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## The Significance of Coastal Processes for Management of the River Murray Estuary

NICK HARVEY

*The tidal prism in the River Murray estuary has been reduced by over 85 percent since completion of the barrages in 1940 and regulation has diminished the rate and size of river flows through the estuary. Reduced fluvial flushing has emphasised the dominance of coastal processes at the river mouth. These are expressed in the accretion and stabilisation of a flood-tidal delta, the migration of the mouth, the erosion of Sir Richard Peninsula and the accumulation of new flood-tidal deltaic deposits. Inconclusive studies relating river flow to mouth migration indicate the importance of coastal processes such as littoral drift, tidal flux and sea state, particularly at times of low river flow, in explaining the position and morphology of the mouth. Previous management strategies have failed to consider coastal processes adequately.*

In a recent article in this journal, Bourman and Barnett (1995) examined the impacts of river regulation on both the terminal lakes and the mouth of the River Murray. In particular, they suggested that river regulation has transformed a migrating flood-tidal delta at the Murray Mouth into a permanently vegetated island. The formation of the flood-tidal delta has previously been described by Bourman and Harvey (1983), historical surveys and photographic sequences of mouth migration have been documented (Harvey, 1983) and analysis of the nature and rate of vegetation succession on the flood-tidal delta (Bird Island) has been reported (Carruthers, 1992). These studies all provide strong evidence of the rapid sedimentation, veg-

etation and stabilisation of Bird Island over the fifty year period since construction of the lower Murray barrages. However, there is less evidence of the impact of river regulation on shorter term geomorphic changes in the estuary, such as the migration of the Murray Mouth.

Attempts to assess the impacts of river flow on the morphology of the Murray Mouth have met with little success. There is disagreement about the role of river erosion in the migration of the mouth (Thomson, 1975; Walker, 1990) although results of flushing studies investigated by the Murray Mouth and Coorong Working Party suggest that the mouth is substantially cleared by a flow of 20,000 ML day<sup>-1</sup> for a month or more (Harvey, 1988). Walker (1990) referred to previous studies, mainly from the North America, which used inlet area, tidal prism, inlet velocity and littoral drift as parameters for describing inlet equilibrium. These

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