Australian Government
Great Barrier Reef Marine Park Authority

The Great Barrier Reef: adaptive management in the face of climate change and other pressures

Andrew Skeat
General Manager
Marine Park Management

June 2013

Abstract

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- **Values**
- **Pressures**
  - Climate Change
  - Water Quality
  - Coastal development
  - Fishing
- **Management Responses**
  - Revised zoning plan
  - Reef Water Quality Protection Plan
  - Climate change adaptation strategy
- **Partnerships**
  - Tourism – high standards
  - Reef Guardian program

The Great Barrier Reef

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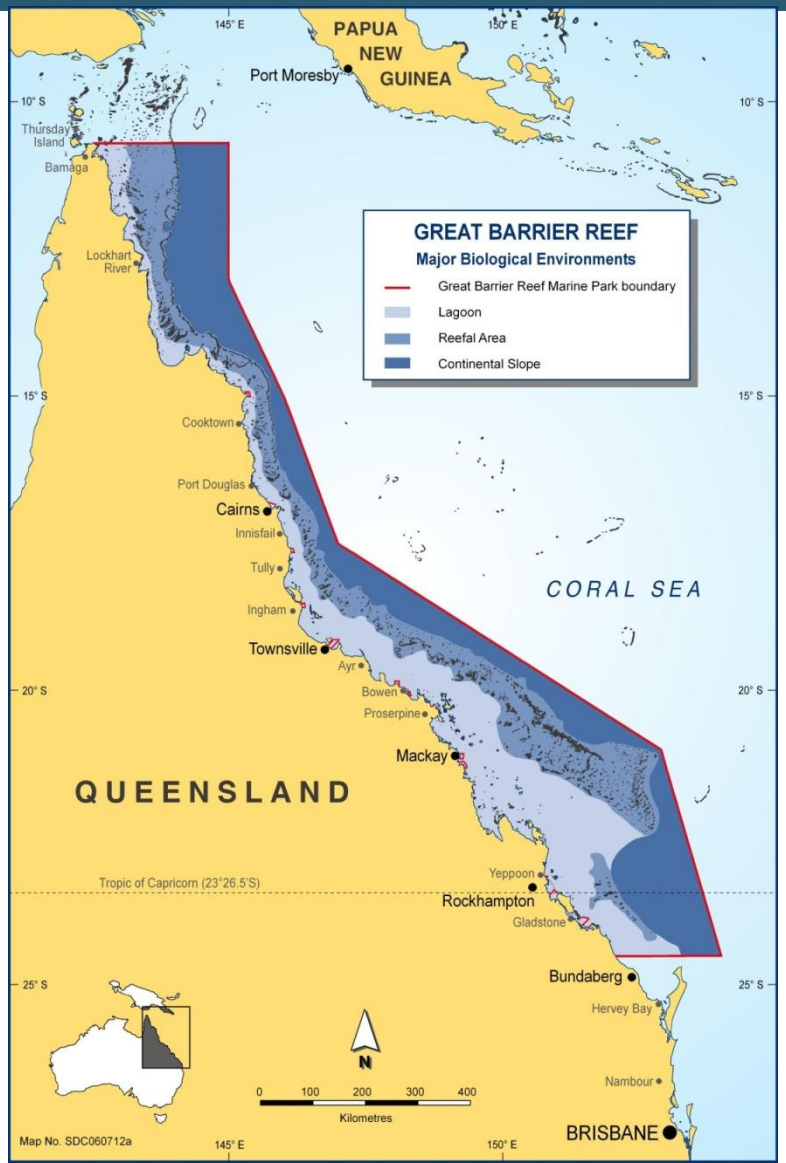
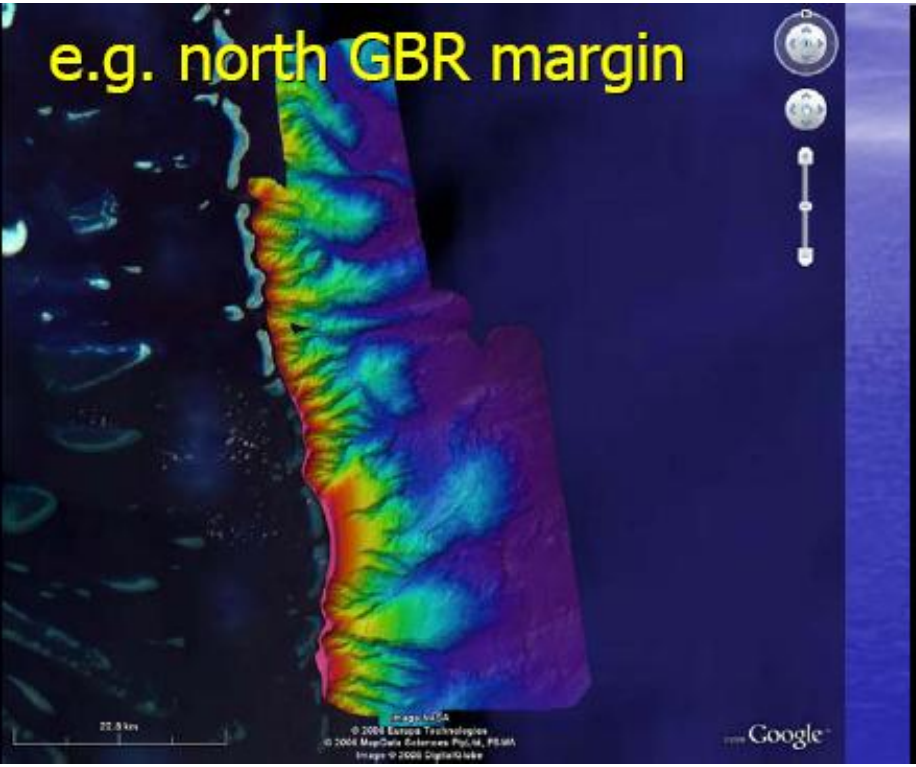
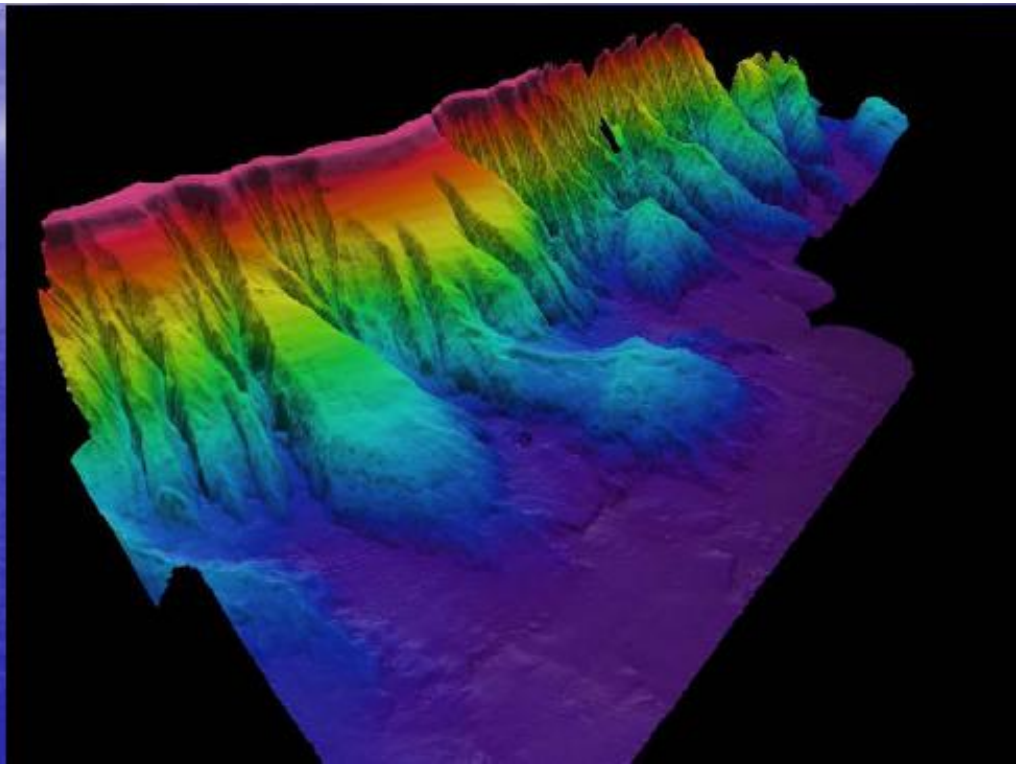


Table 2.1 Area of major types of habitat in the Great Barrier Reef Region

Habitat type	Percentage of the Region
Coral reefs	7%
Seagrass, shoals and sandy or muddy seabed (up to 200m deep)	61%
Continental slope (200-1000m deep)	15%
Deep oceanic waters (deeper than 1000m)	16%
Islands	1%





Source: Robin Beaman, JCU

Ecosystem function

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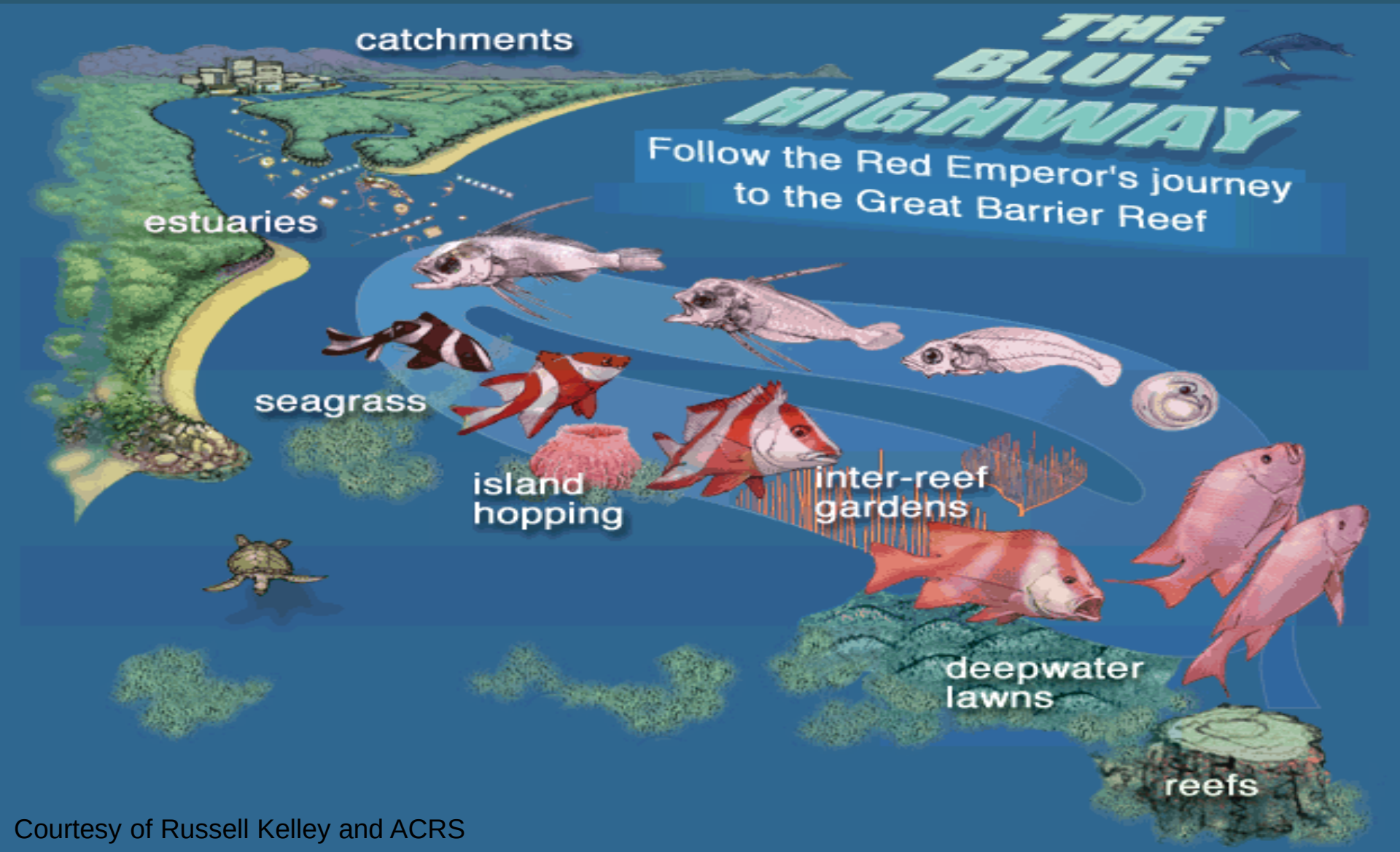

Courtesy of Russell Kelley and ACRS


Outstanding Universal Value
World Heritage
Marine Park
Tourism – ~$5.7B +
14 million recreational visits
2 million tourism
Employment – 68,000 people
Ecosystem Services - $?

