

generally less than 0.5 m in height with periods from 2 to 5 seconds (Byrne, 1988). Most waves are generated locally within the harbour or just offshore in Beagle Gulf. However, during cyclones, it is estimated that waves between 3 and 3.5 m in height could occur (Byrne, 1988).

Darwin Harbour has a macrotidal environment with a tidal range of about 7.8m. There are two high and low tides daily (semi-diurnal inequality) and the maximum daily tidal amplitude varies from approximately 5 to 8 m during spring tides, to around 2 to 4 m during neap tides. During spring tidal cycles currents of up to 2 m s^{-1} can occur in the main estuarine channels (Byrne, 1988) and these also influence development within mangrove habitats. Studies of topographic elevation within mangroves in Darwin Harbour, suggest an equilibrium between the gradients across tidal flats and the flows of tidal waters over them (Woodroffe, 1985). Tidal scouring contributes to the maintenance of a characteristic relationship between surface topography and frequency of tidal inundation which may be plotted as a hypsometric curve for a particular creek system or embayment (Woodroffe, 1985). Recent anthropogenic developments involving extensive reclamation in the mid- and upper intertidal zones of Darwin Harbour may have the potential to alter this equilibrium situation.

Overall, the macrotidal hydrodynamics of the harbour has contributed to the generation of a system of frequently flushed tidal channels with steep banks at low elevations. In contrast, above the level of mean high water neap tides—where tidal currents are minimal and flushing infrequent—extensive tidal flats with very flat terrain have developed.

Mangrove communities of Darwin Harbour

The mangrove communities of Darwin Harbour are some of the most floristically diverse in the Northern Territory, containing over 30 species of mangroves. Based on floristic diversity and extent, the mangroves of Darwin Harbour are placed as one of the three most significant mangrove resources in the Northern Territory (Wightman, 1989). Arnhem Bay and the South Alligator River containing 39 and 38 mangrove species respectively, are the other two. In Australia, such floristic diversity is only exceeded in north-eastern Queensland (Wells, 1983; Duke, 2006).