Deltas: Landforms, Ecosystems and Human Activities
Proceedings of HP1, IAHS-IAPSO-IASPEI Assembly, Gothenburg, Sweden, July 2013 (IAHS Publ. 358, 2013) 159-167.

Flood-tidal and fluvial deltas of Tuggerah Lakes, Australia: Human impacts on geomorphology, sedimentology, hydrodynamics and seagrasses

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Abstract Tuggerah Lakes are a barrier or wave-dominated estuary consisting of three interconnected shallow lagoons impounded by a coastal sand barrier. Sea level rose by about 120 m during the late Pleistocene to about present sea level at about 7900–7700 cal BP. Sea level continued to rise to +1.5 m by 7400 cal BP and persisted until about 2000 cal BP when it regressed to the present level. Throughout most of the early and mid-Holocene, Tuggerah Lakes had two entrances, one in Tuggerah Lake at The Entrance and another in Budgewoi Lake near Budgewoi. Sand completely blocked the entrance near Budgewoi and the remaining channel at The Entrance became ensconced on bedrock. Nevertheless, sandy flood-tidal deltas developed at both entrances, although currently inactive. Where rivers debouche into the lagoons, silt jetties or fluvial deltas have formed. Deep channels have been dredged through river-mouth bars, altering natural sedimentation patterns and the distribution of seagrasses. The geoheritage value of flood-tidal deltas and silt jetties needs to be determined for NSW estuaries so that the most significant can be protected appropriately.

Key words sea level change; entrance atrophy; river-mouth bars; seagrass dynamics; dredging