

## Improving water quality

The Reef Water Quality Protection Plan is a joint initiative of The Queensland and Commonwealth governments. It sets long-term goals to reduce pollutants entering the Great Barrier Reef lagoon. The plan also prioritises the rehabilitation and conservation of wetlands and riverbank vegetation that filters waterborne pollutants. [www.deh.gov.au/coasts/pollution/reef](http://www.deh.gov.au/coasts/pollution/reef)

National Action Plan for Salinity and Water Quality (NAP) is a joint initiative of the Commonwealth, State and Territory governments. The Burdekin, Fitzroy and Burnett catchments have been identified as priority regions adjacent to the Great Barrier Reef Marine Park. [www.napswq.gov.au](http://www.napswq.gov.au)

Natural Heritage Trust (NHT) was established by the Commonwealth Government in 1997 to support projects helping to restore and conserve Australia's natural resources and environment. In 2001, the Commonwealth Government committed a further \$350 million to the NHT (often referred to as NHT2). For catchments outside the NAP priority catchments, these funds will be delivered through Coastcare, Landcare, Bushcare and Rivercare programs through accredited NRM plans. [www.nht.gov.au](http://www.nht.gov.au)

Natural Resource Management (NRM) bodies have been established under the National Action Plan for Salinity and Water Quality, and the Natural Heritage Trust. Each NRM body is developing a regional plan that will set water quality targets for regional areas and develop catchment-specific priorities for action. Once these plans have been accredited by both Commonwealth and State governments, funding for projects that address the targets set in the plans will be available through the NRM bodies.

CSIRO's Water for a Healthy Country Program is working with land users to make best use of water resources and enable sustainable development of the catchment. Innovative agricultural systems will deliver increased profit and better environmental outcomes for rivers, wetlands and estuaries.

*The Catchment to Reef Program is developing the necessary tools to enable land managers to measure, monitor and meet water quality targets relevant to all these plans and projects.*

## Meeting new water quality targets

Healthy rivers and wetlands mean healthy catchments. They filter out contaminants, support rich biodiversity including important fishery species, and provide water for human use. Water from catchments flows out to sea, so healthy catchments also mean healthy reefs, seagrass beds and coastal habitats for marine life such as dugongs and turtles.

Land management practices affect the quality of the water flowing through our river systems and onto the Great Barrier Reef. Farming has introduced nutrients and chemicals, and development has reduced the amount of wetlands and natural vegetation needed to filter water running off the land.

Working together, the Commonwealth and Queensland Governments have developed the Reef Water Quality Protection Plan, which aims to halt and reverse the decline in water quality entering the Reef lagoon within ten years. The Plan will set targets for improving water quality.

We need new tools to measure and monitor the status and trend of water quality in river catchments and in the Great Barrier Reef lagoon to meet these targets, and to evaluate the effects of improving land and water management.

The Catchment to Reef program will develop a range cost-effective tools, protocols and expertise tailored to meet the needs of all sectors of the community and management agencies. This will enable land users and managers to meet the targets set by the Reef Water Quality Protection Plan, and implement best-practice in river management.

While the research will take place on selected catchments and inshore areas in the Wet Tropics region, outcomes from the program will be applicable across all the Great Barrier Reef Catchments.



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CRC Reef Research Centre is a knowledge-based partnership of coral reef ecosystem researchers, managers and industry. It is a joint venture between Association of Marine Park Tourism Operators, Australian Institute of Marine Science, Great Barrier Reef Marine Park Authority, Great Barrier Reef Research Foundation, James Cook University, Queensland Department of Primary Industries and Fisheries, Queensland Seafood Industry Association and Sunfish Queensland Inc.



**Rainforest CRC**

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Rainforest CRC is a research partnership involving the Commonwealth and Queensland State Governments, the Wet Tropics Management Authority, the tourism industry, Aboriginal groups, the CSIRO, James Cook University, Griffith University and The University of Queensland.