Under pressure

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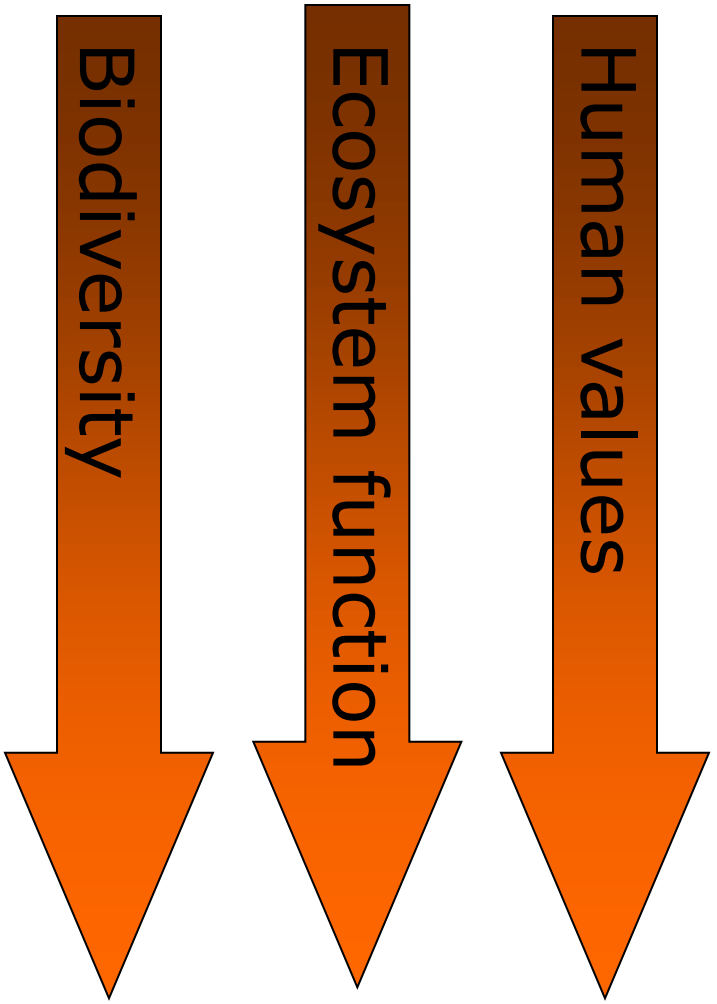
- Climate change
- Degraded water quality
- Coastal development
- Fishing and hunting



Climate change

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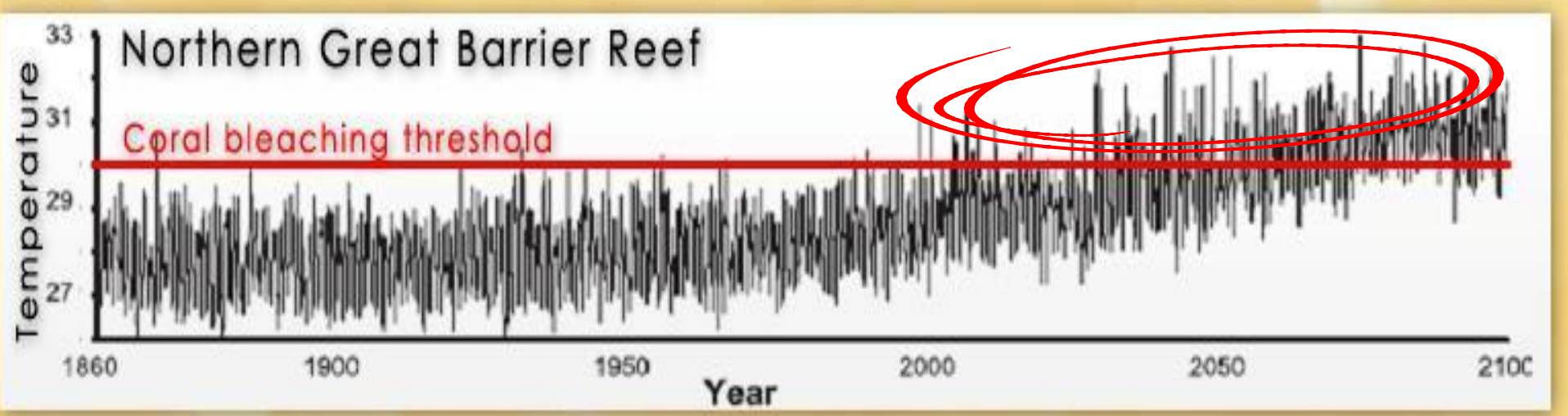
The future...



Observed impacts on the Great Barrier Reef

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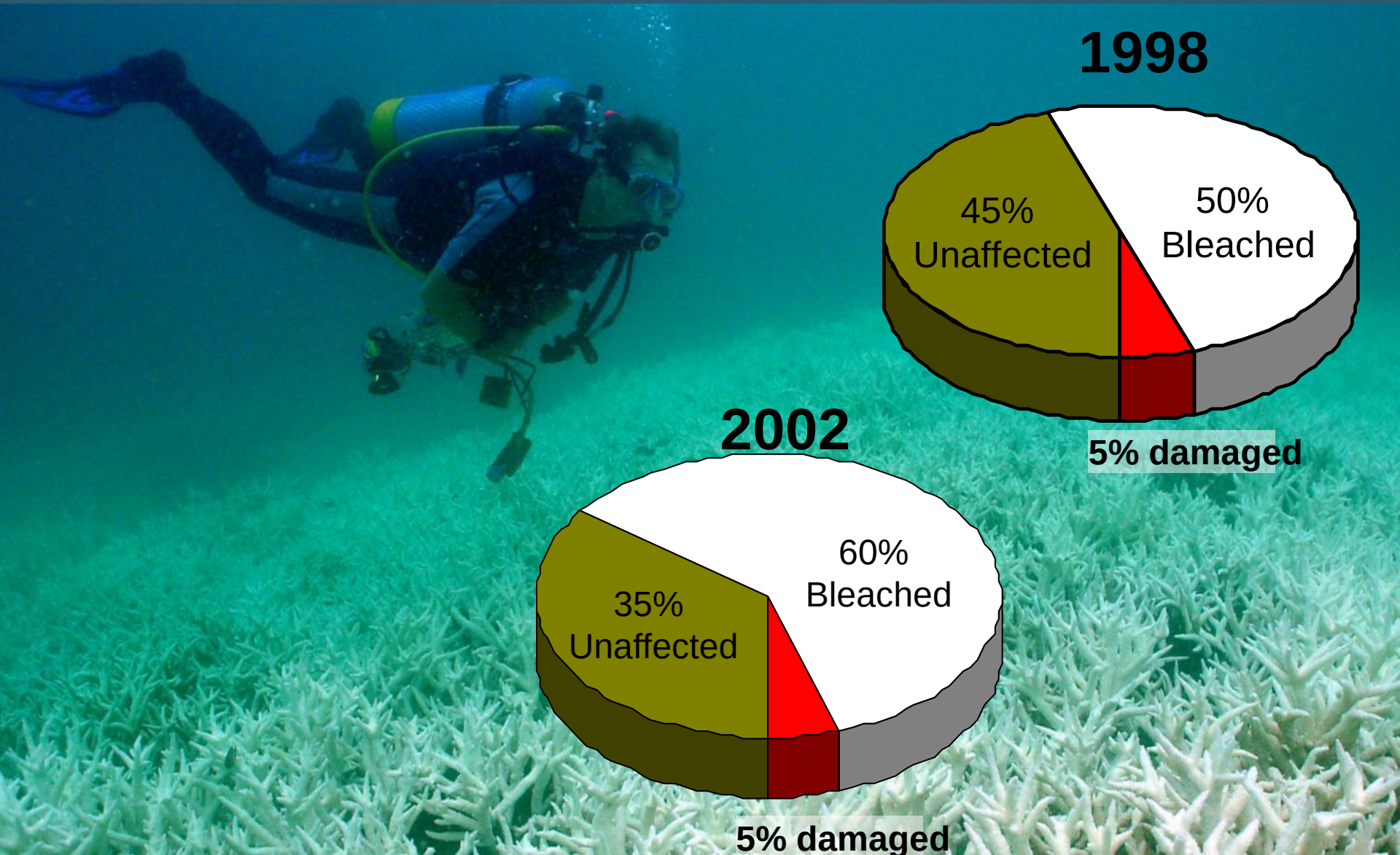

