Development of the Great Barrier Reef Annual Report Card

Bill Dennison
Heath Kelsey
Jane Thomas
Chris Chinn
Carl Mitchell
Outline

• Great Barrier Reef
• Reef Protection Plan
• Paddock to Reef Program
• Reporting concepts and metrics
• The Report Card
The Great Barrier Reef

- World Heritage Area
- 2300 kilometers along the Queensland coast
- 2900 reefs
- Seagrass meadows, mangroves, and other habitats
- Contributes $6 billion annually to the Australian economy
Threats to the reef ecosystem

- Climate Change, Coastal Development, Shipping, Point source pollution
- Diffuse source pollution from agricultural enterprises
Reef Protection Plan goals

- 2013: Halt and reverse deterioration in water quality
- 2020: Water quality will have detrimental effect on reef health and resiliency
The Paddock to Reef Program

- Part of Reef Plan
- Measure and report on Reef Plan goals and targets

2013 Targets:
- 80% improved agricultural practices (50% for grazing)
- Min 50% late dry season ground cover in grazing areas
- Riparian extent and condition improved
- No net loss or degradation of natural wetlands
- Reverse decline in water quality entering reef lagoon
The Paddock to Reef Program

• Part of Reef Plan
• Measure and report on Reef Plan goals and targets

2020 Targets:
• 20% reduction in total suspended solids entering reef lagoon
• Water quality entering the reef lagoon will have no negative impact on reef health and resilience
Communication and reporting

- Tiered system, enabling drill down from synthetic to technical
- "Wedding cake"
- Report card is the top tier
Visualizing the system and assessment

- Universal symbology
- Conceptual diagram
- Data providers and advisory group

workshop May 2010

The Great Barrier Reef catchments are largely rural and dominated by summer monsoonal rains 🌸 and occasional cyclones 🎈, delivering sediments 🌱, nutrients 🥐 and pesticides 🍞 to the inshore and sometimes offshore portions of the reef in pulsed flows 🔫, which can be affected by water reservoirs and dams 🚰. Grazing 🐂 is the largest single land use, and sugarcane 🍌, horticulture 🟢 and other cropping 🌱 make up other agricultural land uses. Small urban centres 🏡 are located on the coastal strip. Habitats include wetlands 🌿, reef 📷, seagrass 🌿 and mangrove 🌳 habitats, and continental 🌾 and coral islands 🌊 are present. Reef-based tourism 🦭, as well as commercial and recreational fisheries 🐟, is an important part of the regional economy.
### Metrics: Land Management Practice Adoption

- ABCD framework
- Goal is to move from C/D to A/B
- 80% by 2013

<table>
<thead>
<tr>
<th>Class</th>
<th>Description of practice</th>
<th>Farm management plan</th>
<th>Community and industry standard</th>
<th>Effect on resource condition</th>
<th>Effect on profitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cutting-edge practices that require further validation of environmental, social and economic costs/benefits.</td>
<td>Yes, develops and tests innovative technology.</td>
<td>When validated is an acceptable practice for the long term. (May not be universally endorsed as feasible by industry and community.)</td>
<td>When validated, practice likely to achieve long term resource condition goals if widely adopted.</td>
<td>When validated, improves profitability in the medium to long term. (May reduce profitability during the transition.)</td>
</tr>
<tr>
<td>B</td>
<td>Currently promoted practices often referred to as ‘Best Management Practices’.</td>
<td>Yes, and utilises common technology.</td>
<td>Acceptable practice for the medium term.</td>
<td>Practice likely to achieve medium term resource condition goals if widely adopted.</td>
<td>Improves profitability in the short to medium term.</td>
</tr>
<tr>
<td>C</td>
<td>Common practices. Often referred to as ‘Code of Practice’.</td>
<td>Basic.</td>
<td>Acceptable practice today but may not be acceptable in medium term.</td>
<td>Practice unlikely to achieve acceptable resource condition goals if widely adopted.</td>
<td>Decline of profitability in the medium to long term.</td>
</tr>
<tr>
<td>D</td>
<td>Practices that are superseded or unacceptable by industry and community standards.</td>
<td>None.</td>
<td>Superseded or unacceptable practice today.</td>
<td>Practice likely to degrade resource condition if widely adopted.</td>
<td>Decline of profitability in the short to medium term.</td>
</tr>
</tbody>
</table>
Metrics: Land Management Practice Adoption

