



Australian Government
Great Barrier Reef
Marine Park Authority



Australian Government



AUSTRALIAN INSTITUTE
OF MARINE SCIENCE



REEF SNAPSHOT

SUMMER 2020-21



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This snapshot draws on various types of information, including:

Climate time series data (www.bom.gov.au/climate/change)


Cyclone wave damage predictions (www.nature.com/articles/srep26009)

eReefs GBR4 rivers 2.0 model data (http://dapds00.nci.org.au/thredds/catalogs/fx3/catalog.html?dataset=gbr4_2.0_rivers)

Eye on the Reef program data (www.gbrmpa.gov.au/our-work/eye-on-the-reef)

Long-term Monitoring Program survey reports (www.aims.gov.au/docs/research/monitoring/reef/latest-surveys.html)

ReefTemp data (www.bom.gov.au/environment/activities/reeftemp/reeftemp.shtml)



We acknowledge the continuing sea country management and custodianship of the Great Barrier Reef by Aboriginal and Torres Strait Islander Traditional Owners, whose rich cultures, heritage values, enduring connections and shared efforts protect the Reef for future generations.

About this snapshot

Summer is a critical time for the health of coral. This snapshot provides a summary of the conditions on the Great Barrier Reef this summer, what this means for coral, and what actions are underway. The focus is coral, it does not examine the health of other habitats or species, however, these may be added for future snapshots.

Each year, towards the end of summer, the snapshot is prepared by the three main Australian Government agencies responsible for Reef management and science: the Great Barrier Marine Park Authority, Australian Institute of Marine Science (AIMS), and CSIRO.

This snapshot is based on the latest available information at the time of writing. It does not take the place of ongoing rigorous reporting by all agencies. It sets the scene for the more comprehensive reports released later in the year, such as the mid-year Long-term Monitoring Program reports by AIMS and reports from the Marine Monitoring Program managed by the Marine Park Authority.



Summary for 2020-21

- Conditions were relatively good for coral recovery.
- There were no prolonged high temperature or major cyclone disturbances, and many reefs continued their recovery from past impacts.
- Water temperatures did not cause as much coral heat stress as recent years, although all months were warmer than average.
- Cyclone Kimi was the only tropical cyclone that tracked across the Reef, and its potential to cause widespread catastrophic damage to reefs was assessed as very low.
- While there was some good rainfall in the catchment, flood levels in waterways near the Reef were generally not major or sustained.
- Crown-of-thorns starfish remain at outbreak or potential outbreak levels in parts of the northern, central and (particularly) southern regions of the Reef. [The Crown-of-thorns Starfish Control Program](#) continues to work in all three regions to cull starfish down to non-outbreak levels.

Coral monitoring programs

AIMS has been monitoring the length and breadth of the Great Barrier Reef for more than 35 years.

The [Long-term Monitoring Program](#) is the most comprehensive record of coral reef condition available for the Reef with a focus on the long-term trends in coral decline and recovery. Ninety-three reefs are routinely monitored as part of this program.

An additional 32 inshore reefs are monitored as part of the [Marine Monitoring Program](#) managed by the Marine Park Authority.

Additional observations are gathered by the multiple organisations and people contributing to the [Eye on the Reef](#) program, including through the Reef Joint Field Management Program.



What has the Reef experienced?

This summer, conditions were relatively good for coral recovery.