Cumulative footprint

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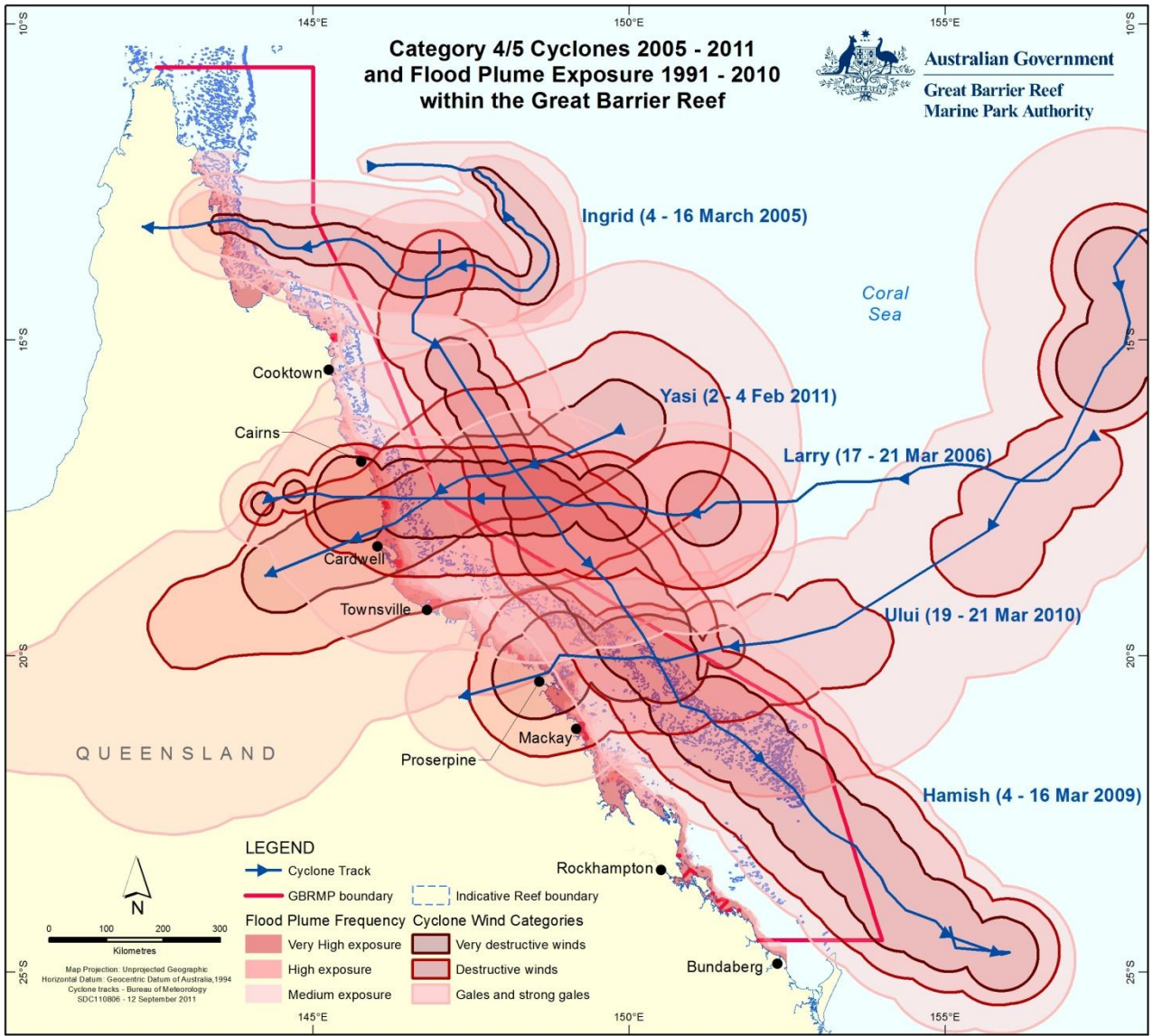

Water Quality: Flood impacts

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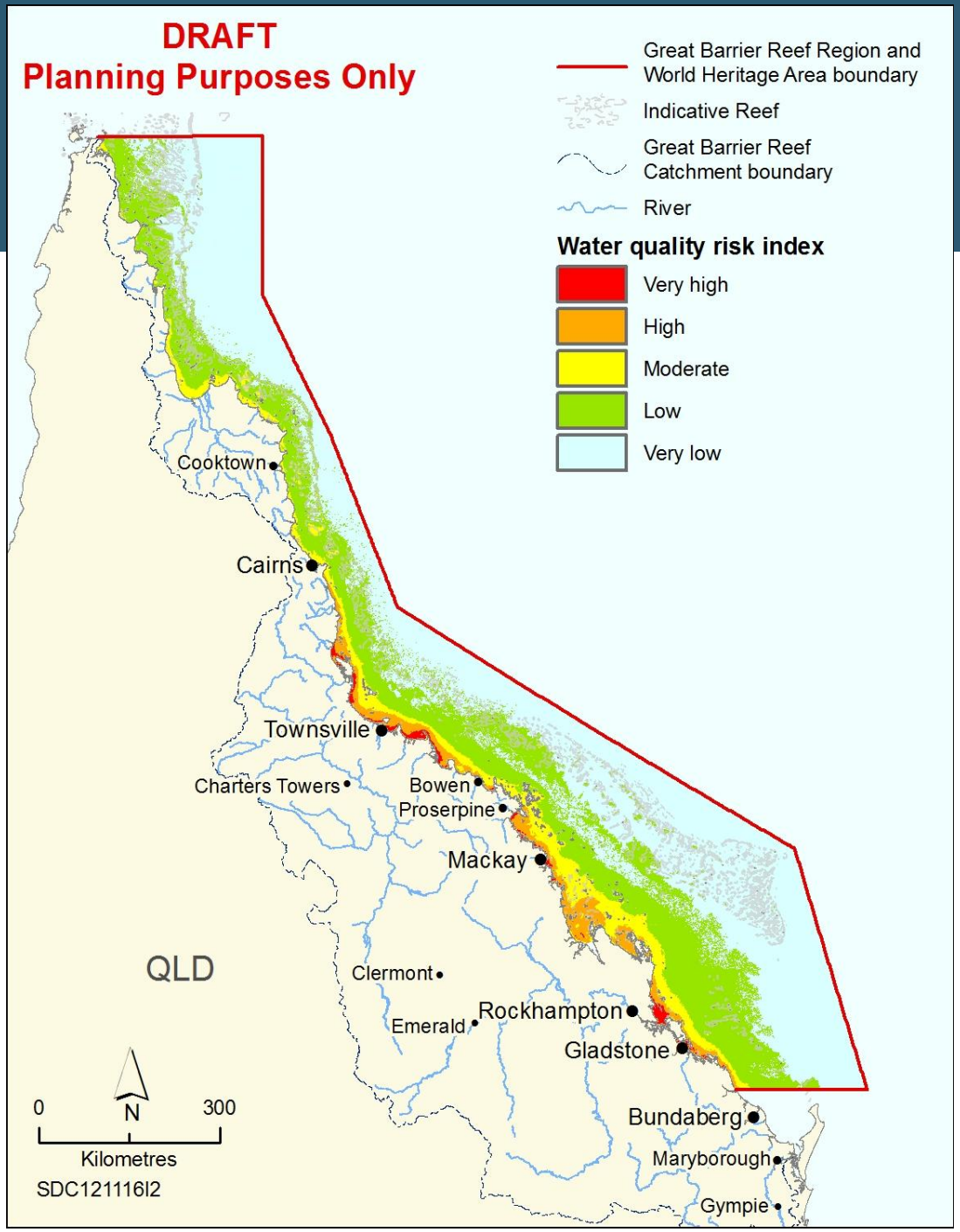
Photo courtesy of CQ Environmental and GKI Resorts Pty Ltd.



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Water Quality risks in the Great Barrier Reef

Change in coral communities along water quality gradient

Source: Fabricius et al. 2005

Coastal Development

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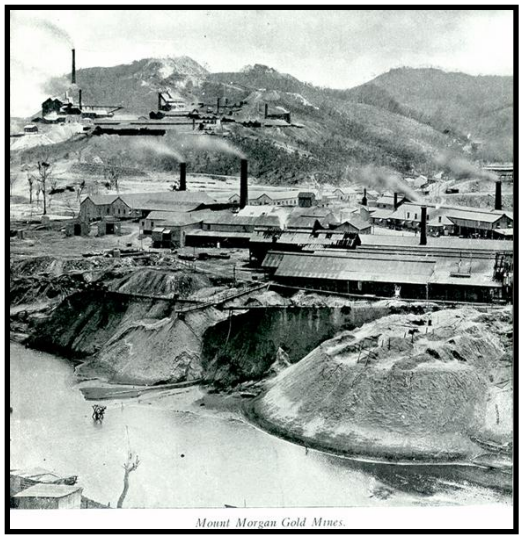
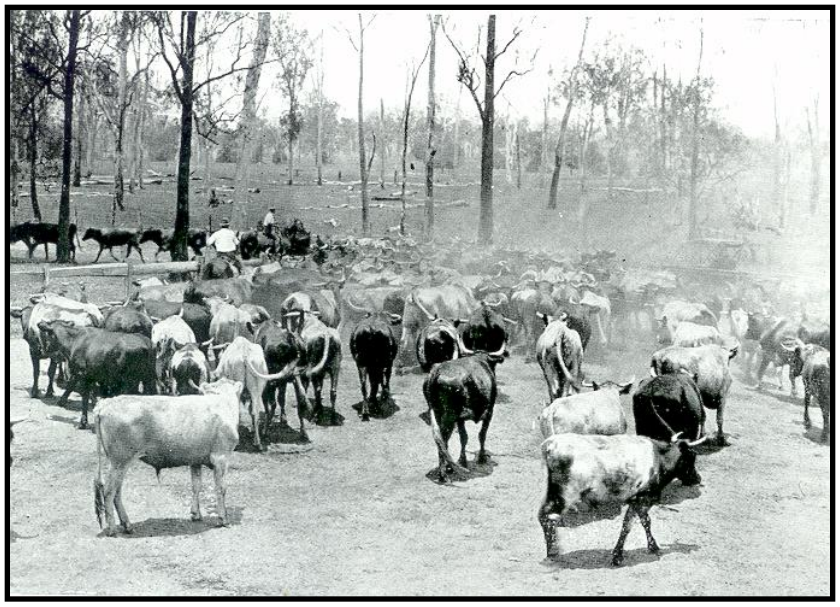


Mount Morgan Gold Mines.



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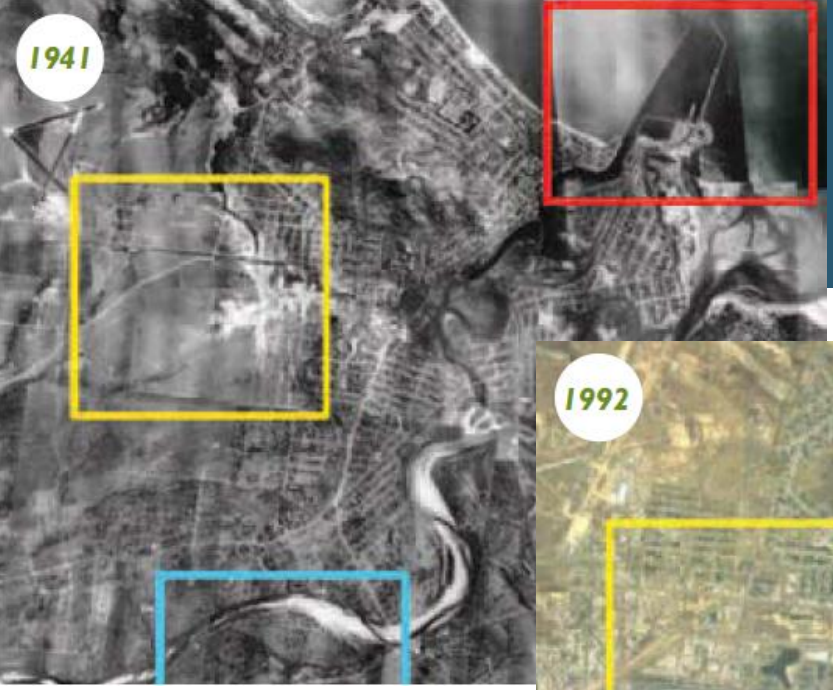

