McCulloch, Malcolm T[1]
malcolm.mcculloch@anu.edu.au
[1] Research School of Earth Sciences, The Australian National University, Canberra, ACT, 0200

Coral record of human impacts on land-sea interactions in the inner Great Barrier Reef

As a direct consequence of pastoral grazing, cultivation, mining and land clearing activities that accompanied European settlement, catchments of the Great Barrier Reef (GBR) are delivering enhanced sediment and nutrient loads into the GBR. To better understand and constrain both the present-day as well as longer-term impacts of these changes on coral reef ecosystems, we describe here an approach based on geochemical tracers preserved in long-lived (300-400 year old) aragonite skeletons of *Porites* corals. This approach has the advantage of not only giving a direct quantitative measure of changes in water quality actually occurring at coral reef sites, but also providing a natural baseline against which the magnitude of anthropogenic changes can be assessed. It is shown that from the 1870's onwards, there has been a five- to tenfold increase in the sediment load delivered by the Burdekin River, the largest source of sediment to the GBR. There is a close correlation between high cattle numbers, especially during the mid-late 1970's, followed by increased sediment fluxes into the GBR. This situation is exacerbated during drought-breaking floods with the largest sediment-load being recorded in the 1981 flood following a prolonged drought. River water discharge volumes have been estimated from salinity changes at the reef, quantified using a combination of oxygen isotope and Sr/Ca tracers. It is likely that freshwater runoff into the inner GBR increased significantly following European settlement, a consequence of reduced vegetation cover, compacted soils, and hence reduced water infiltration rates. A clear link between European land use changes and greatly enhanced sediment, nutrient and freshwater inputs to the GBR is demonstrated, although the ecological impact of these changes requires ongoing study and monitoring. Nevertheless this work reinforces the need for vigilance and sustained long-term remedial actions if major deleterious consequences in the GBR are to be avoided.

McKenzie LJ[1,2], Mellors JE[3], Yoshida RL[1,2], Coles RG[1]
len.mckenzie@dpi.qld.gov.au ;
[1] Department of Primary Industries & Fisheries, NFC, PO 5396 Cairns Qld 4870 hq@seagrasswatch.org; rob.coles@dpi.qld.gov.au
[2] CRC Reef Research Centre, PO Box 772, Townsville Qld 4810
[3] Department of Primary Industries & Fisheries. PO Box 1085 Townsville Qld 4810. jane.mellors@dpi.qld.gov.au

Seagrass-Watch: A non-destructive, seagrass assessment and monitoring program - 1998-2006

Seagrass-Watch is the largest scientific, non-destructive, seagrass assessment and monitoring program in the world. Now in its eight year of operation, Seagrass-Watch provides a reliable early warning system on the condition of near-shore seagrasses throughout Queensland, Australia. Seagrass-Watch is active in 13 countries and territories throughout the Indo- and western Pacific and has evolved into an international environmental program.

Monitoring is conducted by over 500 people at approximately 165 sites throughout Queensland and the western Pacific. The Seagrass-Watch network brings together diverse groups from all sectors to work together towards a common goal of seagrass conservation. Seagrass-Watch has raised public awareness about seagrasses and their threats.

Seagrass-Watch has provided information about the health of seagrass ecosystems for local management agencies. The program has shown clear seasonal patterns in abundance across the Pacific, detected loss and subsequent recovery of seagrasses in relation to climatic events including flooding, has provided an early alert to detrimental effects from poorly managed coastal developments, and used to track the possible consequences of global climate change. The findings from the program have also contributed information for World Heritage Area listing assessments, regional and local Plans of Management, and have recently been adopted by the LMMA network and the GBRMPA as accepted protocols for monitoring seagrass and water quality condition. Through responsive management, based on adequate information, it is hoped that many anthropogenic impacts on seagrass meadows which are continuing to destroy or degrade these coastal ecosystems and decrease their yield of natural resources can be avoided.

This presentation will provide some background to the program and present examples of information collected and the management responses.