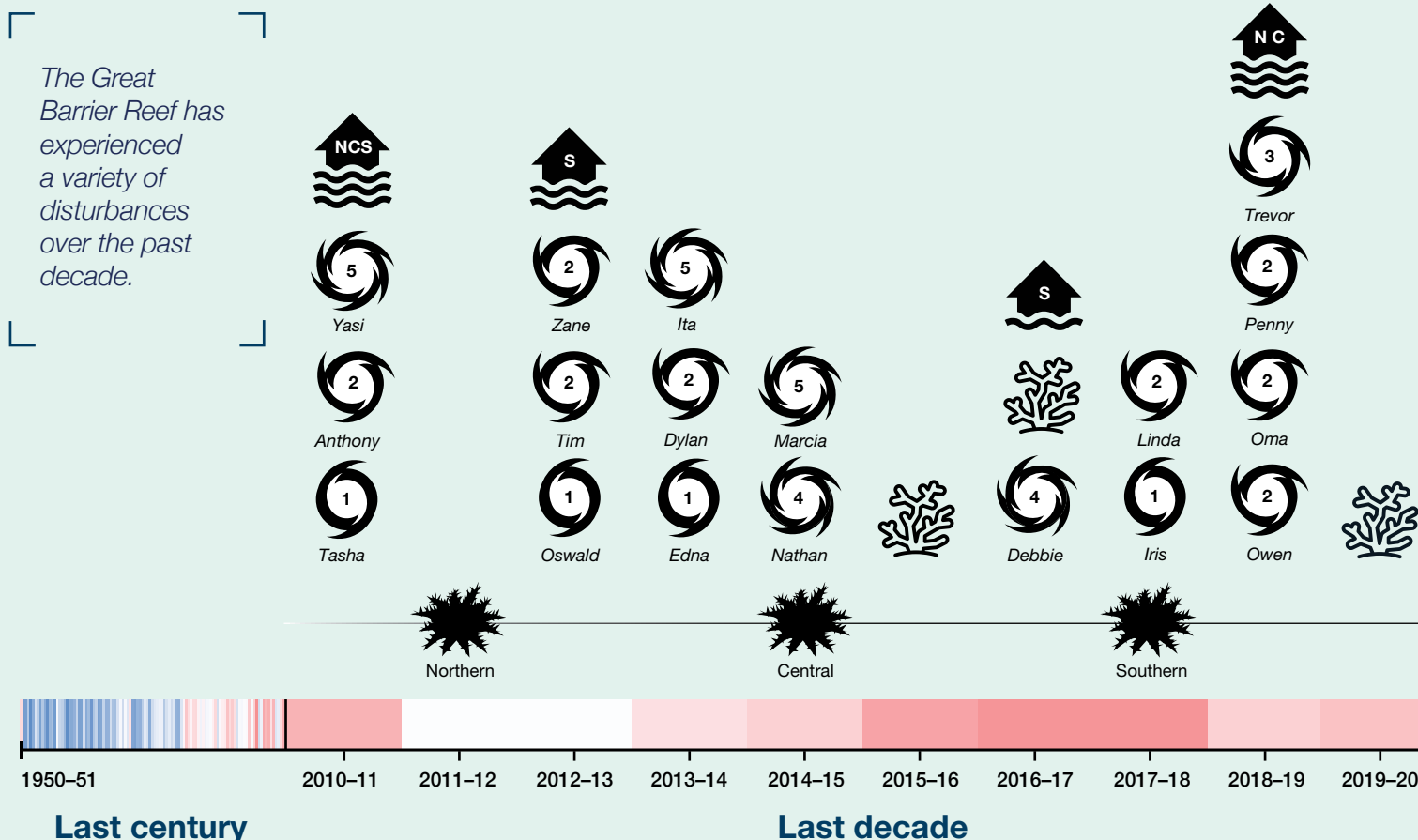
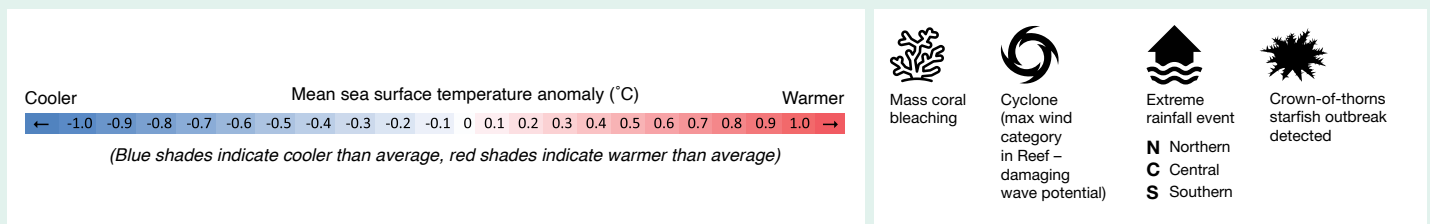
Just like any natural system, the Reef goes through cycles of disturbance and recovery. It is also very large, and disturbances affect it at a range of local and regional scales. This means Reef condition can be variable across different locations.