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Fishing risks

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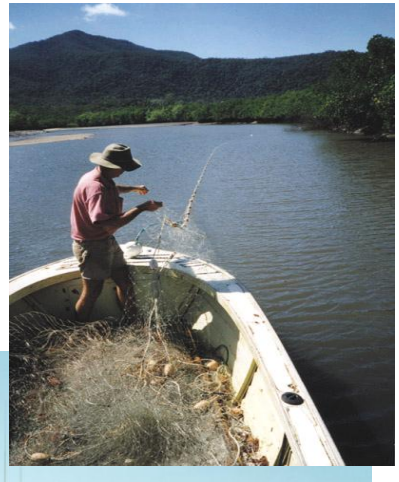
- Incidental catch of protected species and other species of conservation concern
- Death of non-targeted or discarded (by-catch) species
- Illegal fishing
- Fishing spawning aggregations
- Extraction of top order predators (e.g. sharks)



Cumulative impacts

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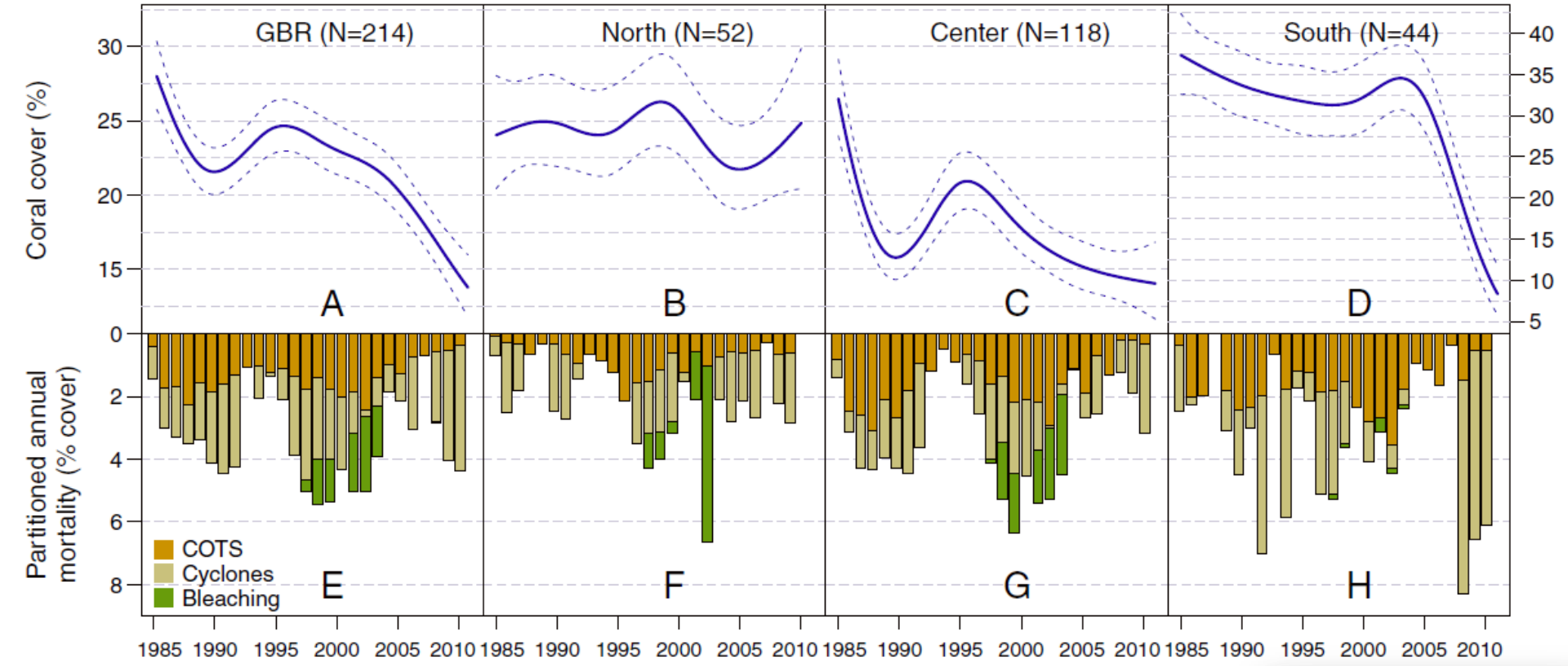

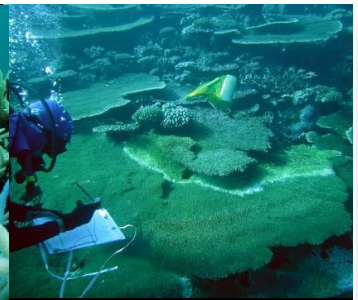

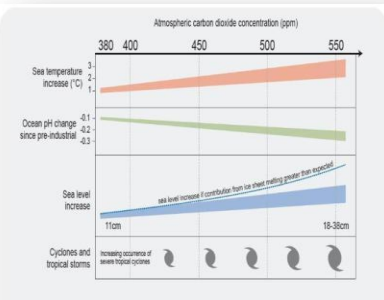

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Management response:

New zoning plan

Protecting biodiversity

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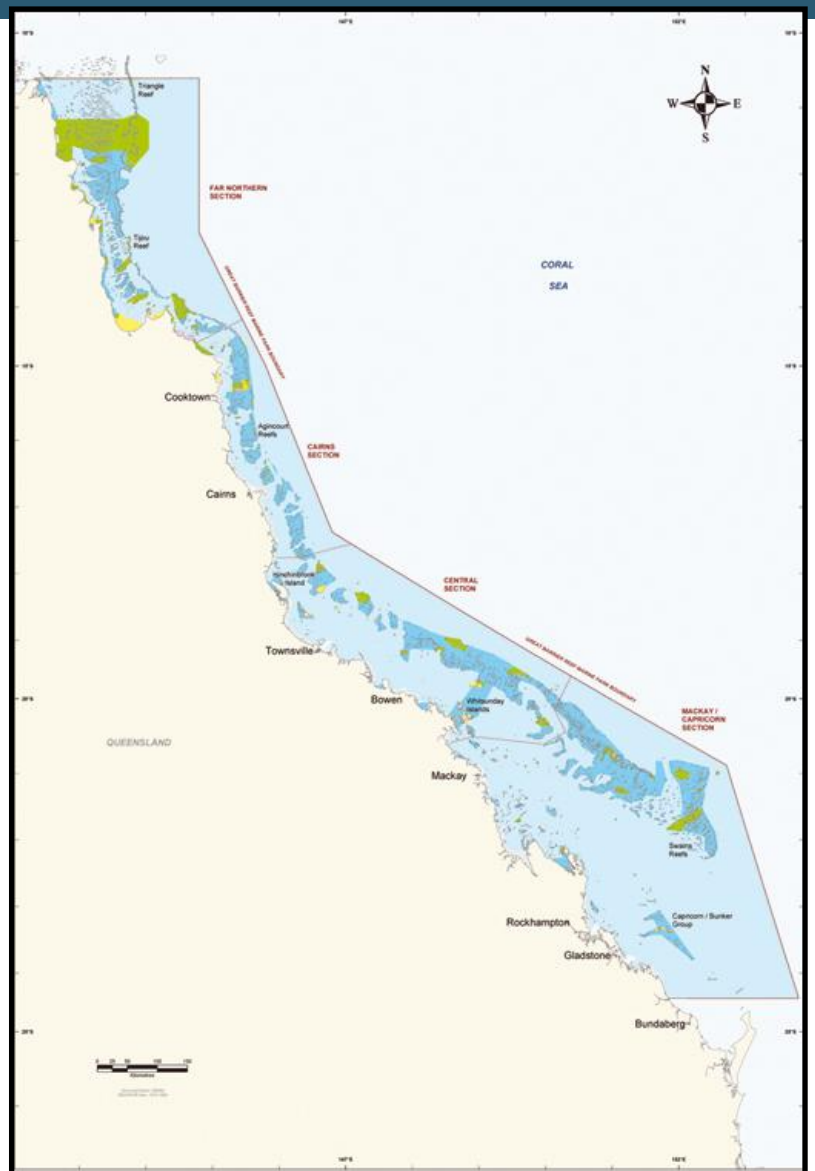

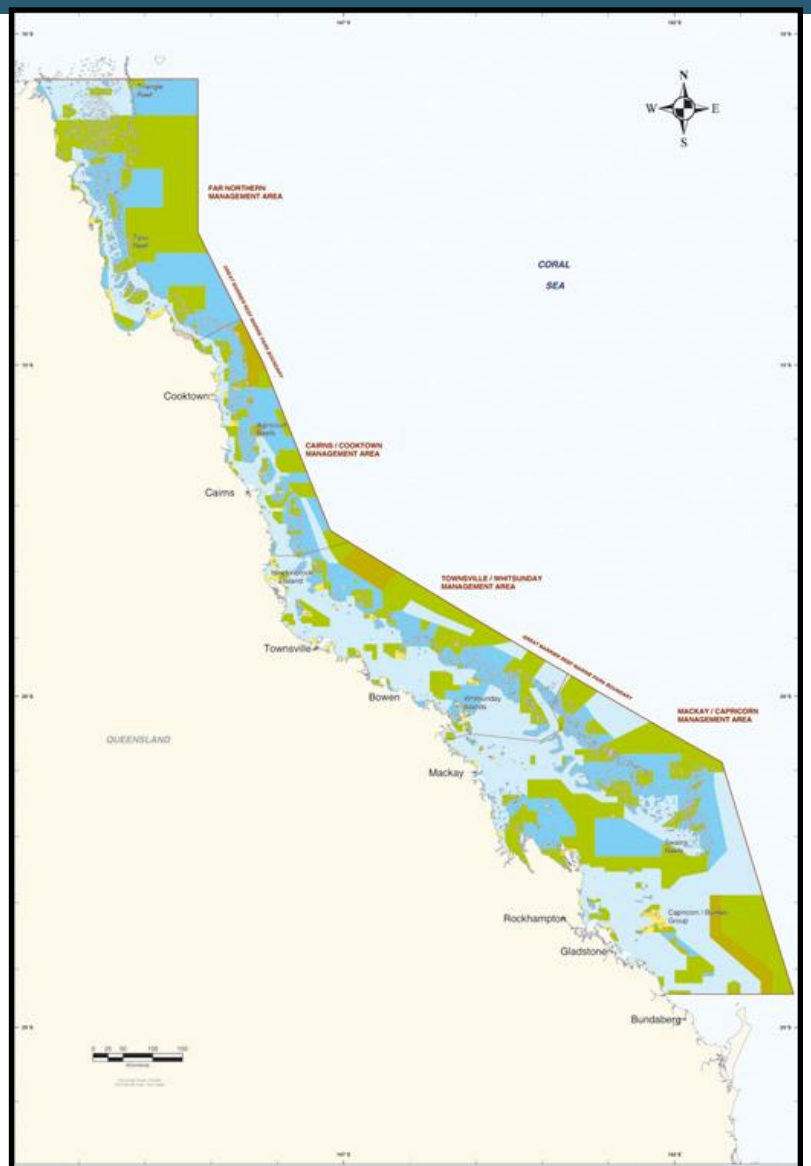

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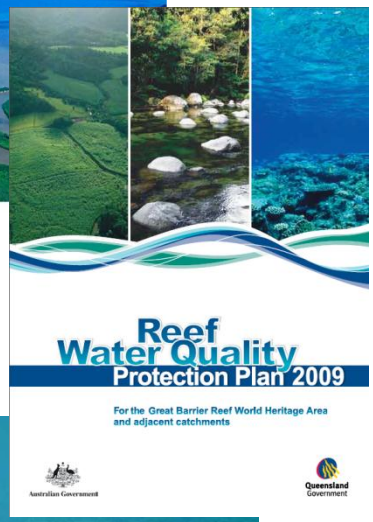
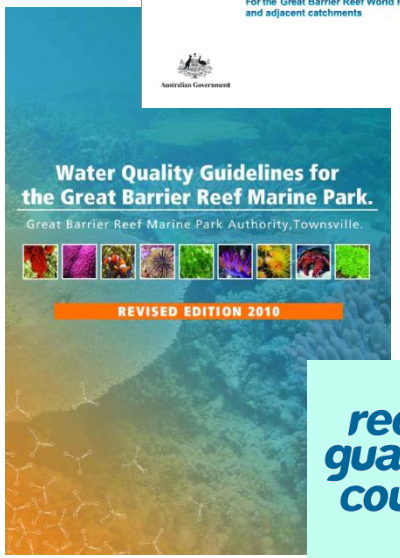
Management response:

Reef Water Quality Protection Plan

Addressing water quality decline





reef guardian council

- Australian and Queensland governments - commited to halt and reverse the decline in water quality entering GBR
- Partnership led to *Reef Rescue* in 2008
- GBR Water Quality Guidelines
- Revised *Reef Plan* included regulation
- Working with Regional bodies/Councils on actions and targets
- Integrated *Paddock-to-Reef* Monitoring, Modelling and Reporting program

Early indication of outcomes for 2009-10

- 4% reduction nutrients
- 3% reduction sediments
- 8% reduction in pesticides

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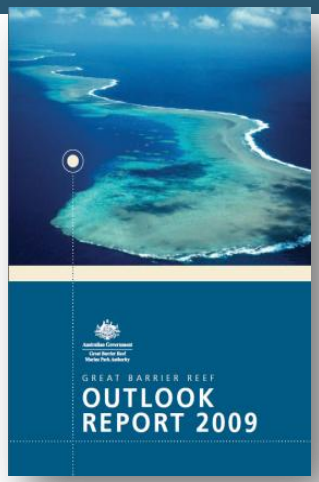
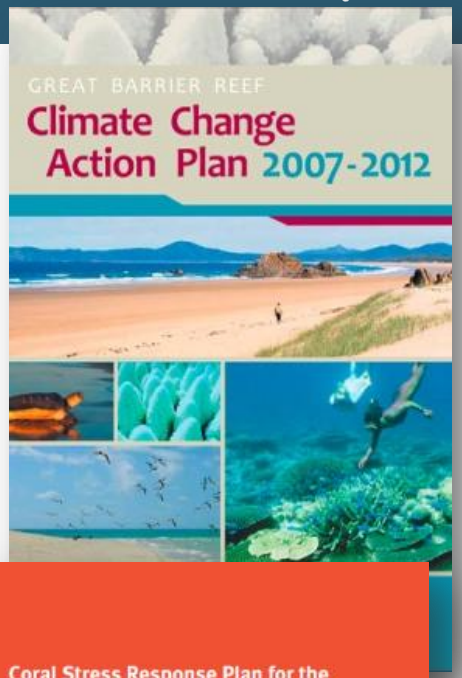
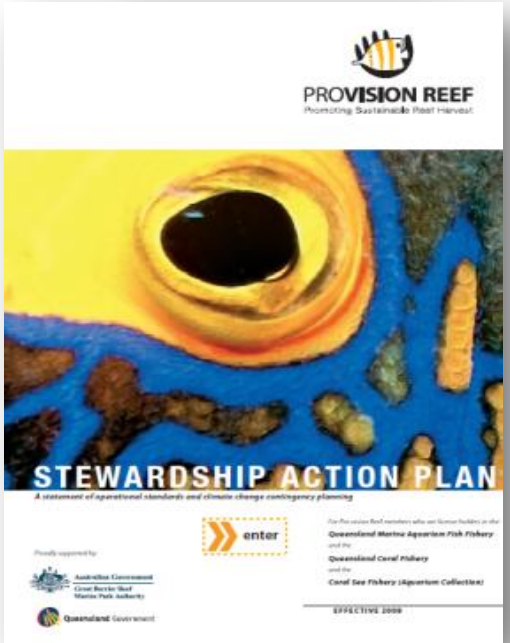
Management Response:

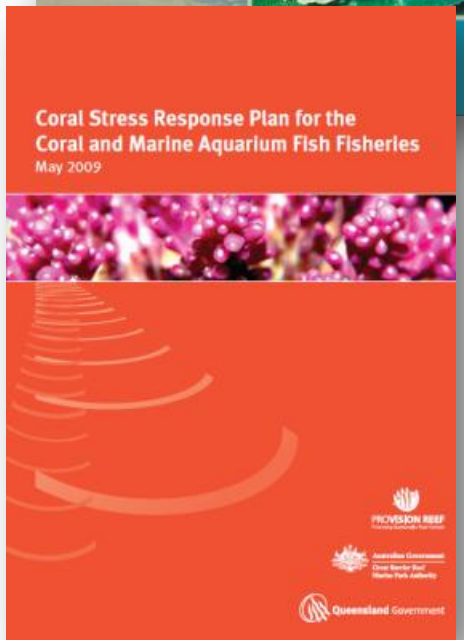
Climate Change Action Plan

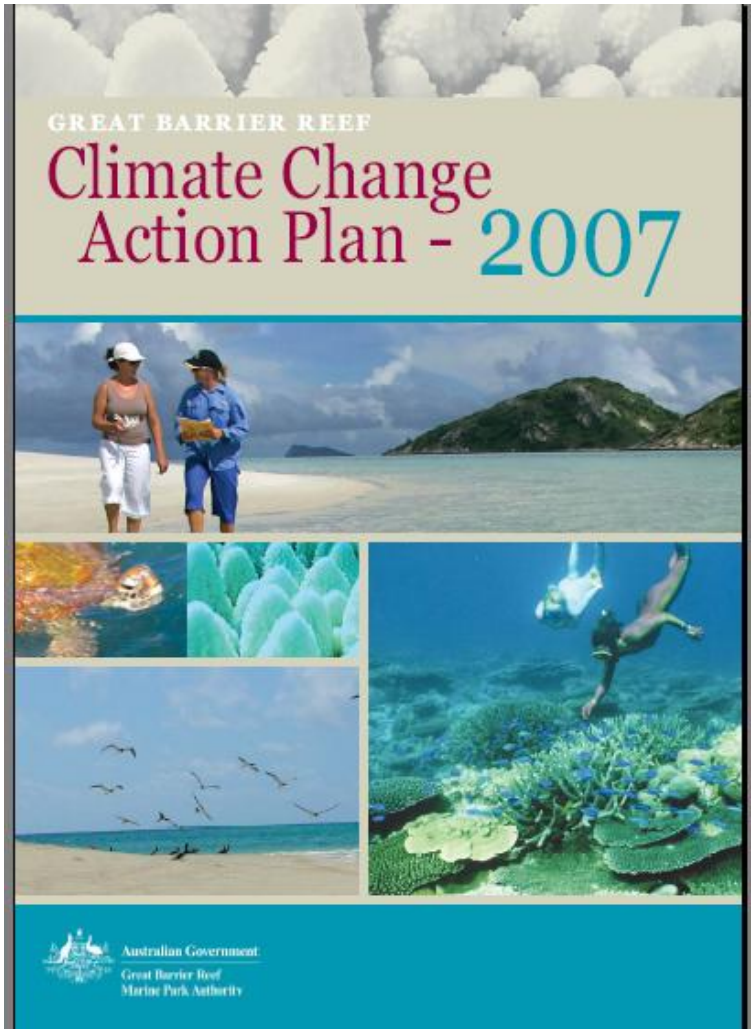
Adapting management to increase resilience





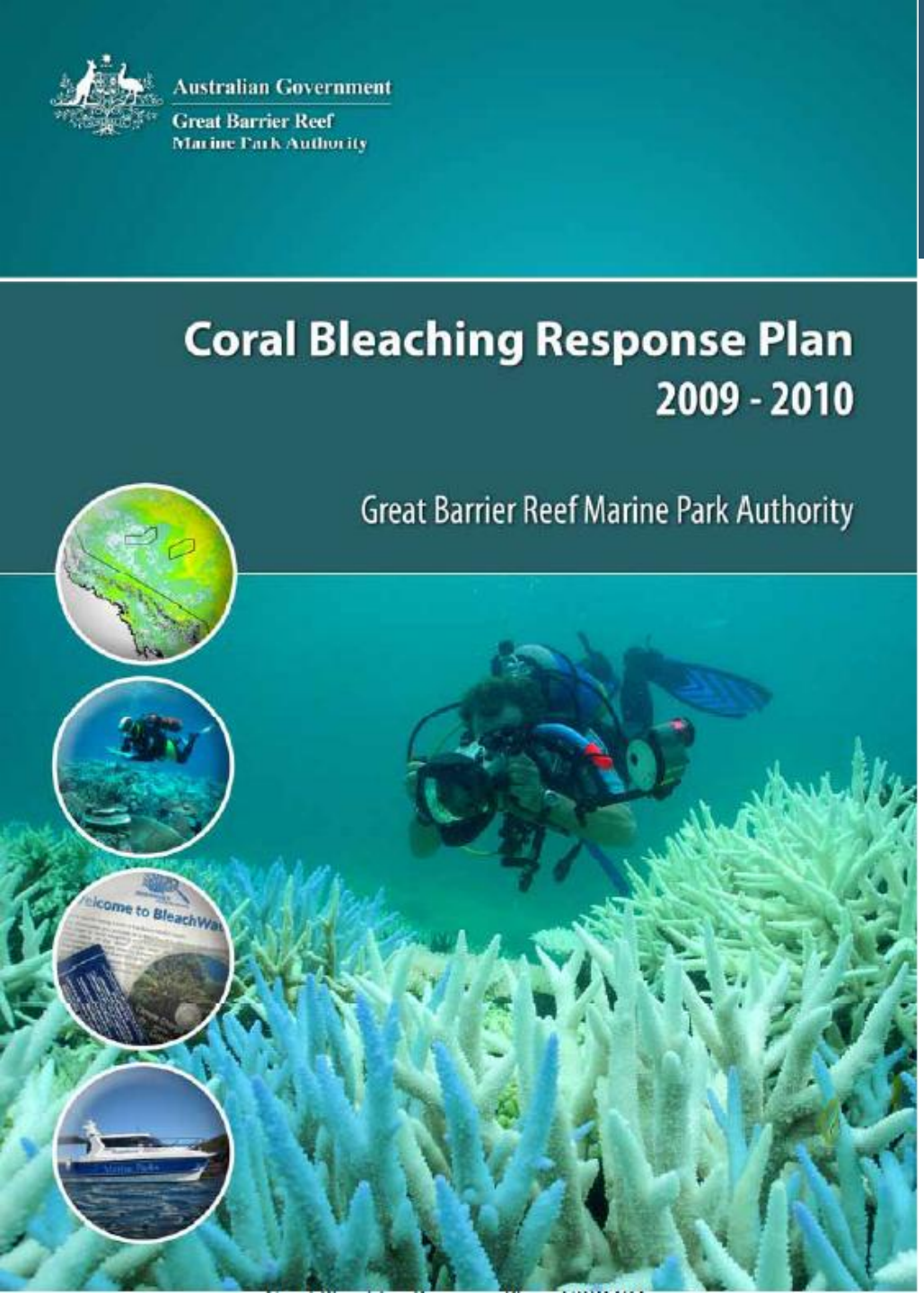






Objectives

1. Targeted Science
2. A Resilient GBR Ecosystem
3. Adaptation of Industries and Communities
4. Reduced Climate Footprints



