Great Barrier Reef
Report Card 2014
Reef Water Quality Protection Plan

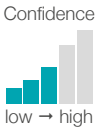
Australian Government

Queensland Government

About the indicators

More detailed information about how the indicators and qualitative confidence rankings are measured is available on the Reef Water Quality Protection Plan website, **www.reefplan.qld.gov.au/methods**.

Management practices



Unlike previous years, the Reef Plan 2013 land management target is based on the *area* of land managed using best practice systems, rather than the *number* of landholders who have adopted improved practices. This is a more meaningful measure as the area of improved land management is the basis for the water quality modelling.

Catchment indicators

Riparian vegetation is the vegetation beside waterways. Both riparian vegetation and ground cover are important to help reduce pollutant flow to waterways and prevent erosion. Wetland and riparian areas have a water quality protection function and a value in their own right.

Ground cover levels are based on annual monitoring data using satellite imagery, calibrated by field data.

Riparian vegetation extent is measured every four years using satellite imagery.

Wetland extent is derived from wetland mapping every four years. A separate case study, available on the Reef Plan website (www.reefplan.qld.gov.au), outlines the pilot project to report on wetland environmental values and processes.

Catchment loads

The catchment loads modelling program estimates average annual loads of key pollutants (**sediment**, **nutrients** and **pesticides**) for each of the 35 catchments draining to the Great Barrier Reef. It models the anthropogenic baseline load and the change in loads for each subsequent year due to the adoption of improved land management practices. For more information, refer to the 'Why use modelling to measure catchment loads?' section below.

Marine indicators

Remote sensed water quality

Chlorophyll *a* indicates nutrient availability and productivity.

Total suspended solids is an indicator of particulate matter in water.

Seagrass

Seagrass abundance includes the cover and change in cover.

Reproduction indicates the potential of seagrass meadows to recover from disturbances.

Nutrient status is a measure of the response of seagrass to nutrient conditions in surrounding waters.

Coral

Coral cover is a measure of the percentage of coral across reefs, and indicates the capacity of coral to persist under the current environmental conditions and its potential to recover.

Coral change measures change in coral cover and indicates coral resilience to disturbance.

Macroalgal cover—high abundance indicates poor water quality and negatively affects the resilience of coral communities.

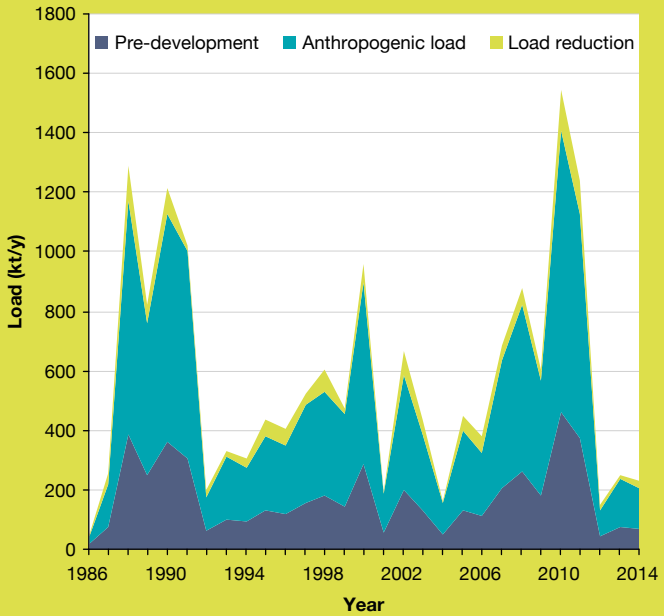
Coral juvenile density measures the abundance of corals less than 10 centimetres in diameter which indicates the recovery potential from disturbances.

Why use modelling to measure pollutant load reductions?

Monitored pollutant loads leaving catchments vary significantly from year-to-year, mainly due to differences in annual rainfall and runoff. Therefore, catchment modelling is used to estimate the long-term annual pollutant load reductions due to the adoption of improved land management practices. This removes the impact of factors such as climate variability. Research suggests time lags to monitor the improvements from land management practice change could range from years for pesticides up to decades for nutrients and sediments, due to the high level of climate variability. The models use measured changes in on-ground management and well-documented and accepted methods and assumptions. Long-term water quality monitoring data is used to validate and improve the models, continuously improving confidence in the estimates of water quality over time.