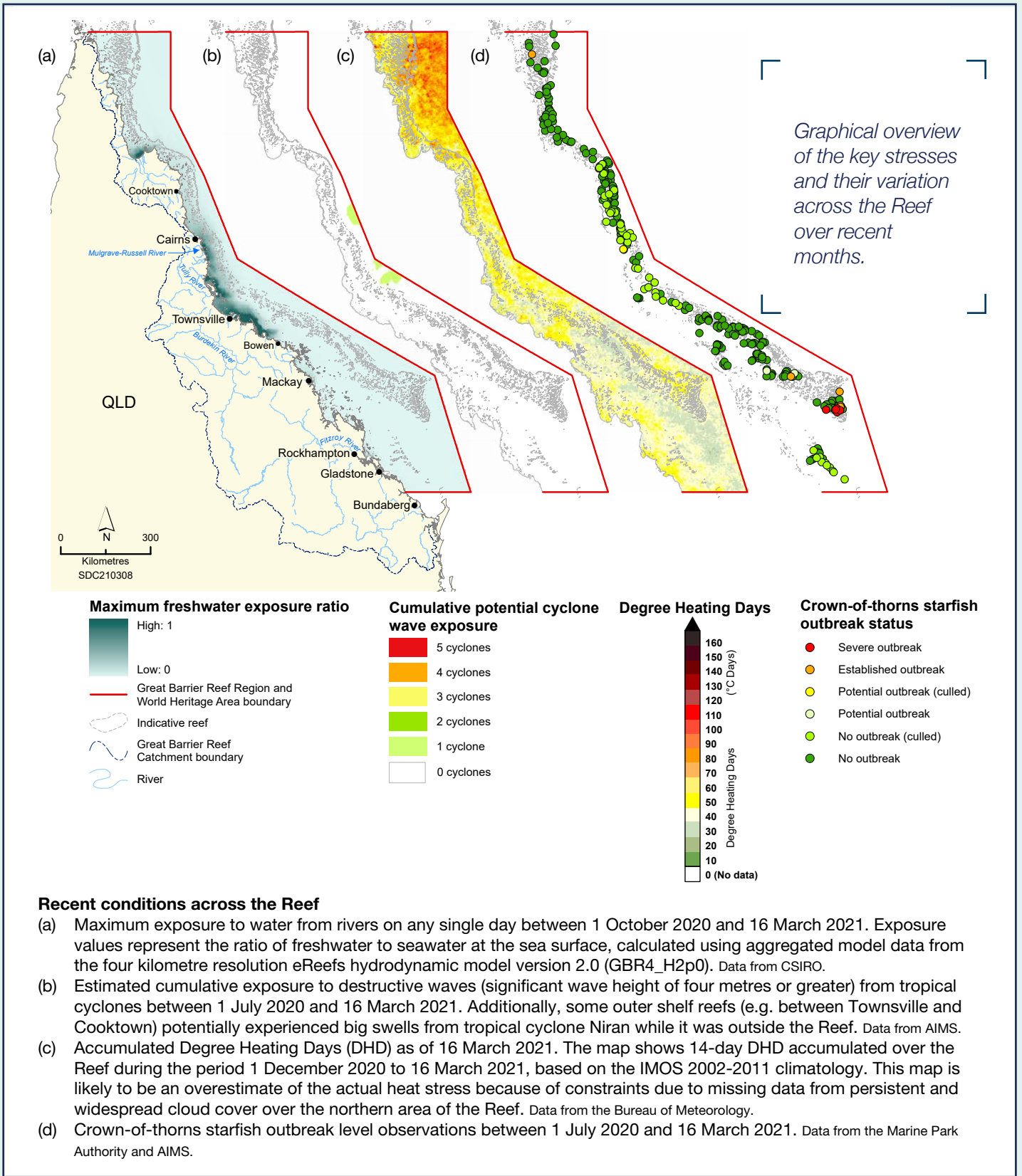
Climate change is the greatest threat to the Reef. It influences weather patterns and the ocean's temperature, pH level and currents, as well as intensifying the effects of other threats. Climate change is escalating, and the Reef is already experiencing the consequences of this.

Unfortunately, the events that cause disturbances on the Reef are becoming more frequent, leaving less time for coral recovery.

Four key stresses on coral reefs:

- **Above average sea temperatures:** an increase of only one degree Celsius above normal summer maximum sea temperature for just four weeks can trigger coral bleaching and potentially death. The level of bleaching risk is assessed by the number of Degree Heating Days, a measure of the accumulation of heat stress over a period of time.
- **Cyclones and storms:** powerful waves generated during cyclones can seriously damage habitat, particularly coral reefs.
- **Flood plumes:** when large volumes of fresh, muddy water flow from the catchment into the ocean after intense or prolonged rainfall, it is called a flood plume. Intense or prolonged rainfall events make this more likely. Flood plumes affect water quality, primarily through reduced clarity due to increased sediment and nutrients, and this can affect coral health.
- **Crown-of-thorns starfish:** crown-of-thorns starfish are a native coral predator, but when populations reach outbreak status (approximately 15 starfish per hectare), they eat coral tissue faster than it can grow.





Ongoing crown-of-thorns starfish outbreak

JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY MARCH

2020-21

What does this mean for coral?

