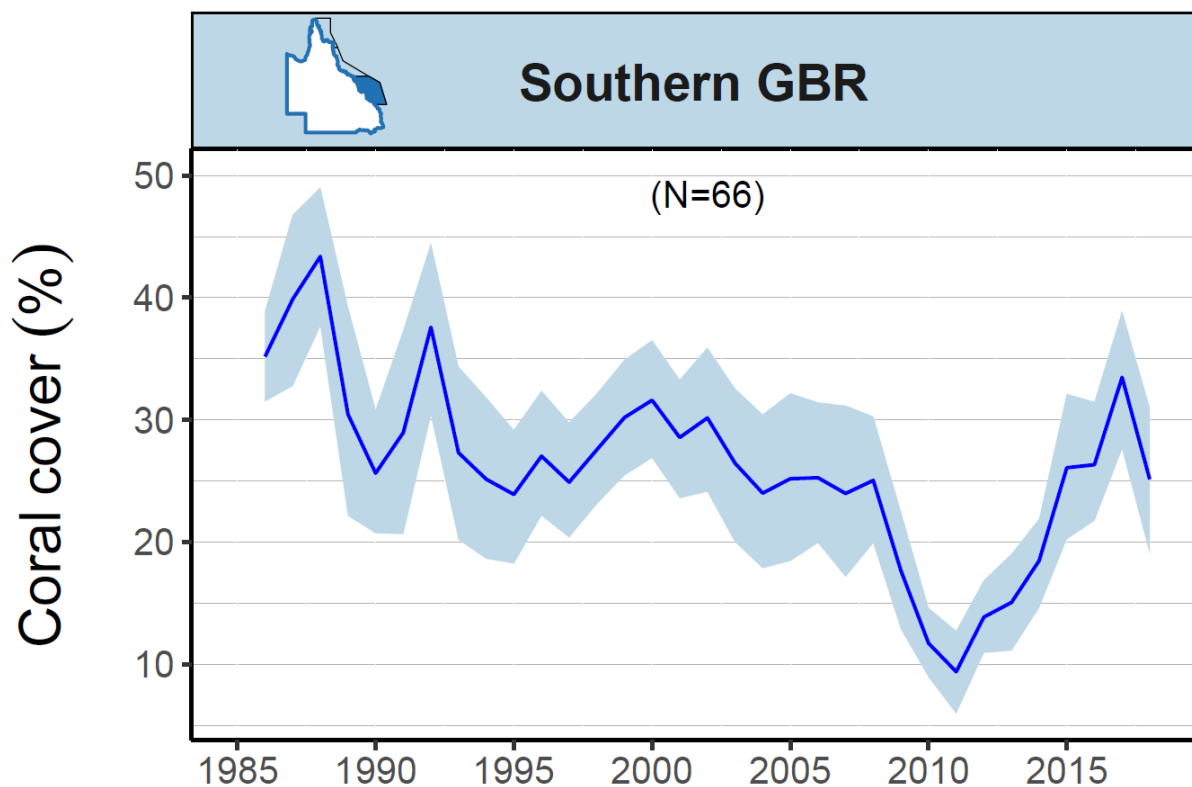
Severe Tropical Cyclone Hamish swept across much of the Southern GBR in 2009 causing extensive damage. Mean coral cover in the southern region dropped sharply as a result. From 2009-2016 there were no severe cyclones and few recorded outbreaks of crown-of-thorns starfish in the Swains or Capricorn-Bunker Sectors, enabling the coral cover on reefs in those sectors to increase. Reefs in the Pompey Sector were close to the path of Tropical Cyclone Marcia (February 2015) which set back recovery of the coral on those reefs.

In March 2017, Tropical Cyclone Debbie made landfall in the north of the region. No reefs in the immediate path of the cyclone were surveyed or included in this analysis, though wave fields from the slow-moving cyclone may have affected reefs as far away as the Pompey sector. AIMS monitoring of inshore reefs under the [Marine Monitoring Program](#) found that more than 90% of existing coral was lost from the worst affected reefs- these results will be reported separately.

Reefs in the southern region were not exposed to extreme sea surface temperatures in 2016 or 2017, but in 2017 an outbreak of crown-of-thorns starfish was recorded

at [Chinaman Reef](#). In December 2017 the effects of outbreaks were seen at [Jenkins Reef](#) and broadscale surveys by the GBRMPA-QPWS Field Management Team found that the majority of south-western Swain Reefs had outbreaks, some very intense. Some AIMS survey reefs in the Swains were similarly affected, resulting in an overall decline in mean coral cover in the region from 33% in 2017 to 25% in 2018 ([Figure 3](#)).