At right: Example of modelled loads for natural (pre-development), human-caused (anthropogenic) and the load reduction following investment in improved practices. The pollutant loads targets aim to reduce the anthropogenic load leaving catchments.

Modelled load reductions



Report card key findings

Report Card 2014 incorporates significant improvements to the reporting methods and details progress towards the updated targets in the Reef Water Quality Protection Plan 2013. It assesses the combined results of all Reef Plan actions up to June 2014 as well as changes in riparian and wetland extent between 2009 and 2013.

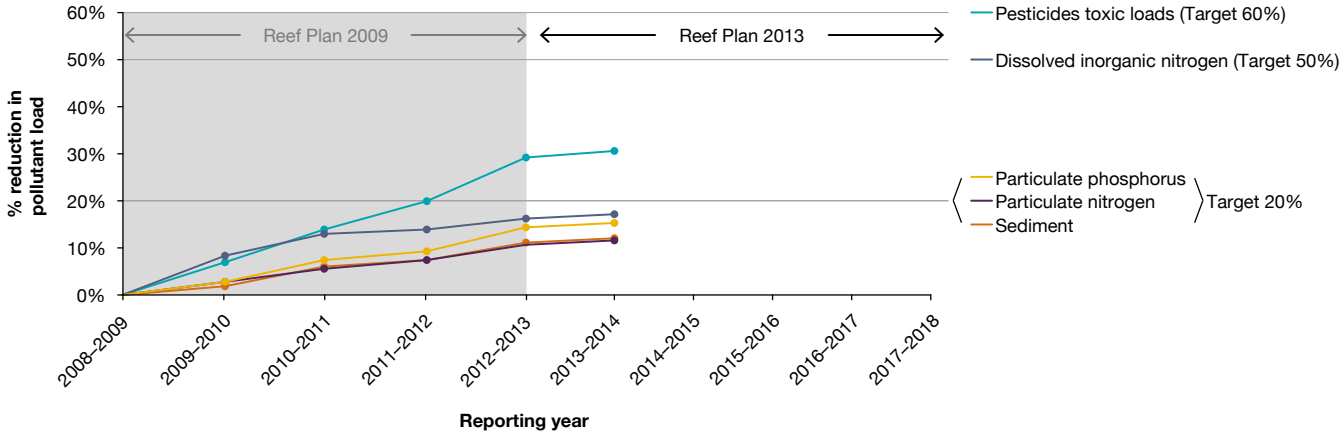
Results show the need to accelerate the rate of change and drive innovation to meet the ambitious targets. However, not all activities undertaken during the reporting period are included so the results are considered a conservative estimate of progress.

- As at June 2014 the area of land managed using best management practice systems for each industry across the Great Barrier Reef was:
  - sugarcane—approximately 13 per cent for nutrients (60,000 hectares), 30 per cent for pesticides (123,000 hectares) and 23 per cent for soil (101,000 hectares)
  - grazing erosion—approximately 28 per cent for pastures (8.6 million hectares), 47 per cent for streambanks (14.5 million hectares) and 24 per cent for gullies (7.4 million hectares).
  - horticulture—approximately 23 per cent for nutrients (20,000 hectares), 45 per cent for pesticides (39,000 hectares) and 71 per cent for soil (61,000 hectares).
- The grains pesticide target was exceeded (91 per cent) in the Burdekin region.
- Overall loss of wetlands continued between 2009 and 2013 (330 hectares, less than 0.1 per cent), although the rate of loss was lower than the previous periods.
- Overall forest loss in riparian areas continued between 2009 and 2013 (31,000 hectares, 0.4 per cent), with an increased rate of loss compared to the previous periods.
- The ground cover target was exceeded across all regions in 2013–2014. However, there were significant areas of low cover which pose a high risk for sediment loss, particularly in areas of the Burdekin and Fitzroy regions that were drought declared.
- Modelled annual average load reductions across the Great Barrier Reef from 2009 to 2014 were:
  - sediment 12 per cent
  - particulate nitrogen 11.5 per cent
  - particulate phosphorus 14.5 per cent
  - dissolved inorganic nitrogen 17 per cent
  - pesticides 30.5 per cent
  - the particulate phosphorus target was exceeded (20.5 per cent) in the Wet Tropics region
- The overall condition of the inshore marine environment remained poor in 2013–2014. Inshore seagrass showed signs of recovery in some regions, but remained in poor condition overall. Inshore coral reefs also remained in poor condition, although there were modest improvements in juvenile coral density.

