LIVING SHORELINES

The following are notes and diagrams from a presentation made by Peri Coleman of Delta Environmental Consulting, to the Port Adelaide Environment Forum in June 2015.

Along the LeFevre Peninsula, while there are risks to our coast from sea level rise, there are greater risks along the Barker Inlet and Port Estuary waterways. Our Port River is tidal, mixing sea and fresh water, and is linked to creeks and channels opening into the Gulf St Vincent.

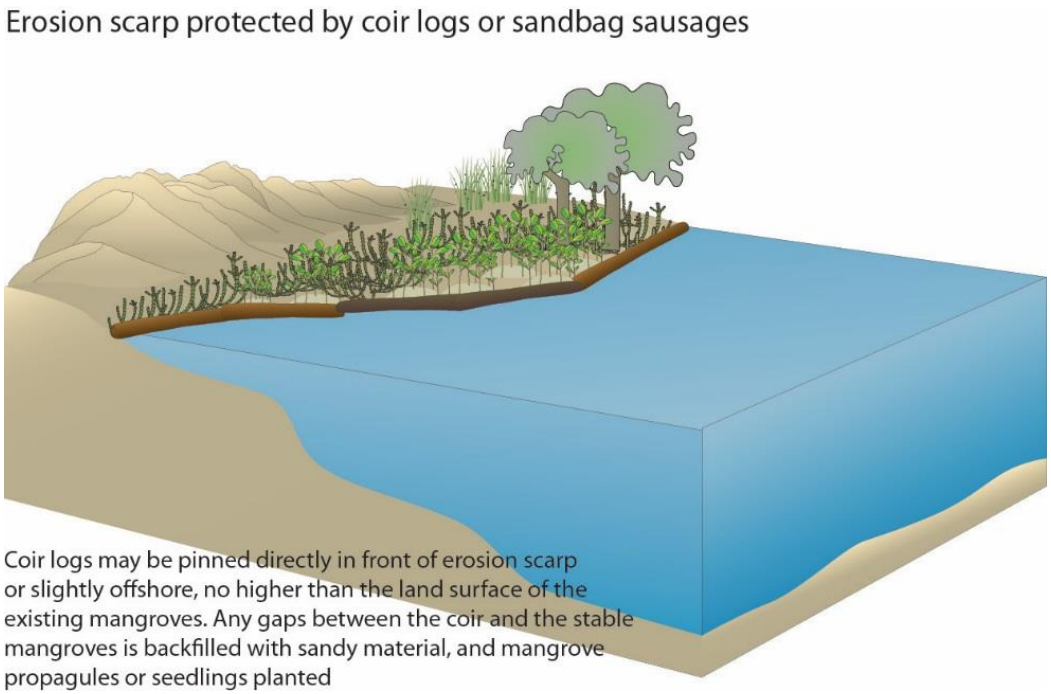
A sea level rise (SLR) of 10cms has occurred in the last twenty years in the Port River and our community is familiar with the impact of king tides, especially if associated with major rain events that put pressure on our stormwater infrastructure.

While hard engineering structures such as seawalls have been used in the past, increasingly there is interest in providing living structures that enable nature to do the engineering for us. This approach is termed 'Living Shorelines' and is being implemented overseas e.g. Chesapeake Bay USA and being trialled in Port Phillip Bay, Melbourne.