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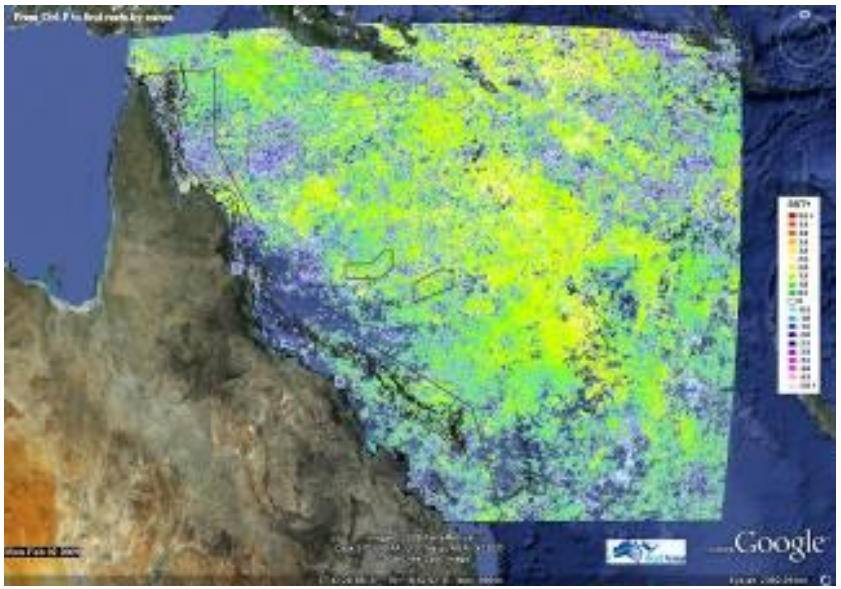
- Early warning system
- Assessment and monitoring
- Communication



GBRMPA Reef Health Response Planning

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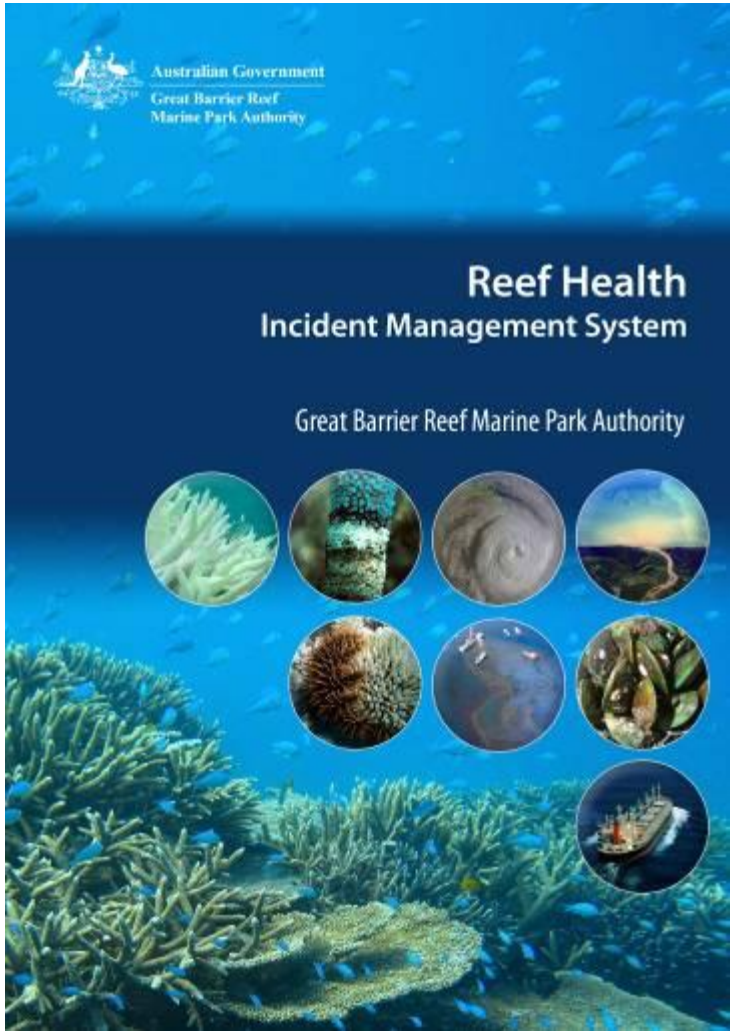
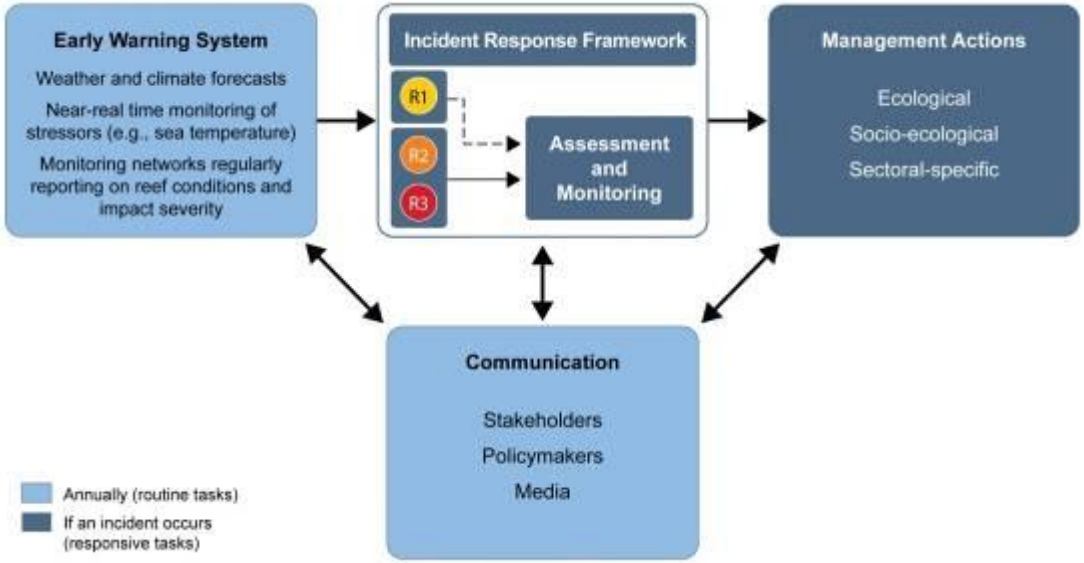


Core Response Plan Components



From Plans to Actions

Traditional Owners

Tourism Operators

Commercial Fishers

Local Communities

The summer of 2010-11 brought unprecedented weather conditions to Queensland. Cyclone Yasi was one of the most powerful cyclones to have affected the Great Barrier Reef since records commenced, while South East Queensland experienced intense rainfall, up to 400 per cent higher than normal.

These extreme weather events damaged coral reefs and seagrass beds, leading to additional pressures on important species such as dugong and green turtle. They also had implications for the industries and communities that depend on the Reef, including direct damage to infrastructure and impacts to natural resources.

Coral reefs have a natural ability to recover from extreme weather impacts, enabling the Reef to bounce back from these events. While the Great Barrier Reef is expected to cope with the impacts of climate change better than most coral reefs around the world, the spate of severe floods and intensity of recent cyclones will test its resilience.

The Great Barrier Reef Marine Park Authority implemented the Extreme Weather Response Program to better understand the impacts of extreme weather on the Great Barrier Reef and help Reef industries and communities prepare for future extreme weather events.

Climate scientists predict increased frequency of extreme weather events such as flooding rains and intense cyclones as a result of climate change. The effects of recent extreme weather events highlight the need for effective management and active stewardship. Insights from the Extreme Weather Response Program are being used to guide the focus of management into the future and to help build the resilience of the Reef and its industries and regional communities to climate change.

Information sheet – turtles and dugongs

Go slow for turtles and dugongs

Turtles and dugongs are two species of concern in the wake of extreme weather events recently experienced in Queensland. Seagrass meadows, the critical foraging areas for green turtles and dugongs, can be damaged due the physical impacts of wave action and degraded due to poor water quality following floods and cyclones.

Changes in their regular foraging areas can cause green turtles and dugongs to move to other areas in their search for food and significant changes in their movements and health have been recorded after similar extreme weather events in the past.

Surface-breathing marine animals such as turtles and dugongs are vulnerable to injury or death from boat strike when surfacing for air or foraging in shallow areas. It is now more important than ever to be careful when boating in the Marine Park as green turtles and dugongs will be on the move and may be in areas they are not usually seen. Be on the lookout for surfacing turtles and dugongs in areas such as shallow reef flats and seagrass meadows. Travel slowly and with no wake in these areas.

Populations of turtles and dugongs take a long time to recover if they become depleted so it is up to all Reef users to help protect them and their Reef habitat. All six species of marine turtle found along the Queensland coast are listed as endangered or vulnerable and it may take decades for these turtles to mature and be able to breed.

Dugongs are also slow breeders, with a calving interval of three to seven years and a gestation period of 13 to 15 months. Animals of breeding age are precious as they produce the next generation and ensure the survival of the species.

How the Great Barrier Reef Marine Park Authority is helping

Experts from the Great Barrier Reef Marine Park Authority are working with partner research organisations and other government agencies to track the movements of green turtles and dugongs, and analyse water quality and the health of seagrass meadows and coral reefs in the aftermath of cyclones and floods.

This research will provide vital information on how green turtles and dugongs respond when their seagrass meadows are damaged and allow managers and researchers to better understand the impact of extreme weather events on marine animals and their habitat.

What you can do to help

Go slow – lookout below!

