

Executive Summary

The Heron Island harbour was re-dredged between September and November 1987 and a swing basin for vessels and a jetty were also constructed at that time. Following concern about the potential effects of the dredging operation, a multi-disciplinary monitoring program was initiated. This report covered the investigation into the nature and distribution of sediments on the reef flat and in the spoil dump, the conditions responsible for the erosion of the spoil dump and the quantity of dredge material in the spoil dump.

Generally, the dredging operation suspended large quantities of fine material which settled south of the spoil dump and particularly along the outer edge of the reef. The dredge material did not appear to affect the area east of the Research Station on the south of the cay and east of the resort on the north of the cay. In the two years following the dredging, much of the fine material was redistributed and removed from the reef flat by natural action. The sediment distribution patterns appear to be returning to those prior to the 1987 dredging operation.

Cyclone Fran was generally responsible for removing a large amount of silt from the reef flat and from the harbour channel itself, thus further acting as a cleansing agent for reef flat biota.

The quantity of dredge spoil deposited on the beach was estimated at $14,860\text{m}^3$. The spoil dump eroded rapidly in the first 5 months following dredging with around 6% of the total volume lost. Over the following 3 years this tapered off to around 11% of the initial spoil dump volume. Major climatic events such as storms and cyclones can still cause substantial erosion to occur from the spoil dump. During Cyclone Fran in March 1992, a further 4% of the total volume was lost and the shoreline underwent substantial re-alignment.

Silt in the spoil dump is concentrated in lenses. These lenses are generally more prevalent in the northern side of the spoil dump which is also the side most prone to erosion. The top of the spoil dump is very rubbly, making it unpleasant to walk on and difficult for turtles to nest in.

The environmental conditions causing silt plumes to be produced from the spoil dump were studied intensely over a 3 year period. Wave height and tidal state were the most important variables affecting erosion. The conditions causing the formation of silt plumes are episodic and have been decreasing over time, so that now they only occur at wind speeds greater than 15-20 knots, coinciding with tide levels of more than 2.5m.

Recommendations are made for the management of the spoil dump and for further monitoring.