A/B practices
• 20% of sugarcane growers
• 62% of horticulture producers
• 50% of grazers
Metrics: Catchment Condition

Wetland and riparian loss (%)

- Wetland loss: 0.12%
- Riparian loss: 0.49%
- Ground-cover: 84%

Dry-season groundcover for grazing lands
Metrics: Catchment loads

- Baseline loads
Metrics: Marine

Measured against desired conditions

Water quality
• Total suspended solids
• Chlorophyll a

Seagrass
• % Cover
• Reproductive effort
• Carbon:Nitrogen Ratio

Coral
• % Cover
• Settlement index
• Macro algae index
• Juvenile index

EMECS9 August 2011
GBR Report Card: top of the wedding cake

Key findings
- The results demonstrate the progress that has been made since 2003, when Reef Plan was first established, and highlight the remaining areas of concern where accelerated action is still required.
- The Great Barrier Reef is in moderate condition overall, but regional variability is evident—the Mackay Whitsunday region has poor reefs, while the Burdekin region has poor coral reefs.
- High rainfall (particularly in the Burdekin and Fitzroy regions) between 2007 and 2008 has resulted in large flood plumes reaching marine waters.
- High rainfall has led to high catchment groundwater (83 per cent), which is well above the 50 per cent target.
- Nutrient management practices considered unacceptable by industry and community standards (57) are used by 34 per cent of sugarcane growers and 24 per cent of horticulture producers.
- The Fitzroy region has 14 per cent of graziers using AI practices that are likely to maintain land in very good condition or improve land in lesser condition, compared to six per cent of graziers in the Burdekin.
- Of all wetland types, vegetated freshwater swamps have had the greatest loss since pre-European times (20 per cent). Loss of all types of wetlands between 2001 and 2005 was 832 hectares.
- Total catchment loads are nine times the natural loads for total suspended solids, nitrogen, and phosphorus. An estimated 26,000 kilograms of pesticides enter the Great Barrier Reef annually.

Taking action
Reef Plan is a joint commitment of the Australian and Queensland Governments to minimise the risk to the reef ecosystem from a decline in the quality of water entering the reef from the adjacent catchments. It has been established to identify and target the collective actions of governments and the community for the protection of the Great Barrier Reef. Reef Plan focuses on the threats posed by diffuse source agricultural pollution. Reducing impacts from this threat also builds the resilience of the reef to impacts from other sources.

Purpose of the First Report Card
The First Report Card provides an estimate of the status of the key indicators for the period preceding 2009. This First Report Card is based on historical data and trends and takes into account the influence of a variable climate from year to year. This serves as a baseline that will be used as a point of comparison to measure progress towards Reef Plan goals and targets.

This report card generates results up to 2009 and therefore does not include the effects of Cyclone Yasi and the more recent flood events which will be presented in subsequent reports.

Paddock to Reef program
The Paddock to Reef program, funded jointly by the Australian and Queensland Governments, is a collaboration involving governments, industry, regional natural resource management bodies, and research organisations. The Paddock to Reef program is a world-leading approach to integrate information on management practices, catchment indicators, catchment loads and the health of the Great Barrier Reef.
GBR Report Card: top of the wedding cake

Land practice results
Adoption of improved management practices varies by industry and practice. The adoption of improved management practices for sugarcane and horticulture as at 2009–2010 is presented using the following framework:


<table>
<thead>
<tr>
<th>Practice Type</th>
<th>Adoption Rate</th>
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<tbody>
<tr>
<td>Sugarcane</td>
<td>100%</td>
</tr>
<tr>
<td>Horticulture</td>
<td>90%</td>
</tr>
<tr>
<td>Grazing</td>
<td>70%</td>
</tr>
</tbody>
</table>

Cutting-edge (A) or best management (B) practices are used by 35 per cent of sugarcane growers for nutrients, seven per cent for herbicides and 10 per cent for soil.

Practices considered unacceptable by industry or community standards (D) are used by 25 per cent of sugarcane growers for nutrients, eight per cent for herbicides and 10 per cent for soil.

Fifty per cent of graziers across the Burdekin and Fitzroy regions are using (A) or (B) management practices that are likely to maintain land in good to very good condition or improve land in poorer condition.

Twelve per cent of graziers in the Burdekin and Fitzroy regions are using (C) management practices that are likely to degrade land to poor condition.

Catchment results
Catchment results include wetland and riparian loss, groundwater and catchment loads. Confidence in catchment load estimates differs across regions due to varying terms of data availability.

