

# Keppel Bay case study

## Managing for resilience on the Great Barrier Reef

### Summary

As climate change exerts its effects on the Great Barrier Reef, it is essential that management approaches evolve to deal with this emerging threat. Resilience-based management provides a framework for maximising the prospects for coral reefs and there is a need to develop the tools and practical management measures that can support reef resilience. The Keppel Bay region is being used by the Great Barrier Reef Marine Park Authority (GBRMPA) as a case study for assessing reef resilience.



### Background

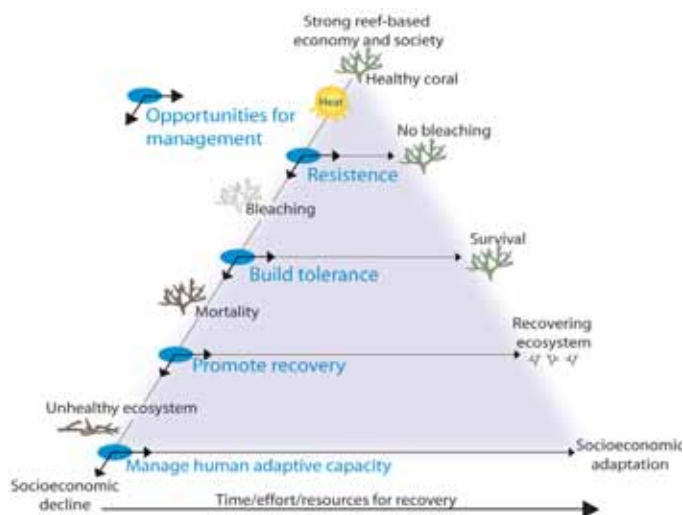
The reefs of the Keppel Bay region are vulnerable to climate change having already suffered extensive coral mortality due to repeated coral bleaching and flooding events. While the reefs in the area remain in good health, growth in tourism and recreation in the area further increase the need for strategic management. In an effort to build resilience of these reefs, and with the support of the local community, the Great Barrier Reef Marine Park Authority (GBRMPA) has been exploring opportunities for collaborative management in the Keppel Bay region.

### Resilience

An important tool for resilience-based management is the ability to assess the resilience of different reefs. Developing and applying methods for assessing resilience is the first priority for the Keppel Bay strategy. This will be done in a close partnership between the GBRMPA, Queensland Parks and Wildlife Service (QPWS) and the local community.

### Resilience assessment protocols

The GBRMPA has developed a preliminary protocol for assessing reef resilience based on resilience indicators identified by The Nature Conservancy and the International Union for Conservation of Nature (IUCN) Working Group on Climate Change and Coral Reefs.



Four conditions determine the outcome of stressful temperatures for coral reefs: bleaching resistance, coral tolerance, reef recovery and human adaptive capacity. Each of these is influenced by a suite of factors that, in combination, determine the resilience or vulnerability of the system. Adapted from Obura (2005).

### Management actions that maximise resilience

**Project name:** Keppel Bay resilience study  
**Project code:** 2.1D.415.20.08  
**Outcome:** A1.3 & B2  
**Year:** 2008 - 2009; 2009 - 2010  
**Bulletin type:** Launch

The key components of the resilience assessment include:

- resilience factors - attributes of reefs that are critical to their ability to tolerate and/or recover from disturbance
- incorporation of both broad (eg connectivity, upwelling) and local-scale (eg coral cover, biodiversity) resilience factors
- incorporation of local values and knowledge in weighting resilience factors
- a numerical ranking of site resilience.

***Community engagement is fundamental to provide local knowledge that informs resilience assessment, and for effective implementation of management responses to the climate change threat.***

## Project objectives and activities

- This project aims to engage strategic and day-to-day managers in a joint effort to test and refine a protocol for assessing reef resilience.
- This will be underpinned by a workshop on resilience theory and management principles.
- The protocol will be used to assess the resilience of the main reef areas of the Keppel Bay region.
- This assessment will then provide the foundations for a resilience-based approach to future management of the region.

## Key desired outcomes

1. Increased capacity of regional managers to measure and assess resilience of the reef areas they manage.
2. Engagement of the local community in gathering information to support future management.
3. A resilience monitoring protocol that can be applied to other regions in the Great Barrier Reef Marine Park.
4. Selection of sites in the Keppel Bay region for trialling management response for the coming summer.



Reefs of the Keppel Bay region are vulnerable to climatic extremes, partly due to stress-susceptible coral populations (A). The region has been affected by both flooding and coral bleaching events regularly over the last 20 years, including the 1991 flood and the mass bleaching events of 1998 and 2002 (B). Most recently, the 2006 regional bleaching event caused severe damage, with most Keppel reef sites experiencing at least 40% coral mortality (C). This was followed in 2008 by an extreme monsoon event that resulted in another major flood of the Fitzroy River; fortunately only minimal impact was recorded (less than 5% mortality).

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