# Sediment Dynamics of a Large Tropical River System: The Burdekin River and Lake Dalrymple, Australia

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## Abstract

The Burdekin River Catchment is situated in the dry tropics region of Northern Queensland, Australia and covers 130,000km$^2$. As the second largest catchment in the state it impacts significantly upon the Great Barrier Reef shelf system in terms of water, sediment and nutrient exports, but due to the seasonal nature of rainfall in the region, these impacts are highly episodic. In 1989, the Burdekin Falls Dam was built in order to provide a storage reservoir for irrigation. It was expected to act as a sediment trap, however the reservoir fills and overflows during flood events, which carry large amounts of suspended particulate matter. The reservoir is chronically turbid (>100NTU) and consequently discharge from the dam is no longer clear during the dry season, which may potentially cause adverse affects downstream.

Our investigation into the characteristics, source and fate of sediment in the Upper Burdekin catchment and its behavior within the system has been undertaken within the two major inflowing rivers (Suttor and Burdekin Rivers) and impoundment area during base flow and storm flow periods. Preliminary results indicate that the high turbidity relates to fine clay minerals of generally <10µm (kaolinite, smectite, muscovite), while sediment deposition within the reservoir has been minimal. A bi-modal distribution implies a second grain size population related to an organic component. Benthic sediment exhibits a uni-modal distribution and as expected is coarser grained than suspended sediment. XRD work has shown that the composition of the suspended sediment in the inflowing rivers is similar and representative of catchment geology. Suspended sediment grain size patterns from samples collected post-wet season in the Suttor River and reservoir are virtually identical, which along with turbidity and conductivity data implies that the persistent turbidity in the dam is largely controlled by inflow from the Suttor River.