

Why is Great Barrier Reef 'not so great'

April 13 2012, By Jon Brodie and Jim O'Brien

(Phys.org) -- Researchers at James Cook University have questioned why coral cover on the Great Barrier Reef has continued to decline when it is recognised as “the best managed coral reef system in the world”.

Jon Brodie, Senior Principal Research Officer with JCU's Centre for Tropical Water and Aquatic Ecosystem Research (TropWater) and Research Fellow Jane Waterhouse said that recent estimates put average coral cover across the [Great Barrier Reef](#) (GBR) at about 20–30% - estimated to be a large reduction since the 1960s.

“The Great Barrier Reef Marine Park Act was enacted in 1975 and the Great Barrier Reef Marine Park Authority (GBRMPA) set up shortly afterwards,” they said.

“So the question is: why has coral cover continued to decline when the GBR is being managed with a management regime often recognised as ‘the best managed coral reef system in the world’, based on a strong science-for-management ethic.”

Writing in Elsevier's *Estuarine, Coastal and Shelf Science* journal, Brodie and Waterhouse said that the stressors which are known to be most responsible for the loss of coral cover and general ‘reef health’ were terrestrial pollution including the link to outbreaks of crown of thorns starfish, fishing impacts and climate change.

“However the management response of the GBRMPA after 1975, while based on a strong science-for-management program, did not concentrate

on these issues but instead on managing access through zoning with restrictions on fishing in very limited areas and tourism management.”

They wrote that significant action on fishing, including trawling, did not occur until the Trawl Management Plan of 2000 and the rezoning of the GBR Marine Park in 2004. Effective action on terrestrial pollution did not occur until the Australian Government Reef Rescue initiative, which commenced in 2008.

“Effective action on climate change has yet to begin either nationally or globally,” they said.

In their paper Mr. Brodie and Ms. Waterhouse said it was not surprising that coral cover on the GBR had reduced to values similar to those seen in other coral reef areas in the world such as Indonesia and the Philippines.

“Science has always required long periods to acquire sufficient evidence to drive management action and hence there is a considerable time lag between the establishment of scientific evidence and the introduction of effective management.

“It can still be credibly claimed that the GBR is the best managed coral reef system in the world but it must be realised that this is a relative assessment against other reef systems and management regimes and not an absolute claim for effective management.”

They said that the GBR has been managed under a complex but powerful regime with great governmental support, financing and research and monitoring expenditure since 1975.

They said there had been notable successes in recent times including:

- the major rezoning of 2004 with new no-take zones showing increased fish populations but also apparent effects on crown of thorns starfish populations;
- little loss of mangroves as a result of strong prohibitions on damaging marine plants under the Queensland Fisheries legislation;
- sewage effluent discharges from resort islands and mainland cities and towns have been improved dramatically; and
- strong action on compulsory pilotage and navigation equipment may have prevented many shipping accidents but ships still manage to run on to the reef every decade or so.

“On the other hand coral cover has declined considerably, seagrass health in the central GBR is in poor shape, dugong numbers have declined precipitously, shark populations are in serious decline (although perhaps recent management has reduced the rate of decline), many other large fish on the GBR have had large population declines (although data on many are incomplete) and the fourth wave of crown of thorns starfish outbreaks has commenced.

“Most notably coral bleaching has become more frequent, widespread and damaging and [coral](#) calcification has started to decline due to ocean acidification.”

They write that the reasons for this situation are complex but include the need for reasonably ‘certain’ science before management action occurs - and the long times need to achieve this.

Time lags in recovery after management action are long. For a slow breeding animal like a dugong – one calf every few years - population recovery is a very slow process and catchment management activities such as reforestation of riparian areas take decades to reduce erosion and river sediment loads.

“In particular the need to get the political, organizational, scientific, economic and human elements to align at the right time so effective management can occur in time to avert phase change is a frighteningly difficult task,” Brodie and Waterhouse said.

They conclude that it “is easy now for us to claim that management should have focussed on these from the start of the GBRMPA. However, as is often said, hindsight is a wonderful thing and both authors of this paper have been engaged from long ago in a water quality management role for the GBR.”

“Our inability to manage climate change for the GBR, including increased temperatures, extreme weather events and ocean acidification, means that even in the light of some success in other management areas and the fact that the GBR is the best managed reef system in the world means the long term prognosis for a healthy GBR system is poor.

“The extension of the Reef Plan management actions beyond 2013, the continued strong management of no-take zones in the GBR and a better management regime for the coastal and estuarine areas of the GBR are thus even more essential to give us any hope of retaining some of the World Heritage values of the system.”

More information: “A critical review of environmental management of the ‘not so Great’ Barrier reef” was published in the journal *Estuarine, Coastal and Shelf Science*.

Provided by James Cook University

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