Reef Rescue Marine Monitoring Program

Final Report of AIMS Activities 2009/10
Project 3.7.1b Inshore Coral Reef Monitoring

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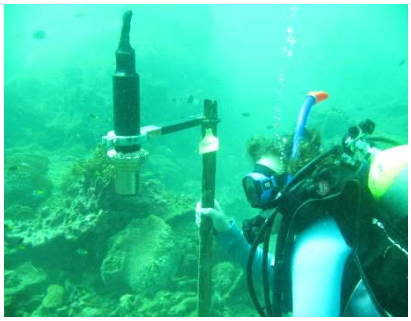
PRODUCED FOR
Reef and Rainforest Research Centre

Australian Government | Australian Institute of Marine Science

Townsville
May 2010



due to the frequent re-suspension of sediments by wind waves and subsequent advection away of fine sediments away from reefs by coastal waves. In the Burdekin region there has been no evidence of an increase in the nutrient content of the sediments despite substantial flooding of the Burdekin in 2008 and 2009. However, this is not unexpected considering that the survey reefs are located a considerable distance (>100 km by sea) from the mouth of the Burdekin River. Over the time taken for flood waters to travel this distance (several days) most dissolved nutrients would have been taken up by biological communities or settled to the sea bed adsorbed to sediment particles (Furnas 2003. Such settlement of nutrients in close proximity to the river is likely responsible for the marked increase in nitrogen content of the Fitzroy region sediments in 2008 following a major flood of the Fitzroy River (Figure 2).

Catchments in the Wet Tropics and Mackay Whitsunday regions are relatively small and compressed by coastal mountain ranges. At greater than 1000 mm y^{-1} average rainfall is 2-3 times higher in these catchments than for the Burdekin or Fitzroy. Both regions have several rivers flowing into the inshore waters. These river systems are relatively small and meander through soils primarily cultivated for crops, with high carbon and nitrogen content (Australian Natural Resource Atlas, electronic resource). The reef sediments analysed in the Mackay Whitsunday region have the highest proportion of fine grained particles, nitrogen and organic carbon and the lowest levels of inorganic carbon (Figure 2). In combination, and considering the high turbidity in this region, these results indicate that reefs in this region have a much greater exposure than reefs in other regions to pressures associated with high sedimentation and nutrient levels. This is supported by field observations of substantially greater accumulation of sediments to coral settlement tiles deployed in this region compared to other regions, which provide direct evidence of the difficulty facing coral larvae attempting to settle to substrates on these reefs. There is also a relationship between changes in sediment composition and annual fluctuations in river flow. In the Mackay Whitsunday region flows in the period 2001/02 to 2005/06 were substantially lower than flows from 2006/07 on (Table 5). Over this recent period of high flows the proportion of sediments of marine origin (inorganic carbon) declined while nitrogen and organic carbon content and the proportion of fine grained particles in the sediment, all increased (Figure 2). Data from the Wet Tropics are more variable with moderate proportions of clay and silt and sediment nutrients. Moderate though variable levels of fine grained particles could indicate a variable hydrodynamic setting with periods of sediment accumulation punctuated by re-suspension events over which our annual sampling is haphazardly applied.

In summary, while the sediment composition in future monitoring will vary among sites from year to year, the last four years of monitoring has established a range of regional values to support a baseline against which future changes in the catchment can be assessed.

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