1. Keep a good lookout on the water
2. Avoid shallow seagrass meadows
3. If you cannot avoid seagrass meadows, reduce your speed to below 10 knots

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Report sick, injured or dead marine animals on 1300 130 372

Response: Reduce dugong & turtle mortality

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- Expanded strandings program
- "Go-slow" campaign to minimise strikes
- Traditional Owners reducing hunting
- Revising management of net-fishing

Response: Island recovery

Australian Government
Great Barrier Reef Marine Park Authority

- Mapping new and altered cays
- Repairing and rebuilding island infrastructure
- Enhanced pest detection and control

Response: Aquarium fishery

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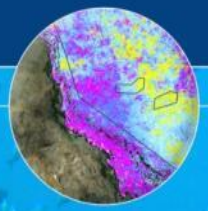
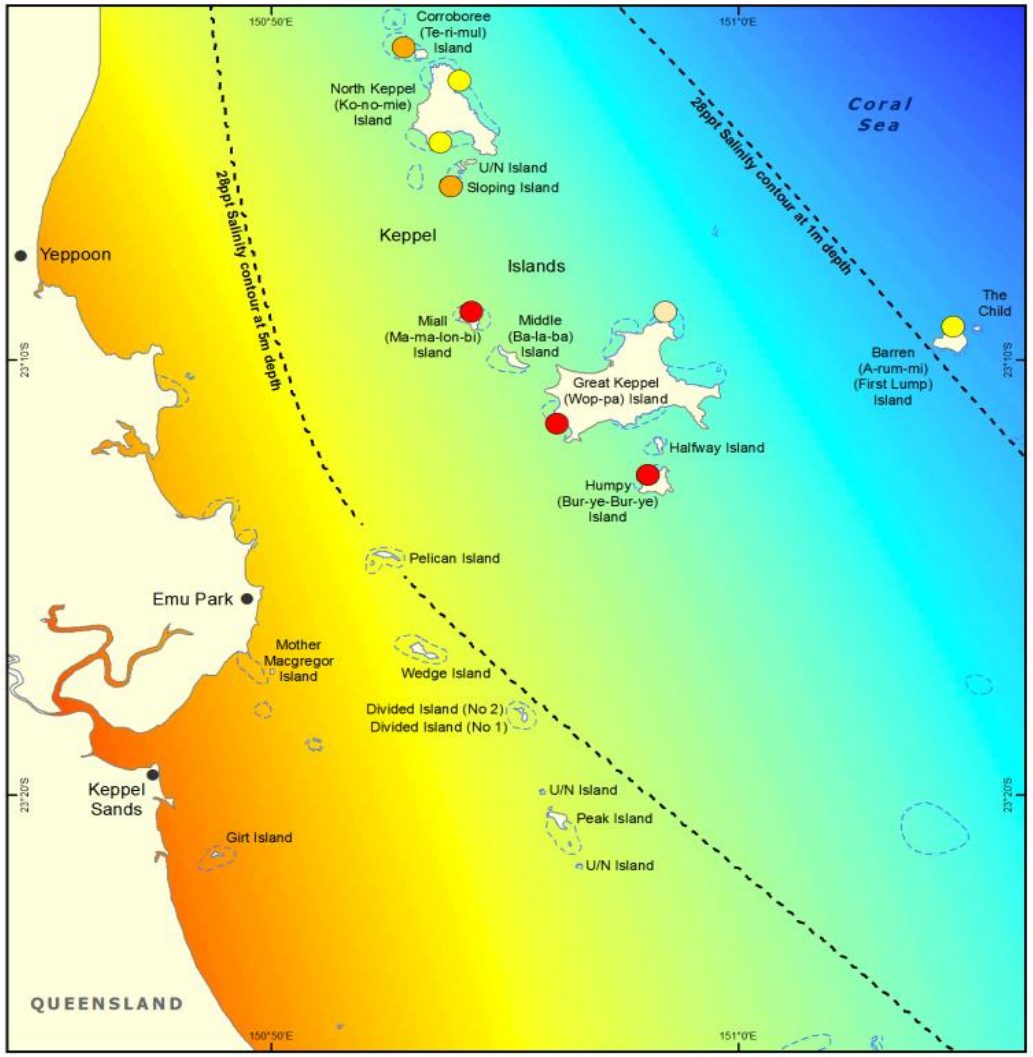
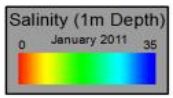
Reef Health
Incident Response System

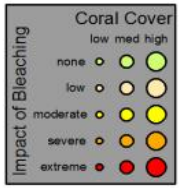
Great Barrier Reef Marine Park Authority





Salinity at 1m depth and Keppel Islands Reef Health
01 March 2011 to 30 June 2011





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N

0 2 4 6 8 10
Kilometres

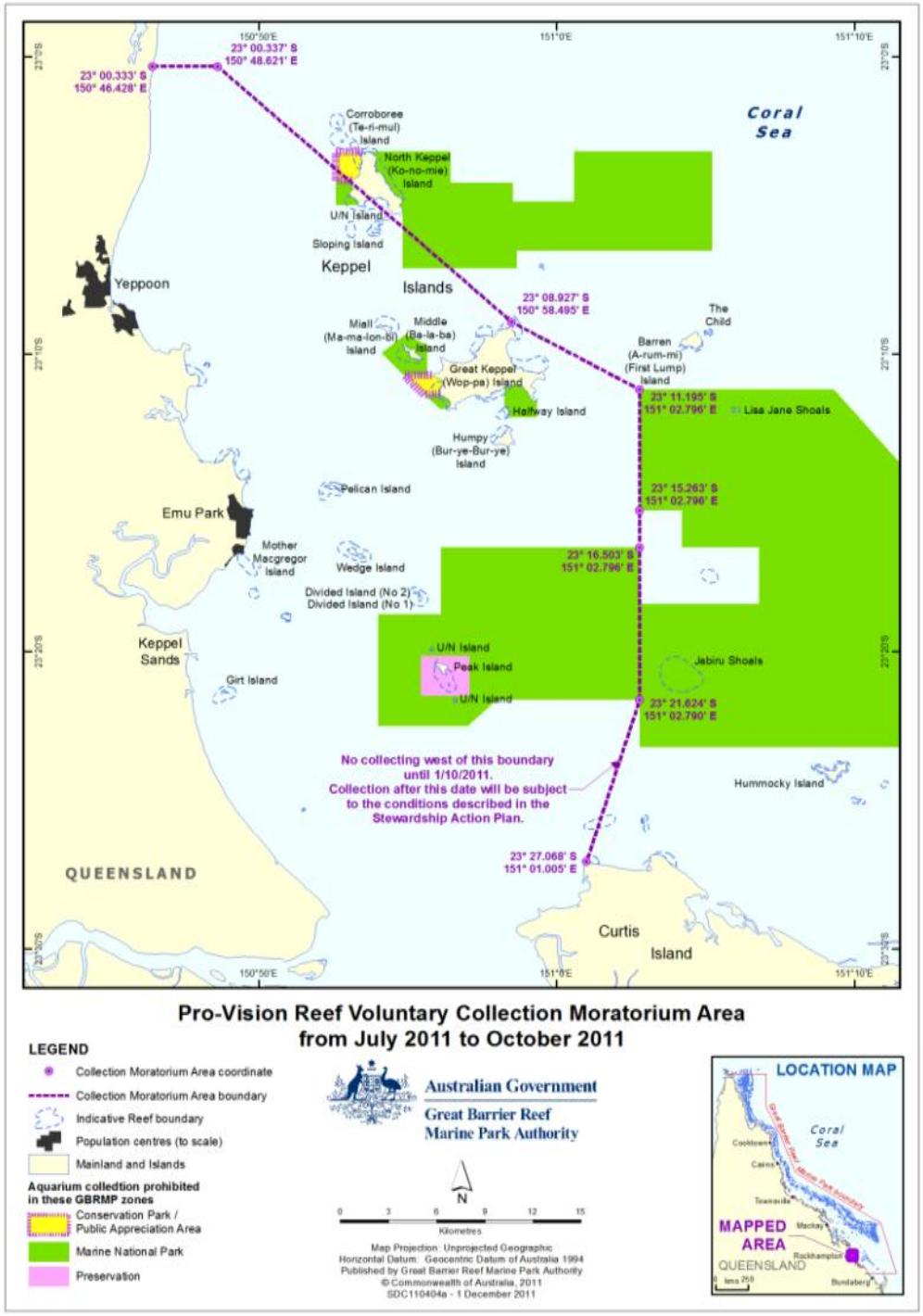
Map Projection: Unprojected Geographic
Horizontal Datum: Geocentric Datum of Australia 1994
Raster Source (Salinity): Michelle Devlin, James Cook University
Published by Great Barrier Reef Marine Park Authority

SDC110712f - 2 September 2011

Response: Aquarium fishery

- Aquarium fishery moratorium based on RHIS
- Initially July to Oct 2011

Still in place…..



Pro-Vision Reef Voluntary Collection Moratorium Area from July 2011 to October 2011

LEGEND

- Collection Moratorium Area coordinate
- Collection Moratorium Area boundary
- Indicative Reef boundary
- Population centres (to scale)
- Mainland and Islands

Aquarium colledtion prohibited in these GBRMP zones

- Conservation Park / Public Appreciation Area
- Marine National Park
- Preservation

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N

0 3 6 9 12 15
Kilometres

Map Projection: Unprojected Geographic
Horizontal Datum: Geocentric Datum of Australia 1994
Published by Great Barrier Reef Marine Park Authority
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SDC110404a - 1 December 2011

Response: Crown-of-thorns Starfish

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COTS control program led by the Association of Marine Park Tourism Operators

Aims:

- *reduce impacts on tourism sites*
- *assist recovery of damaged reefs*

Partnerships

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- **Tourism**
- **Reef Guardians**

Tourism on the Great Barrier Reef: partnership approach

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Great Barrier Reef Marine Park Authority

An iconic Australian experience reliant on a healthy ecosystem

- Tourism:
  - About 1.8 million visitor days and 2.1 million passenger transfers p.a.
  - Provides $5.7 billion value added and employs 64,000 FTE
  - Contributes 16-20% of GBRMPA budget through Environmental Management Charge ~$7-8million



Benefits of well managed tourism

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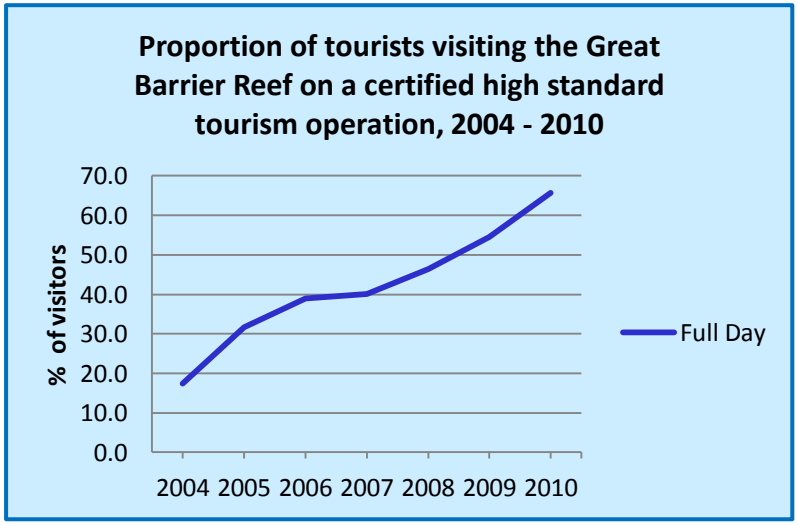
- A productive, open and adaptive partnership with the tourism industry
- Tourism operators present the values of the World Heritage Area
- Industry and operators are strong advocates for the Marine Park
- Tourism contributes to management of the Marine Park

High Standard Tourism Program

Australian Government
Great Barrier Reef Marine Park Authority

- Recognises independently certified operators
- Rewards these operators with a range of benefits
- Continuously improves standards for environmental, social and cultural sustainability



*"The logo and our interpretation program give us a **clear market advantage**, which responds to the increasing demand for a 'green' product."* **Jordic Pellefigue, Pro Dive Cairns**

Eye on the Reef

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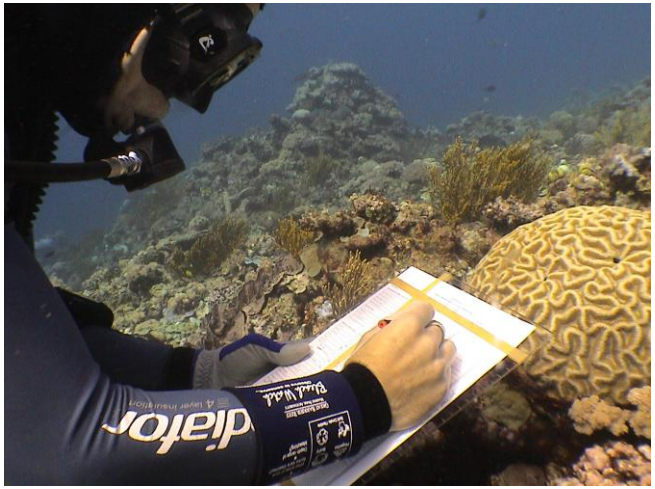
Program partners

- Tourism operators
- Reef researchers
- GBRMPA

What is monitored?

