

Catchment to Reef Ecological Expert Advisory Workshop

Climate change, coastal development and water quality

Summary

Climate change, coastal development and water quality threaten the health of the Great Barrier Reef and the terrestrial catchment ecosystems connected to it. Identifying and understanding the coastal ecosystems that provide the ecological services between land and sea, and how climate change will impact upon these areas, is essential for long-term management of the Reef.

Background

This project sought to fill knowledge gaps relating to catchment ecosystems that have integral ties to the health of the Great Barrier Reef World Heritage Area; namely what are the ecological services that these ecosystems provide and how will climate change affect these services in the future? This will feed information into climate change action plan objective 1—Targeted Science.

Objective

In June 2010, over 30 ecology experts attended a workshop to discuss and report on ecological connectivity between the Great Barrier Reef catchment area and the Great Barrier Reef World Heritage Area.

The objective of the workshop was to identify the key ecological services provided by catchment ecosystems that are important for the health and resilience of the Great Barrier Reef. Four distinct ecosystem groups were defined: terrestrial, freshwater wetlands, tidal wetlands and inshore marine. The workshop participants were divided into these groups based on their expertise and knowledge.

Each group discussed their designated ecosystem in the context of the entire catchment, as it would have been in pre-European times.

Ecosystems important to the Reef

- Terrestrial: rainforests, floodplain forests, woodlands and beaches
- Freshwater wetlands: Lacustrine, palustrine and riverine wetlands, tea-tree swamps
- Tidal wetlands (figure 1): mangroves, mudflats, salt marshes
- Marine Inshore: seagrass, reefs, soft bottoms and the water column

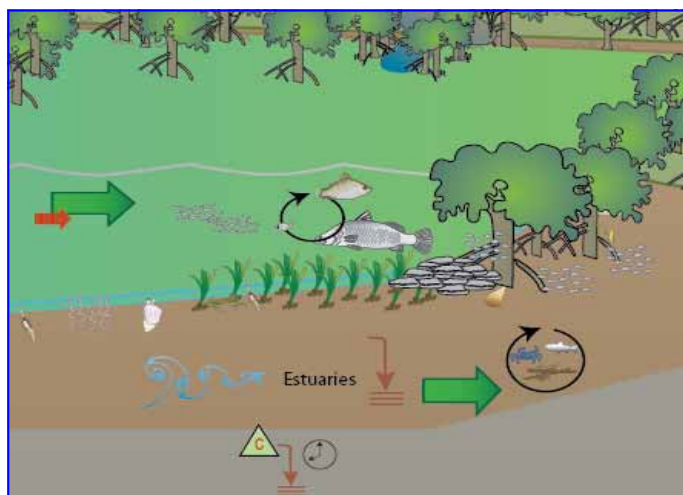


Figure 1. Conceptual model showing some of the ecological functions identified at the workshop that occur in estuaries that are important for ongoing reef health (for further information contact the GBRMPA Coastal Ecosystems and Water Quality Group).

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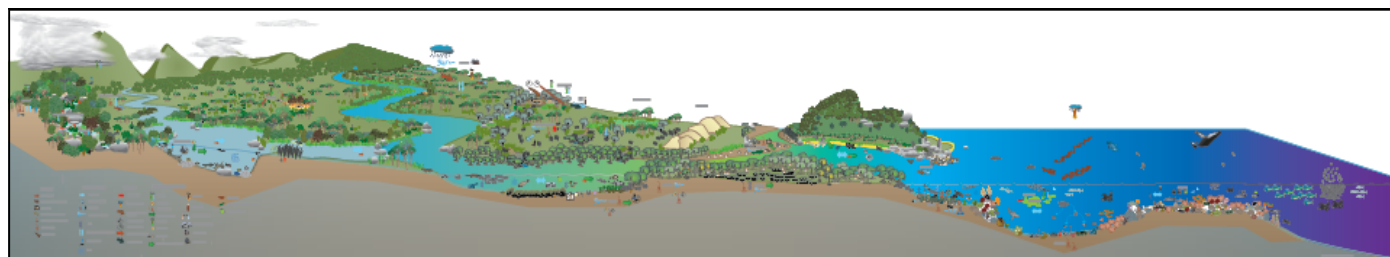


Figure 2. Conceptual model of a generalised pre-European catchment and adjacent inshore reef areas developed at the Ecological Expert Advisory Panel workshop

Once key ecological services were identified, the possible impacts of climate change on these areas and processes, and ultimately the long term health of the Great Barrier Reef, were considered. The workshop participants considered climate change scenarios reflecting varying combinations of temperature increase, rainfall, dry season duration and sea level rise. These were applied to the ecosystems and ecological services identified earlier in the workshop.

The consensus of the experts at the workshop was these climate change scenarios will effect the delivery of key ecological services. The extent and severity of these impacts may be further complicated because of the current extent of catchment modification and any human adaptations for climate change that may occur.

Those involved in the workshop included experts from:

- Department of Environment and Resource Management (DERM)
- Australian Centre for Tropical Freshwater Research
- Australian Institute of Marine Science
- University of Queensland
- James Cook University
- Commonwealth Scientific and Industrial Research Organisation
- Department of Employment Economic Development & Innovation
- Central Queensland University
- World Wildlife Fund for Nature
- Representatives from regional Natural Resource Management and private consultants

Outputs

- A conceptual model for the Great Barrier Reef catchment (pre-European settlement) (figure 2).
- A conceptual model for a pre-European settlement catchment under one climate change scenario.

- A summary report of the workshop proceedings.

Outcomes

This information will be used to identify and map terrestrial and inshore marine ecosystems that are critical for the health and resilience of the Great Barrier Reef World Heritage Area. This information will then be used to inform coastal and catchment management planning processes of the importance of these remnant ecosystems for ongoing reef health and resilience.

Future directions

The information from this workshop will:

- Be used to develop vulnerability assessments for the critical coastal ecosystems.
- Inform detailed conceptual models for each of the critical coastal ecosystems.
- Be used by the GBRMPA and DERM to map connectivity across the catchment.
- Form the basis for further work to consider the effects of land use change on the ecological services, and what these changes mean for ongoing Reef health.
- Provide information that can be incorporated into a bayesian network model to help identify priority areas for coastal managers.

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