Long-term progress towards catchment pollutant loads targets

The Reef Water Quality Protection Plan targets have become more detailed since they were first set in 2009 based on findings from the 2013 Scientific Consensus Statement. The relative priorities of individual pollutants were used to refine the Reef Plan 2013 targets. The nitrogen target changed from total nitrogen to dissolved inorganic nitrogen in priority areas. The sediment target was expanded to include particulate nutrients (particulate nitrogen and particulate phosphorus) in priority areas. The pesticide target increased and now reports overall toxic loads. Previously the toxicity of individual pesticides was not taken into account. Progress towards these targets since 2009 is assessed using modelling.

Modelled pollutant load reductions



Scoring system

A standardised scoring system was developed for each of the key indicators in the report card. The scoring system is used to assess and communicate progress towards the management practice and catchment targets as well as current marine condition using the following categories:

- Very good
- Good
- Moderate
- Poor
- Very poor
- No data

Further details on the scoring system for each indicator are outlined in the supporting technical information on the Reef Water Quality Protection Plan website, www.reefplan.qld.gov.au/scoring.

Management practice indicators

Management practices are assessed in terms of their relative water quality risk from Low to High. The area managed using best management practice systems as at June 2014 is defined as the area managed under Low and Moderate–Low risk levels.

Sugarcane

Area of sugarcane lands managed using best management practice systems as at June 2014.

Grazing

Area of grazing lands managed using best management practice systems as at June 2014.

Horticulture

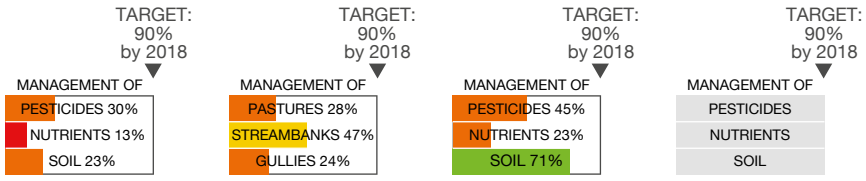
Area of horticulture lands managed using best management practice systems as at June 2014.

Grains

Area of grains managed using best management practice systems as at June 2014. Note: grains are only grown in two regions.

Great Barrier Reef

The greatest water quality risks to the Great Barrier Reef are nitrogen, sediment and pesticides.
***Management priority:** nitrogen and pesticides from sugarcane and erosion management in grazing.

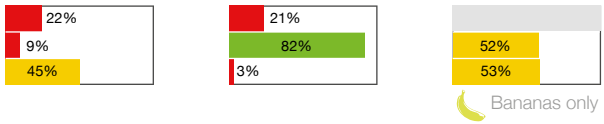


Cape York

Includes 43,000 square kilometres of catchments that drain into the reef. The main agricultural land use is grazing.
***Overall relative risk:** low.
***Management priority:** maintain the current values of the region.

Wet Tropics

Covers 22,000 square kilometres. The main agricultural land uses are grazing, sugarcane and horticulture.
***Overall relative risk:** very high.
***Management priority:** nitrogen from sugarcane and bananas, pesticides from sugarcane.

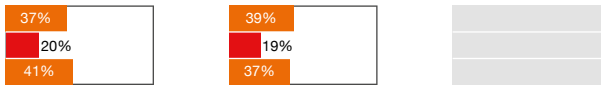


Burdekin

Covers 141,000 square kilometres and is largely drained by the Burdekin River system. The main agricultural land use is grazing.
***Overall relative risk:** high.
***Management priority:** nitrogen and pesticides from sugarcane and erosion management in grazing.