The current coral cover estimate does not yet account for the damage due to Tropical Cyclone Debbie which affected reefs in the northern part of this region. Crown-of-thorns starfish outbreaks on Capricorn-Bunker reefs had subsided and coral cover was stable or had increased on these most southerly reefs.



**Figure 3.** Trends in mean hard coral cover for the Southern GBR based on broadscale (manta tow) surveys up to March 2018. N indicates the number of reefs contributing to the analyses; blue shading represents 95% certainty.

## Assessing the long-term health of the Great Barrier Reef

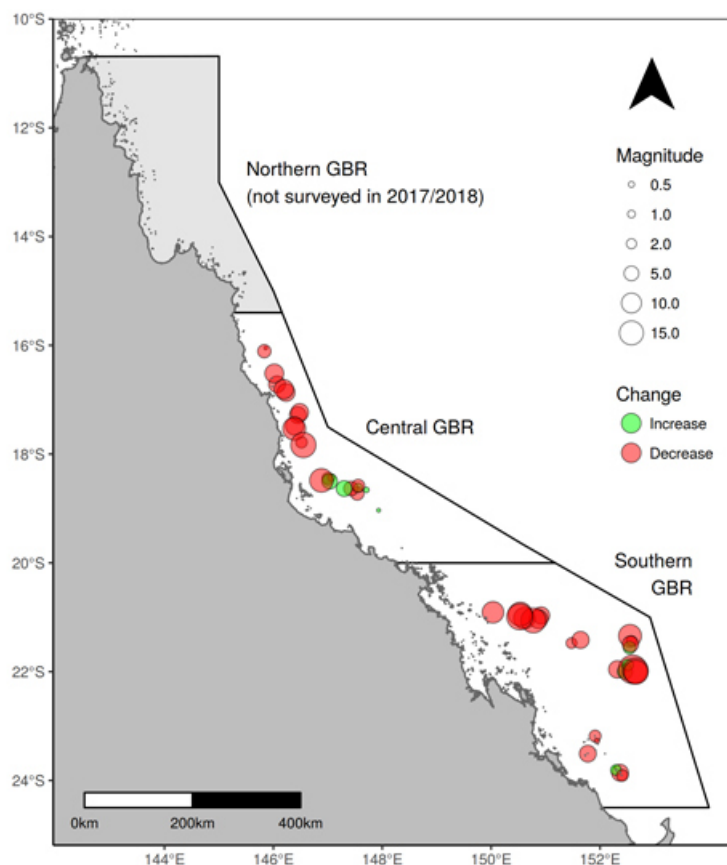
Major bleaching events in successive years have not been seen on the GBR before 2016 and 2017. Over the 30+ years of monitoring by AIMS, GBR reefs have shown their ability to recover after disturbances, but such 'resilience' clearly has limits. The predicted consequences of climate change include more powerful storms and more frequent and more intense bleaching events. More intense disturbances mean greater damage to reefs, so recovery must take longer if the growth rate remains the same. At the same time, the intervals between acute disturbance events are decreasing and

chronic stresses such as [high turbidity](#) and [high ocean temperatures](#) can slow rates of recovery.

The geographic scale of recent bleaching means that breeding populations of corals have been decimated over large areas, reducing the potential sources of larvae to recolonise reefs over the next years. It is unprecedented in the 30+ year time series that all three regions of the GBR have declined and that many reefs have now very low coral cover. The reefs in the Southern GBR still have relatively high coral cover but have [limited genetic connection](#) to reefs further north and may not be a source of significant broodstock to support reef recovery elsewhere.

The prognosis of more frequent disturbances, each causing greater damage to reefs, combined with slower rates of recovery will inevitably lead to less living coral on reefs of the GBR.

Measuring and understanding the process of coral reef recovery will be a major focus of AIMS' research and monitoring over the next years.



**Figure 4.** Boundaries of Northern, Central and Southern regions used in the trend analyses (Figures 1 to 3), locations of the 50 reefs surveyed by manta tows between September 2017 and May 2018. Size and colour of the symbols represent the absolute change in reef-level percent hard coral cover between 2017 and 2018, displaying high variability between reefs and regions.

**Enquiries and further information** Dr Hugh Sweatman, Team Leader, Long Term Monitoring Program |  
Email: [h.sweatman@aims.gov.au](mailto:h.sweatman@aims.gov.au)