During summer, surveys are conducted on the Great Barrier Reef to help us see how corals have been faring in different regions. The information below summarises what we know about coral condition as of the end of March 2021. It is a summary of what has happened over summer and gives the long-term context of the new observations. More comprehensive analyses and summaries will be available later in the year. A timeline of key monitoring reports appears on the back page of this snapshot — for example, surveys of additional inshore coral reefs will be conducted by the Marine Monitoring Program over the coming months. References for the information below appear on the inside cover.



Northern

The northern region includes coral reefs from Cape York down to Lizard Island.

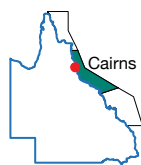
In-water surveys

(October to December): These surveys found high (30 to 50 per cent) levels of hard coral cover in the Cape Grenville area and moderate (10 to 30 per cent) levels in the Princess Charlotte Bay and Cooktown-Lizard Island areas. Coral cover had increased on most of the visited reefs since they were last surveyed, although there were declines on 12 reefs. One reef had elevated levels of white syndrome disease.

An incipient outbreak of crown-of-thorns starfish was detected on one reef in the Cape Grenville area. Starfish levels recorded at other surveyed reefs were low or zero.

Low levels of hard coral bleaching were observed on some reefs in the region, restricted to scattered individual colonies.

Later, in January-February, anecdotal reports and Eye on the Reef program surveys observed bleaching and fluorescing of corals on shallow reef flats around several mid-shelf islands. In March, **helicopter surveys** in the Cooktown to Cape Melville area observed only low to moderate coral bleaching on some inshore and mid-shelf reefs, and none on outer-shelf reefs.



Central

The central region includes reefs from just north of Cairns down to south of the Whitsundays. Reefs

in this region have sustained significant coral loss in the past due to mass coral bleaching and severe tropical cyclone Debbie in 2017 and the continued southward spread of crown-of-thorns starfish outbreaks.

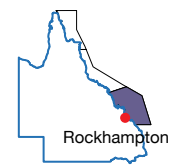
This summer, sample reefs off Cairns, Innisfail and the Whitsunday Islands have been surveyed by the Long-term Monitoring Program. Surveys of reefs off Townsville are to occur in March-April, but results from these were not yet available when this snapshot was prepared.

In-water surveys (January to February):

This summer's surveys found hard coral cover was moderate for the Cairns area and had increased at all surveyed reefs. There has been strong recovery since 2020, which was the lowest hard coral cover recorded since surveys began and resulted from cumulative disturbances between 2016 and 2019. Coral cover was also moderate in the Innisfail area, with surveyed reefs showing a mix of increased, decreased and stable cover levels since they were last visited. Similarly, coral cover was also moderate in the Whitsunday Islands area, where cover had increased on five reefs and declined on five reefs.

Numbers of crown-of-thorns starfish were low and stable since previous surveys, with only two individuals recorded across 31 surveyed reefs.

Low levels of hard coral bleaching were observed on a few reefs in the region, restricted to scattered individual colonies.



Southern

The southern region includes reefs from south of the Whitsundays down to the Capricorn-Bunker area and out to the Swain Reefs.

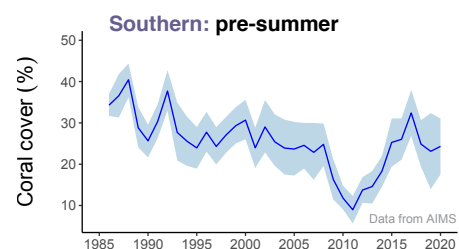
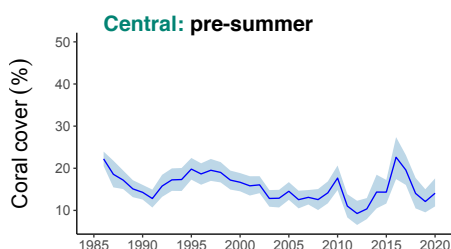
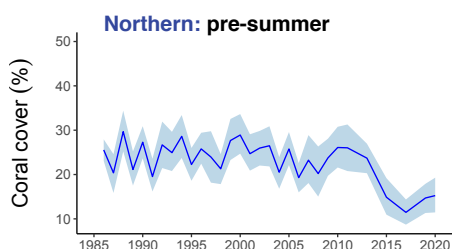
In-water surveys (August to September): The Pompey Reef area was not due to be surveyed by the Long-term Monitoring Program this year.

Hard coral cover was very high (50 to 75 per cent) in the Capricorn-Bunker area overall, with increases on most surveyed reefs since they were last visited. Declines in cover were recorded for two reefs, likely as a result of the 2020 mass coral bleaching event. Numbers of crown-of-thorns starfish were low overall and the trend was unchanged since previous surveys.