Artwork: Catherine Bone. Photographs: Richard Pearson, Chloe Lucas and David Wachenfeld (Triggerfish Images).

# Catchment to Reef Research



*The quality of water entering the Great Barrier Reef lagoon from Queensland's rivers has deteriorated since European settlement. Human activities change aquatic habitats, and produce nutrients and sediments that run into river catchments and out to sea. This threatens the health of our rivers and wetlands, as well as our coral reefs and seagrass beds.*

The Catchment to Reef research program will develop new tools to assess and monitor the health of catchments and aquatic systems in both the Wet Tropics and Great Barrier Reef World Heritage Areas. The tools will also enable land managers to mitigate the effects of human activities on water quality. This research will help to improve the health of Queensland's river catchments and the Great Barrier Reef lagoon.

The three-year, \$5m program is a joint initiative by two Co-operative Research Centres (CRCs) - Rainforest CRC and CRC Reef.



# Catchment to Reef Research

## MANAGING RIVERBANK VEGETATION

Vegetation growing along riverbanks and around farm drainage systems prevents sediment run-off and also filters contaminants flowing into streams, rivers and wetlands.

Researchers are developing tools to assess the influence of soil type, land use, vegetation structure, and width of the vegetated zone on the performance of riverbank vegetation. From this work, they will develop guidelines for designing vegetation buffer zones in agricultural areas.

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## RIVER HEALTH ASSESSMENT TOOLS

Researchers are developing physical, chemical and biological indicators to assess river health in the Wet Tropics. Each indicator must be sensitive to land use, riverbank disturbance, or run-off from catchments.

Researchers will compare measured values of different components of the river system, such as the biodiversity of fish life and the amount of attached algae, against values expected under pristine conditions. Differences between measured and expected values of indicators can signal the health of a system, and if it is declining, suggest reasons for the decline.

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## ADVANCED TECHNOLOGIES FOR MONITORING WATER QUALITY IN THE GREAT BARRIER REEF

Researchers are testing the ability of satellite imagery of ocean colour to provide accurate estimates of water quality on reefs and coastal areas. They are also trialling new passive sampling technologies to measure pollutant levels in reef waters. This will enable cost-effective monitoring of water quality on the Reef.

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## ACHIEVING OUTCOMES

An essential component of the Catchment to Reef Program is converting the outputs of each task into tools that can be adopted by land users and managers across the catchment. Tools will be tailored for, and communicated to, different users throughout the community, from school groups to farmers and management agencies.

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## NEW TOOLS TO ASSESS THE HEALTH OF INSHORE ECOSYSTEMS

Different organisms react to the stresses of nutrient, pollutant and sediment run-off in different ways. Tiny microbes on the Reef respond to changes in water quality much faster than more complex animals such as coral or fish.

Researchers are investigating how a range of microscopic organisms, algae, seagrasses and corals react to changes in water quality. They will develop sensitive biochemical indicators to act as an early warning system for deteriorating water quality on inshore reefs.

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## PRIORITISING RIVER REHABILITATION

The Great Barrier Reef catchment is a patchwork of different land and water uses, with different levels of disturbance, ecological health and protection of ecological functions and values.

Researchers are producing frameworks to prioritise river rehabilitation and restoration actions. This will improve river health and water quality across the Great Barrier Reef catchments. It will also help to ensure that water of high quality enters the Great Barrier Reef lagoon.

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## IMPROVED WATER QUALITY MONITORING

Many factors, such as time of day, extent of river vegetation, and recent disturbances of the water system affect water quality. Monitoring is often flawed because these factors are not considered.

Site selection is very important. Most monitoring is done at the end of river systems. However, as contaminants may enter and leave the system at different points, end-of-system monitoring gives incomplete information. It also overlooks the role of wetlands in filtering out contaminants. Researchers are establishing better methods for site selection and effective monitoring across the catchment.

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