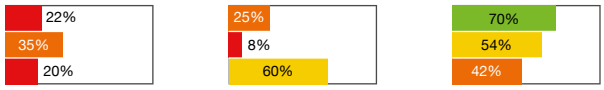
Mackay Whitsunday

Covers an area of 9000 square kilometres. The main agricultural land uses are grazing and sugarcane.
***Overall relative risk:** moderate.
***Management priority:** pesticides and nitrogen from sugarcane.



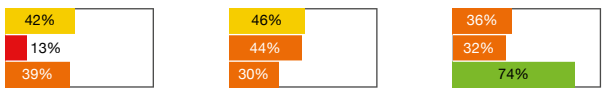
Fitzroy

Covers 156,000 square kilometres and is the largest region draining into the reef lagoon. Grazing is the predominant land use.
***Overall relative risk:** high.
***Management priority:** erosion management and pesticides in grazing and cropping.



Burnett Mary

Covers 53,000 square kilometres. The main agricultural land use is grazing.
***Overall relative risk:** *uncertain.*
***Management priority:** erosion management in grazing.



Catchment indicators

The loss of wetlands and riparian vegetation is mostly caused by clearing, often for agricultural use. Wetland modification through bunding can increase the extent of wetlands. Ground cover is influenced by land management and climate. There were significant areas of low ground cover within the Burdekin and Fitzroy regions which were drought declared.

Wetland loss

Change in extent of natural wetlands between 2009 and 2013.

Riparian

Change in extent of riparian vegetation between 2009 and 2013.

Ground cover

Late dry season ground cover in 2013–2014.

Reported every four years

TARGET: No net loss by 2018

TARGET: Extent increased by 2018

TARGET: minimum 70% cover by 2018

330ha loss (<0.1%)	
30,980ha loss (0.4%)	
77%	
No loss	
226ha loss (0.02%)	
84%	
9ha loss (<0.1%)	
1060ha loss (0.2%)	
85%	
61ha gain (<0.01%)	
8351ha loss (0.3%)	
73%	
5ha gain (<0.1%)	
539ha loss (0.3%)	
88%	
348ha loss (0.1%)	
14,777ha loss (0.7%)	
78%	
39ha loss (0.1%)	
6027ha loss (0.7%)	
81%	

Catchment loads

Modelling of pollutant load reductions is based on reported improvements in management practice systems. Results are an estimate of the annual average reduction in human-caused (anthropogenic) pollutant loads at the end of catchments.

Dissolved inorganic nitrogen

Reduction in annual average dissolved inorganic nitrogen load between 2009 and 2014.

Particulate nitrogen

Reduction in annual average particulate nitrogen load between 2009 and 2014.

Particulate phosphorus

Reduction in annual average particulate phosphorus load between 2009 and 2014.

Sediment

Reduction in annual average sediment load between 2009 and 2014.

Pesticides

Reduction in annual average toxic pesticide load between 2009 and 2014.

TARGET: 50% by 2018

TARGET: 20% by 2018

TARGET: 20% by 2018

TARGET: 20% by 2018

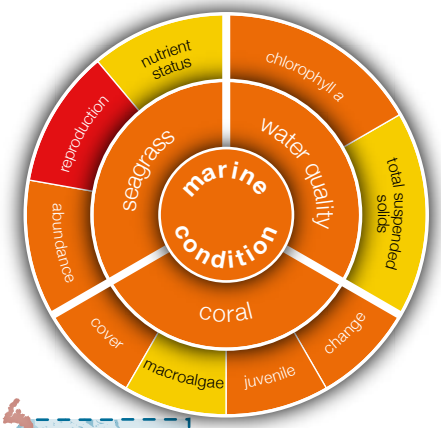
TARGET: 60% by 2018

17%	11.5%	14.5%	12%	30.5%
	8%	12%	8%	
14.5%	11.5%	20.5%	13.5%	28.5%
16%	15%	15.5%	17%	20%
24%	11%	13%	9%	41%
	3%	6.5%	4.5%	4%
31.5%	6%	12%	3%	33%