Coral cover was moderate in the Swain Reefs area, and had increased at most survey reefs. Crown-of-thorns starfish were recorded at most surveyed reefs. Active outbreaks were recorded on three reefs and an incipient outbreak at a fourth reef. At two reefs, starfish numbers had reduced sufficiently for the reefs to be considered recovering rather than under active outbreaks.

Low levels of hard coral bleaching were observed on a few reefs in the Swain Reefs area and most surveyed reefs in the Capricorn-Bunker area. Bleaching was restricted to scattered individual colonies. Additionally, Eye on the Reef program surveys indicate levels of bleaching remained low throughout summer across a range of reefs in the southern region.

Summer 2020-21 was a relatively good year for the Reef's corals. No major cyclone or prolonged high sea temperature disturbance events occurred. Many reefs will have been able to continue their recovery from past impacts.



What are we doing to help coral?

Supporting coral reef resilience is vital. Below are three examples of actions being taken to help coral.



Seeing the benefit of green zones

Green zones, or no-take marine reserves, protect 33 per cent of the Marine Park, and multiple lines of evidence show they are effective. Studies indicate reefs in green zones have fewer crown-of-thorns starfish outbreaks and recover faster from disturbances when compared to blue zones, which are open to fishing. Green zones also provide benefits for highly-prized fish, particularly coral trout. Recent AIMS monitoring shows there are nearly twice as many coral trout than in areas open to fishing, and biomass (the total weight of all trout) is now 122 per cent higher on reefs inside green zones. Coral trout in marine reserves also provide larval subsidies to help re-seed populations in areas open to fishing.

Harnessing coral slicks for recovery

Coral spawning events often happen only a few times a year, over a couple of nights, following a full moon. Drones are used to detect slicks of coral spawn in the water. Scientists then collect samples and (in floating ponds, transportable aquaculture systems, or back in the lab) culture the larvae in the millions. The larvae are then tagged before being deployed back onto the reef. As part of the Reef Restoration and Adaptation Program, researchers from universities and CSIRO will use predictive modelling and 3D mapping to track larval releases and see how effective the larval deployments are at restoring reef areas compared to areas where larvae are not deployed. The aim is to test protocols that could be scaled up in the future to support recovery on damaged or degraded reefs.



Slick spotting from the air



Asking people what they value

Changes in environmental threats and impacts to the Great Barrier Reef mean that Reef communities are changing the way they use and protect this Aussie icon.

Reef managers require an up-to-date understanding of how people value, perceive and interact with the Reef, in order to manage adaptively and protect community values while responding to emerging threats.

SELTMP is the Social and Economic Long-Term Monitoring Program for the Great Barrier Reef, led by CSIRO. Its researchers have conducted large-scale surveys of Reef user groups in 2013 (8300 people) and 2017 (4000 people).

In May-June 2021, SELTMP will be running new surveys, seeking participation and input from thousands of residents between Bundaberg and Cape York.

What can you do?

See the Reef. Love the Reef. Protect the Reef.

The Reef is facing unprecedented pressures, yet its astounding beauty continues to inspire people. We acknowledge the impact that COVID-19 is having on international opportunities to visit the Great Barrier Reef. As opportunities to visit in a safe way increase, we encourage people from around the world to come and be inspired by the Reef's beauty and to take actions to protect it for future generations to enjoy.

Think globally, act locally.









Every effort, no matter how small, collectively matters. Be it in your home or business, all actions matter. Visit gbrmpa.gov.au for steps you can take.

Understand and follow protection rules for the Great Barrier Reef.

Measures like zoning (access restrictions), permits, no anchoring areas, and extraction limits protect the Great Barrier Reef for the long term. Adopting a 'protect your patch' approach and making the most of user-friendly tools like the Eye on the Reef app and public moorings will help you help the Reef.

Reef health monitoring

Each year, data on the health of the Reef's corals are collected, analysed, and shared. The timing of data collection periods, report releases and related workshops is shown below.

| Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun |
|---|---|---------|---|
|  Marine Monitoring Program surveys (inshore reefs) |  Long-term Monitoring Program surveys (mainly mid and outer shelf reefs) | |  Marine Monitoring Program surveys (inshore reefs) |
|  Eye on the Reef (surveys/submissions) | | | |
|  Long-term Monitoring Program annual summary report (annual) |  Pre-summer workshop (annual) | |  Post-summer Reef snapshot (annual) |
|  Marine Monitoring Program reports (annual) | | | |



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