



Great Barrier Reef Ecosystem Services

By Eric Wolanski
James Cook University

A mini symposium organized by G. Lukacs and E. Wolanski was held in Townsville on Feb 9 2009 on the ecosystems services of the Great Barrier Reef (GBR). The stakeholders were James Cook University (JCU), the CSIRO, and the Great Barrier Marine Park Authority.

D. Wachenfeld (GBRMPA) opened the symposium, stressing the potential benefits of quantifying the ecosystem services of the GBR.

In the biophysics session, D. Bellwood (JCU) identified critical ecosystem processes or functions of coral reefs. Initial findings suggest that key processes may be dependent on just a few critical species and that biodiversity may not offer the protection we once hoped. There is increased recognition that it is the processes not species that are important if we are to maintain ecosystems and the services they provide. **E. Wolanski** (JCU) described the oceanic and coastal drivers of the GBR. Ecohydrology modeling predicts a gloomy scenario for coral cover by 2050.

In the ecosystem services session M. Finlayson (CSU) described the Millennium Ecosystem Assessment methodology to provide a knowledge base to support improved decisions to enhance the contribution of ecosystems to human well-being, particularly by altering the current balance between provisioning and regulating services. **M. van Grieken** and **J. Butler** (CSIRO) presented the results for assessing potential trade-offs in the provision of a regulating hydrological ecosystem service, the control of agricultural diffuse pollution by land use management practices and the restoration of native riparian vegetation. Using ecosystem services they explored the options for improving links between the ecological and social systems, including payments for ecosystem services, and building resilience and adaptive capacity to protect the GBR.

In the ecosystem value section, J. Rolfe (CQU) provided an overview of non-market valuation techniques that are relevant to the Great Barrier Reef, and illustrated some results of recent studies. **N. Stoeckl** (JCU) reviewed the studies that have estimated economic values associated with ecosystem services in the Great Barrier Reef region. She highlighted gaps in current knowledge that warrant further investigations.

In the threats to the GBR session, K. Fabricius (AIMS) showed that the reefs of the Great Barrier Reef have been losing >0.25% coral cover per year since ~1970, due to cumulative disturbances. She provided an overview of the main past and present disturbances to the Great Barrier Reef. She discussed how the intensity, frequency and types of threat are continuing to change with increasing CO₂ levels and an exponentially growing human population.

In the ecosystem services overview session, R. Costanza (U. Vermont) demonstrated how an ecosystem services based approach can assess the trade-offs inherent in managing humans embedded in ecological systems. Evaluating trade-offs requires both an understanding of the biophysical magnitudes of ES changes that result from human actions, as well as an understanding of their impact on human well-being, broadly conceived. The state of the art of ES assessment and modeling was discussed, including the potential of integrated ecological economic modeling. A discussion followed among the 70 participants,



moderated by **G. Lukacs** (JCU); the common thread emerged that (1) the GBR ecosystem is not as resilient as we had thought; (2) it is suffering a lot more from human impact than the politicians and tourist brochures say; (3) the assessment of its ecosystem services need much attention; (4) the survival of the GBR depends on co-managing the land and the sea, something which is not done at present and which could be done using ecosystem services as a common currency for the land and the sea. There is no common currency at present; (5) research much focus on the continued supply of ecosystem services to provide a bridge between various disciplines of science and with the human dimension to help ensure the future of the GBR; (6) Major reform across all levels of state and Commonwealth governments to focus on sustaining ecosystem services in the whole GBR ecosystem (land and sea) may be necessary to achieve the above.

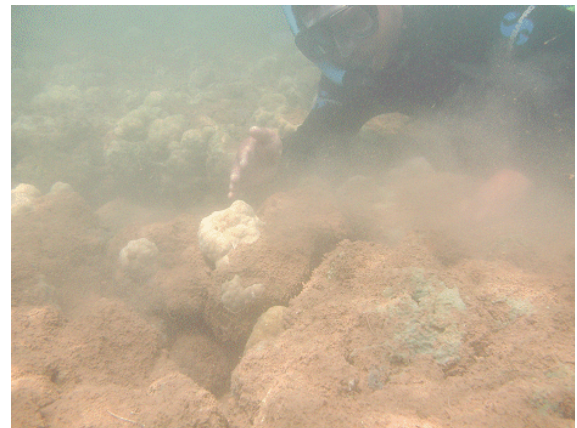
Contact: eric.wolanski@jcu.edu.au

Healthy inshore reef



(Photo: L. McCook)

Suffocated inshore reef



(Photo: R.H. Richmond)