Marine condition 2013–2014

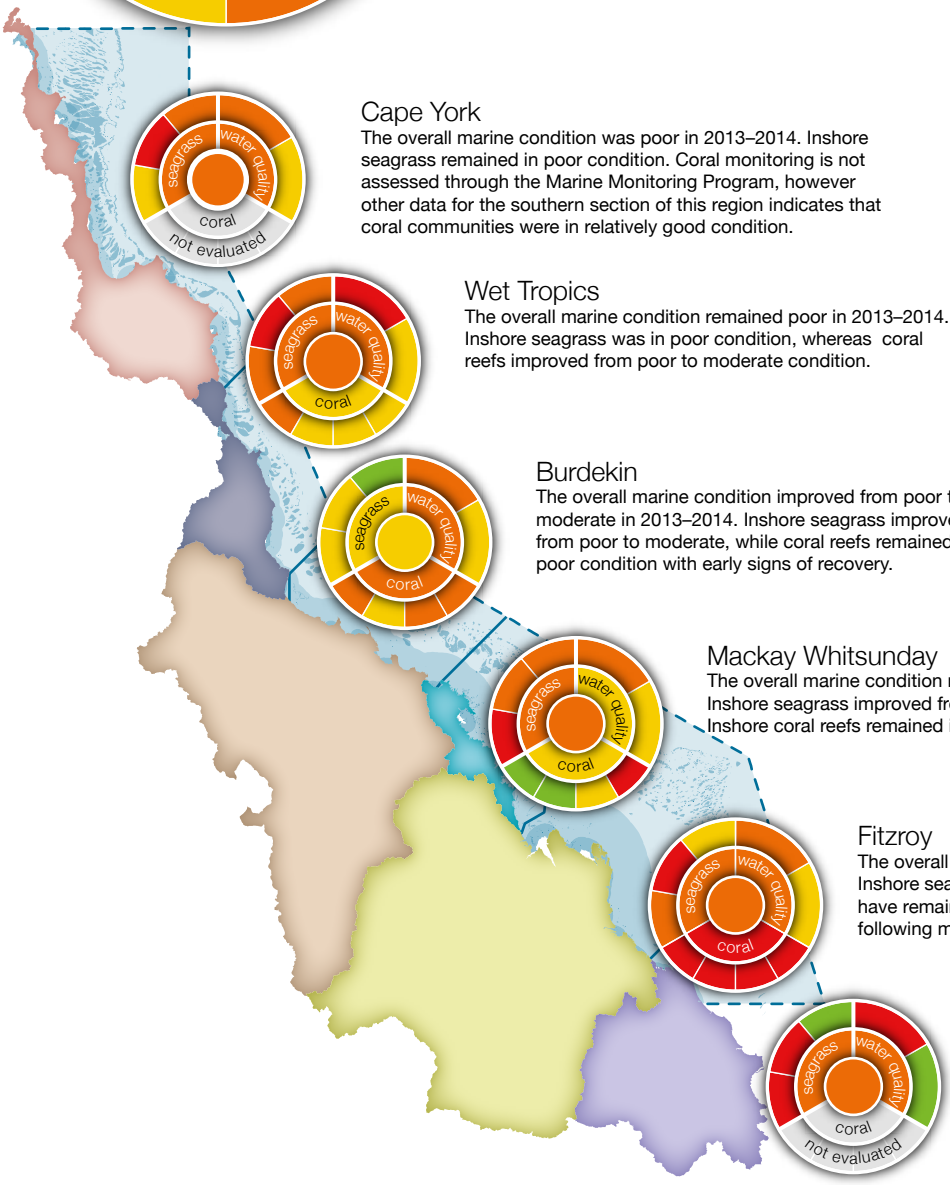
It will take time for marine condition to show improvements as there are significant time lags between implementation of land management practices and measurable outcomes in these natural systems. Inshore marine condition is also strongly influenced by severe weather events, such as tropical cyclones and floods, which have impacted all regions in recent years. Confidence in the marine results for Cape York and the Burnett Mary remains low due to limited data availability and validation. Consequently, data from these regions is not used in the Great Barrier Reef-wide assessment.

This section focuses mainly on the inshore area of the Great Barrier Reef. Water quality at mid and outer shelf sites is generally good to very good overall because it is less directly influenced by river discharge.



Great Barrier Reef

The overall condition of the inshore marine environment remained poor in 2013–2014. Inshore seagrass showed signs of recovery at locations that were relatively free from disturbances in recent years, but remained in poor condition overall. Inshore coral reefs have continued to improve since 2011–2012 when their condition reached its lowest point due to impacts by repeated disturbances. However, they remained in poor condition overall.