<table>
<thead>
<tr>
<th>Catchment Load</th>
<th>Loading Factors</th>
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<tbody>
<tr>
<td>Wetland loss from 2001 to 2005 was 15,833 tonnes (12 per cent) with greater losses occurring in smaller catchments. Wetland loss in European times is 0.1 per cent.</td>
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<tr>
<td>There has been a loss of 10,000 hectares (49 per cent) of riparian vegetation between 2004 and 2008.</td>
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<tr>
<td>Dry season groundwater for grazing lands is high (91 per cent), well above the 50 per cent target and likely due to high rainfall.</td>
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Although natural catchment loads occur, most of the loads to the Great Barrier Reef are from human activities.

Annual total suspended solid loads are 71 million tonnes of which 14 million tonnes are from human activities.

The largest contributor of total suspended sediment load is from the Burdekin and the Fitzroy regions (4.7 and 4.1 million tonnes respectively), mainly derived from grazing lands.

Agricultural fertilizer use is a key source of dissolved nitrogen and phosphorus runoff. Annual loads of dissolved nitrogen are 31,000 tonnes.

All pesticides are from human activities. The total annual pesticide loads are approximately 20,000 kilogrammes and the highest loads are from the Mackay Whitsunday and Whitsunday regions (approximately 10,000 kilogrammes each per year).

Water quality: Inshore water quality is moderate overall. Concentrations of total suspended solids range from poor (Burdekin and Mackay Whitsunday regions) to very good (Booinda Mary region).

Marine results
The effects of river discharge into the Great Barrier Reef are largely concentrated into inshore areas up to 20 kilometres from shore. Higher than average wet season rainfall in the Great Barrier Reef catchment occurred between 2007 and 2008, particularly in the Burdekin River catchment. Marine results for 2006–2009 are presented for seagrass, water quality and coral.

Seagrass: Inshore seagrasses are in moderate condition. Seagrass abundance is moderate and has declined over the past five to 10 years, associated with water quality changes. The number of reproductive structures is poor or very poor in four of the six regions, indicating limited resilience to disturbance.

Coral: Most inshore reefs are in good or moderate condition, based on coral cover, macroalgal abundance, settlement of larval corals and numbers of juvenile corals. Most inshore reefs have either high or increasing coral cover; however, corals in the Burdekin region are mostly in poor condition.
GBR Report Card: Regional Summaries

Cape York region First Report Card 2009-2010 Reef Water Quality Protection Plan

Regional profile
The Cape York region includes 43,000 square kilometres of catchments that drain around to the Great Barrier Reef. The region contains some exceptional conservation assets, including relatively intact and extensive coastal dune fields, wetlands, rainforests, heathlands and river systems that support high levels of biodiversity found nowhere else in Australia. This region has a large ares of land than any other region and these are considered to be areas of high biodiversity value. Traditional use of marine resources is very high, particularly in the areas adjacent to Indigenous communities. Major catchments of the region include: Jowalbinna Creek, the Olive Ponds, Coorabakh, Stovall, Happyland, Jerreba and Burdekin Rivers.

Key findings
- Cutting-edge or best management practices are used by 52 per cent of Queensland producers and 60 per cent of farmers.
- Waterways are 120 per cent intact relative to pre-European times.

What is being done?
Cape York Sustainable Futures is working with producers in the grazing and horticultural industries to implement best management practices to improve the water quality of agricultural runoff. To complement this, a study is also being done to identify the main sources and sinks of sediment within the Laura River catchment.

EMECS9 August 2011
GBR Report Card technical report: the next tier

Report Card

Technical Report

Program Reports

Reef Water Quality Protection Plan
First Report
2009 Baseline

EMECS9 August 2011
Key findings

• Great Barrier Reef is in moderate condition overall, but is regionally variable
• High rainfall has led to both high groundcover (desired), and extensive flood plumes (not desired)
• Unacceptable nutrient management practices are used by 34% of sugar cane growers and 24% of horticultural enterprises
• 50% of grazers use practices likely to maintain high land condition
• Total watershed loads are 5 to 9 times higher than natural for suspended solids, nitrogen, and phosphorus
• 28,000 kg of pesticides is estimated to enter the reef lagoon annually

• Workshop August 2011
• Release scheduled for late 2011 or early 2012
• Moving to web-based reporting
Acknowledgments

For more information:
http://ian.umces.edu/press/report_cards/

Contact:
Heath Kelsey
heath.kelsey@noaa.gov
410 226 5193