- Health indicators of Reef
- Presence and abundance of iconic, indicator and protected species
- Unusual phenomenon



The Reef Guardian stewardship concept

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- It is a stewardship recognition program **NOT** an eco-certification program
  - Created in 2003 around Reef Guardian Schools
  - It is completely voluntary
  - No funding for participants
  - Aims to showcase good environmental activities which help to promote and foster positive behaviour change

A renewed focus and a new challenge...

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Schools launched in 2003 and Councils in 2007

In 2010 allocated short term funding to:

- strengthen existing Reef Guardian Programs of schools and councils
- develop opportunities for farmers and fishers and tourism operators

Our approach

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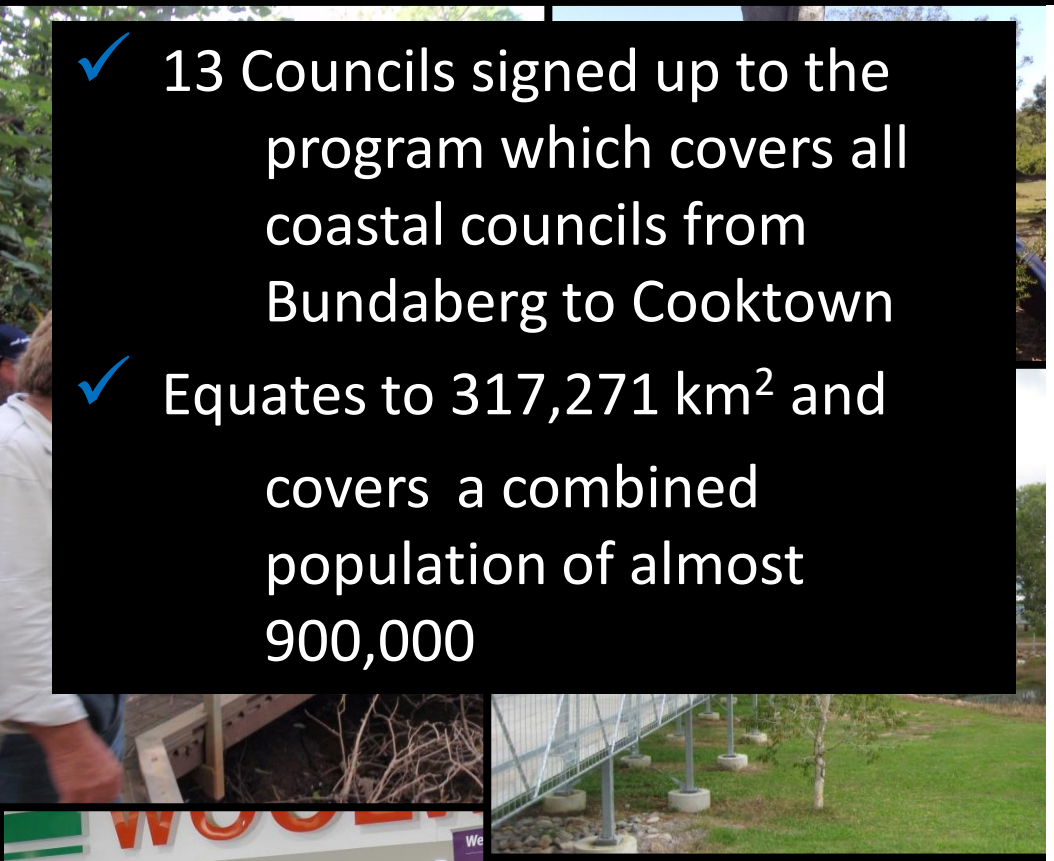
- ✓ **Anchor existing and new programs around activities which would address the key risks to the reef**
  - Land Management (including biodiversity)
  - Water Management
  - Waste Management
  - Climate Change
  - Community education and knowledge sharing
- ✓ **Develop the new programs from the ground up**

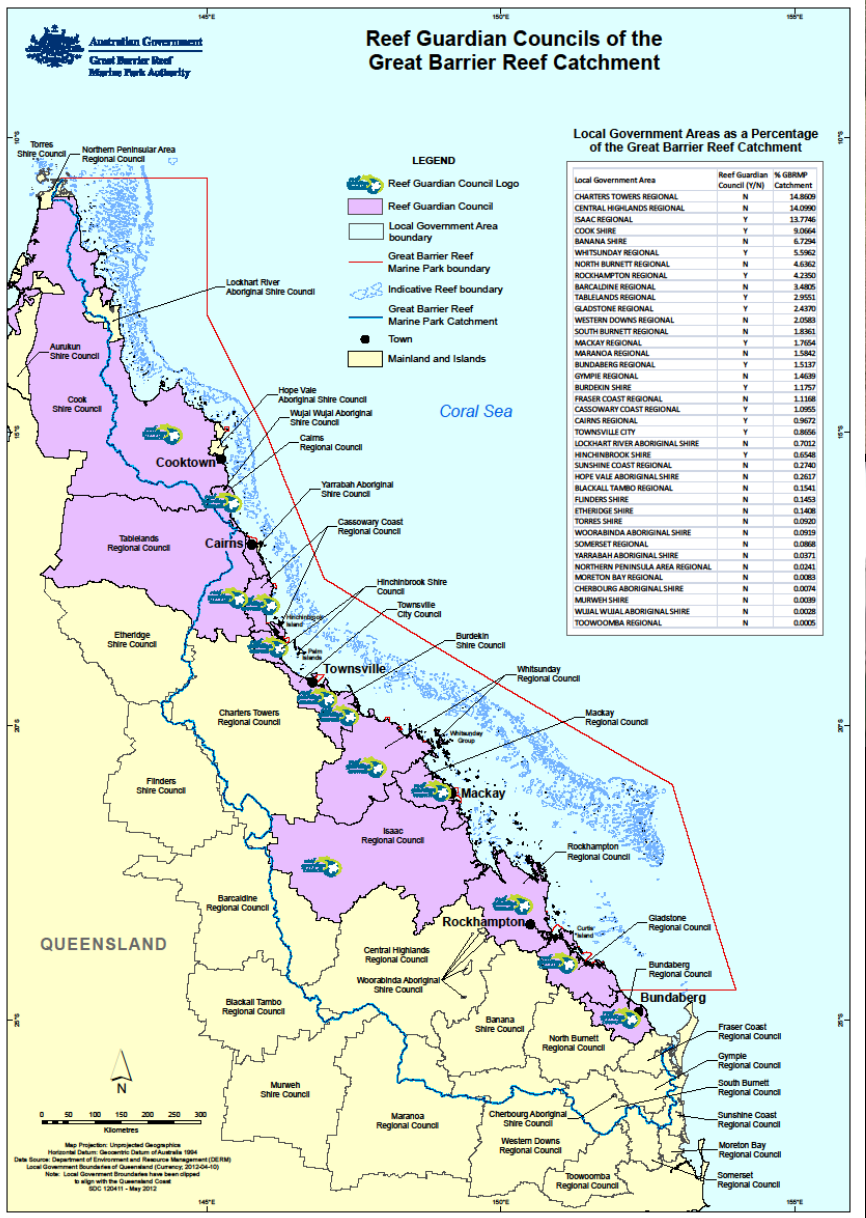
  - with industry for industry

Reef Guardian Councils

Australian Government
Great Barrier Reef

- ✓ 13 Councils signed up to the program which covers all coastal councils from Bundaberg to Cooktown
- ✓ Equates to 317,271 km^2 and covers a combined population of almost 900,000





Reef Guardian Schools

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- ✓ Currently in its eleventh year
- ✓ Involves more than 115,000 students and teachers in 293 schools across the Great Barrier Reef catchment
- ✓ Curriculum units developed to around key risk to the reef
- ✓ Undertaking over 1600 projects in their schools relating to
  - Waste management
  - Water management
  - Biodiversity/Land Management
  - Climate Change

Reef Guardian Farmers and Graziers

Australian Government
Great Barrier Reef

Cane, Bananas, Graziers

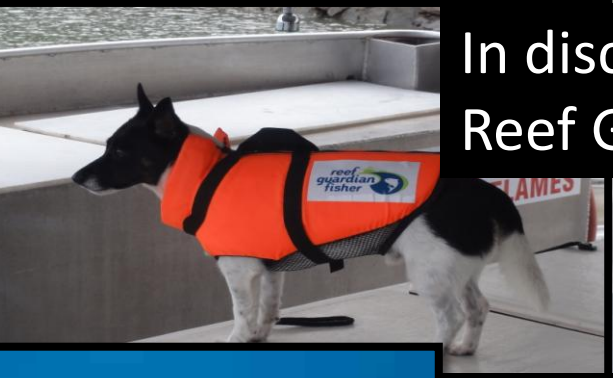
Are passionate and forward thinking about their farming practices, industries, communities and the health of the Great Barrier Reef.

A total of 20 farmers and graziers have been recognised as Reef Guardian Farmers / Graziers.

Reef Guardian Fishers

Australian Government

Eleven fishing operations in the Reef Line and Marine Aquarium Fish and Coral Collection fisheries have been recognised as Reef Guardian Fishers



In discussions with net fishers about developing of a Reef Guardian Net Fishers pilot program

Currently exploring options for electronic data collection

Reef Guardians...

Australian Government
Great Barrier Reef
Marine Park Authority

Community-based Reef Guardian stewardship programs are essential!

They play a critical role in ensuring that the values of the Great Barrier Reef are appreciated
and
that community actions are focussed where they need to be to support management of the Marine Park
so that it is well placed to meet the challenges ahead.

Strategic Assessment

Australian Government
Great Barrier Reef Marine Park Authority

Queensland Government
Great Barrier Reef Coastal Zone Strategic Assessment

GBRMPA
Great Barrier Reef Region Strategic Assessment

Two assessments

Land use planning for:
- Urban development
- Industrial development
- Port development

Shipping

Cumulative impacts

Water quality

Island management

Management arrangements for the marine component of the World Heritage Area

Thank You

Australian Government
Great Barrier Reef
Marine Park Authority