Cape York

The overall marine condition was poor in 2013–2014. Inshore seagrass remained in poor condition. Coral monitoring is not assessed through the Marine Monitoring Program, however other data for the southern section of this region indicates that coral communities were in relatively good condition.

Wet Tropics

The overall marine condition remained poor in 2013–2014. Inshore seagrass was in poor condition, whereas coral reefs improved from poor to moderate condition.

Burdekin

The overall marine condition improved from poor to moderate in 2013–2014. Inshore seagrass improved from poor to moderate, while coral reefs remained in poor condition with early signs of recovery.

Mackay Whitsunday

The overall marine condition remained poor in 2013–2014. Inshore seagrass improved from very poor to poor condition. Inshore coral reefs remained in moderate condition.

Fitzroy

The overall marine condition remained poor in 2013–2014. Inshore seagrass remained in poor condition. Coral reefs have remained in very poor condition since 2011–2012 following multiple disturbances.

Burnett Mary

The overall marine condition remained poor in 2013–2014. Inshore seagrass improved from very poor to poor condition. No coral monitoring occurs in the Burnett Mary region through the Marine Monitoring Program.

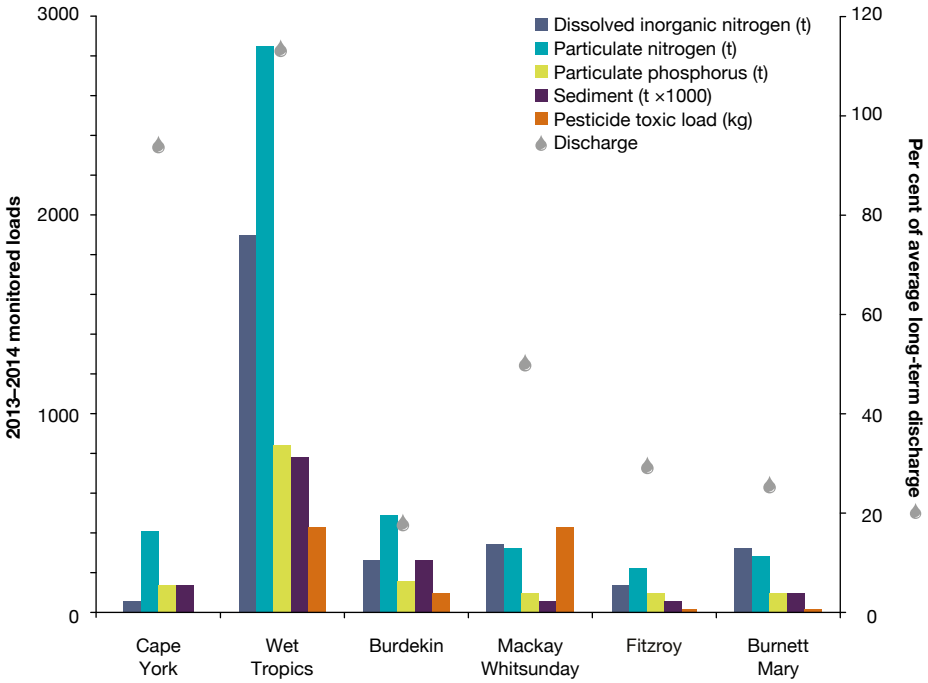
Marine context

Between 2006 and 2014, repeated disturbances (extreme weather events) have had a considerable and widespread impact on the water quality and ecosystem health of the inshore area.

In 2013-2014:

- Two tropical cyclones traversed parts of the reef: Tropical Cyclone Dylan (Category 2) which made landfall between Bowen and Proserpine and Tropical Cyclone Ita (Category 4) which made landfall north of Cooktown.
- There were few floods as the level of rainfall in the reef catchment was low to average. However, Tropical Cyclone Ita caused some flooding in the Wet Tropics, mainly from the Herbert River.

