

Sand Nourishment in the City of Busselton

Busselton is located on the scenic sandy coast of Geographe Bay, and this sandy coastline is naturally dynamic.

Coastal erosion and accretion occurs over a range of time scales. This includes the rapid erosion of the beach and foredunes observed during winter storms (Figure 1); and more complex longer-term changes to the shoreline associated with sand supply around Cape Naturaliste, the migration of the distinctive transverse sand bars evident on aerial photography, and downdrift erosion from groyne fields.

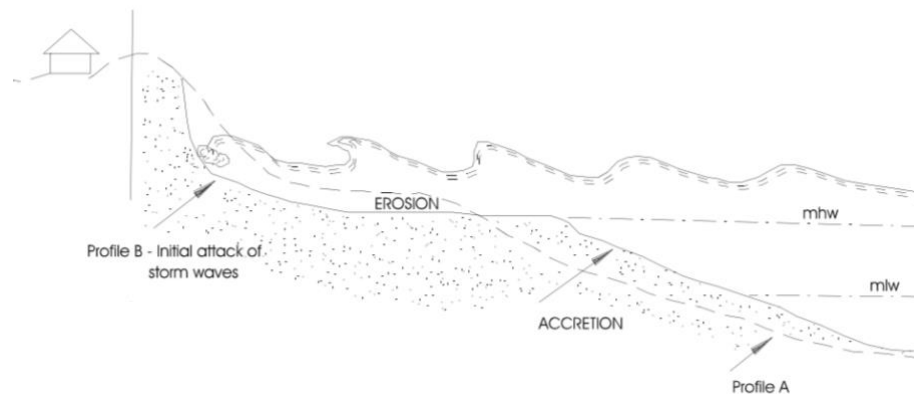


Figure 1 – Process of Coastal Erosion (USACE 2002)

Sand nourishment is an important coastal management tool within the City of Busselton's Coastal Management Program. Sand nourishment is the replenishment of an eroding beach with sand from another site. This placed sand reinstates the beach or foredune and becomes a "sacrificial" coastal erosion buffer in future storms, increasing the protection of assets behind it.

Sand nourishment is placed prior to winter at sites identified in strategic coastal monitoring with low erosion buffers to public assets. This provides a short-term sacrificial buffer to winter storms. However, effective sand nourishment serving as coastal protection requires an *ongoing program of nourishment*. For example:

- Beaches in Old Dunsborough are occasionally nourished with relatively small quantities of sand in response to coastal erosion from north east storms. The reinstated beaches typically require nourishment every few years. (Figure 2a).
- Beaches in Broadwater are subject to higher rates of erosion. These beaches require larger quantities of sand nourishment more frequently, to protect the coastal path and reserve whilst longer term options such as asset relocation and protection are being considered. Eroded sand is not 'lost' from the system as it provides a supply of sand to downdrift beaches in West Busselton (Figure 2b).



Figure 2: Sand nourishment at Bayview Crescent in Dunsborough (a) and Allen St, Broadwater (b).

Sand nourishment is also deployed rapidly in response to coastal erosion. This is typically the City's primary response to storm erosion. Placed sand is eroded but provides enhanced protection to the adjacent asset. Eroded sand is transported from the foredune to the nearshore areas (Figure 1) and alongshore to downdrift beaches.

Sand nourishment is undertaken as part of the City's wider **Coastal Management Program (2018-2028)** that includes:

- *Asset relocation*: Coastal paths or carparks in coastal reserves are moved further landward, where feasible, to protect them from coastal erosion (Figure 3).
- *Coastal structure maintenance*: Strategic maintenance of the more than 50 coastal protection structures (groynes and seawalls) along Geographe Bay.
- *Coastal adaptation and protection*: Construction of new groyne fields in areas with very high rates of erosion and potential for downdrift impacts to be mitigated by onshore sand feeds and wide coastal reserves.

There will, however, always be a place for sand nourishment in the City of Busselton's management of coastal erosion, due to the speed with which sand nourishment can be implemented, its *versatility* and limited adverse impacts.



Figure 3 Asset relocation of the Mill Rd carpark in West Busselton has increased the erosion buffer and reduced nourishment requirements.