Monitored pollutant loads impacting on the marine environment in 2013–2014



Cape York and the Wet Tropics had near-average river discharges and monitored loads of sediment and nitrogen. All other regions had significantly lower than average discharge which resulted in markedly below average monitored sediment and nitrogen loads. The highest pesticide loads were from the Wet Tropics and Mackay Whitsunday regions. Note: pesticides are not monitored in Cape York.

Scoring system

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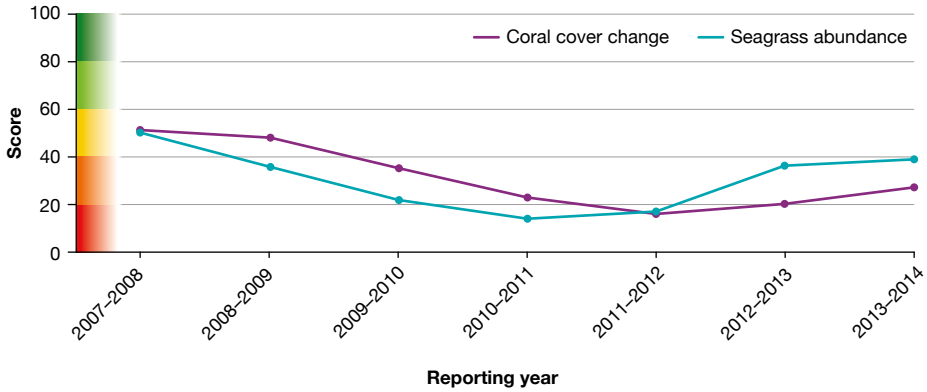
Great Barrier Reef trends in coral cover change and seagrass abundance



The long-term trends in key coral and seagrass resilience indicators show the cumulative impacts of multiple disturbances on the reef in recent years.

Great Barrier Reef

The Great Barrier Reef receives runoff from 35 major catchments, which drain 424,000 square kilometres of coastal Queensland. These catchments are spread from the Cape York region in the north to the Burnett Mary region in the south. Climate and soil characteristics vary widely across the catchments. Grazing (77 per cent) is the dominant agricultural land use, particularly in the Burdekin and Fitzroy regions. Sugarcane (1.4 per cent) and horticultural crops (0.2 per cent) are more prevalent on the coastal floodplain with high rainfall and/or irrigation. Grain crops and irrigated cotton are prevalent in inland areas of the Fitzroy region.

Poor water quality from catchment runoff affects the health of the reef, causing degradation of inshore reefs and contributing to crown-of-thorns starfish outbreaks. This decreases the Great Barrier Reef's ability to withstand and recover from the cumulative impacts of climate change and increasing intensity of extreme weather events.

Reef 2050 Long-Term Sustainability Plan

The Reef 2050 Long-Term Sustainability Plan is the Australian and Queensland governments' overarching framework for protecting and managing the reef from 2015 to 2050. It responds to the challenges facing the reef and presents actions to protect its Outstanding Universal Value while allowing ecologically sustainable development and use. Improving water quality is one of the themes of the plan and it incorporates the goal and targets of the Reef Water Quality Protection Plan. For more information, see **www.environment.gov.au/marine/gbr/long-term-sustainability-plan**.

Reef Water Quality Protection Plan

The Reef Water Quality Protection Plan (Reef Plan) is a joint commitment of the Australian and Queensland governments to halt and reverse the decline in the quality of water entering the reef. It was established to galvanise and target the collective actions of government and the community to protect the reef. An updated Reef Plan was released in 2013 with refined targets that identified a pathway towards the long-term goal. This Report Card details the efforts of land managers, agricultural industries and regional natural resource management organisations to reduce the impacts of diffuse source agricultural pollution on the health and resilience of the reef. For more information, see **www.reefplan.qld.gov.au**.

Paddock to Reef program

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program), funded jointly by the Australian and Queensland governments, is a highly innovative approach to collecting and integrating data and information on agricultural management practices, catchment indicators, catchment loads and the health of the Great Barrier Reef. The objective of the program is to measure and report on progress towards the Reef Plan goal and targets through annual report cards. The program integrates the best available information, recognising that data confidence varies across the indicators and regions. The quality of data is continually improving as new methods are applied and more information becomes available.

Contributors

More information

More information, methods and detailed results can be found on the Reef Plan website, www.reefplan.qld.gov.au.

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