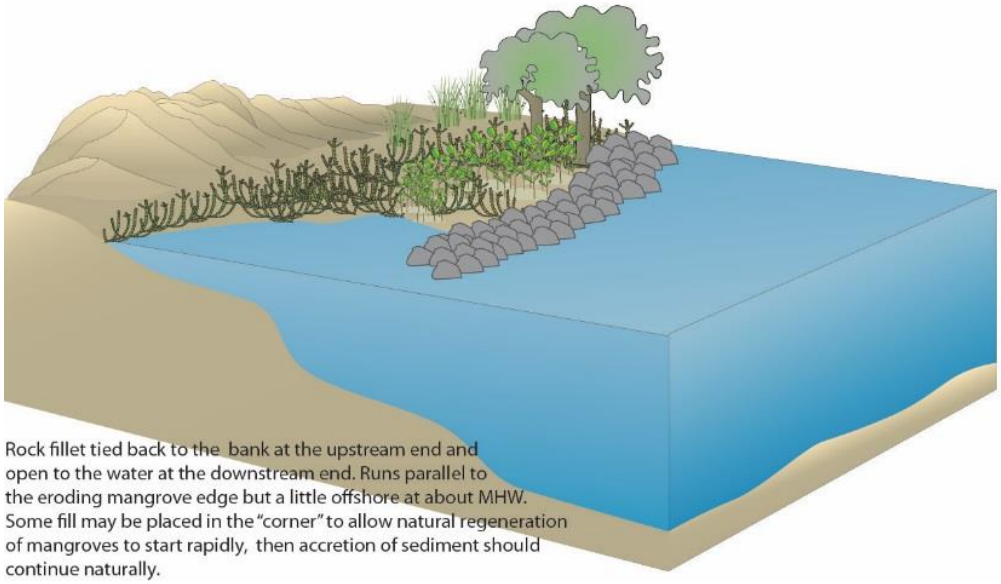
As a response to sea level rise 'Living Shorelines' have the potential advantage of their height increasing naturally once established.

(Note: MHW means Mean High Water)

A Living Shoreline approach for the Port River and Barker Inlet
The following diagrams show steps that can be taken to protect our river shoreline:

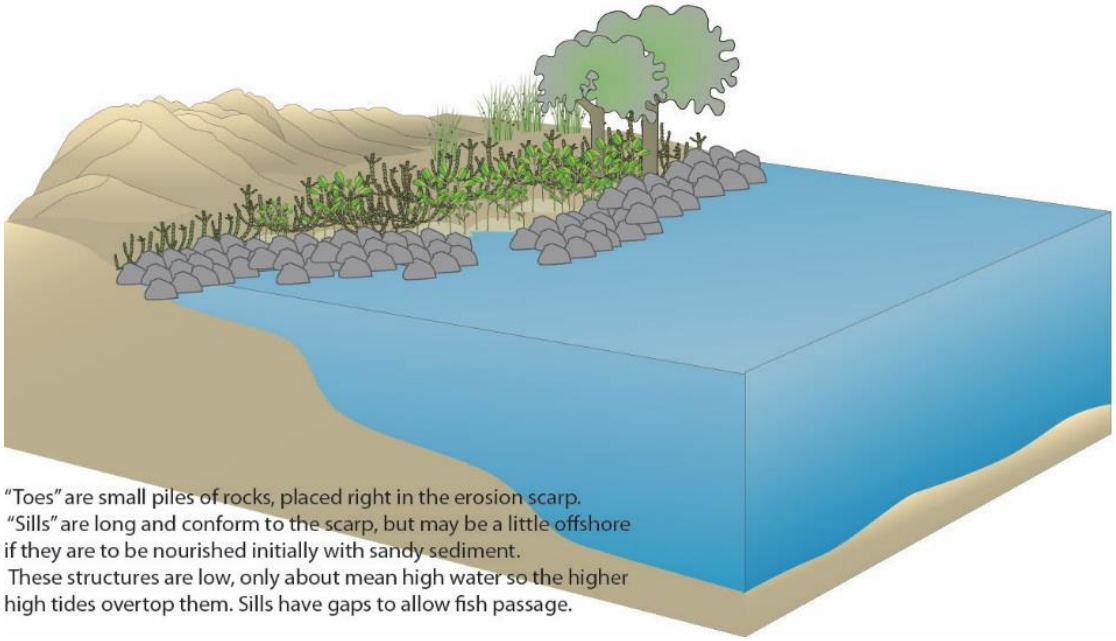


Rock fillet to regain eroded area and allow natural regeneration of mangroves and saltmarsh



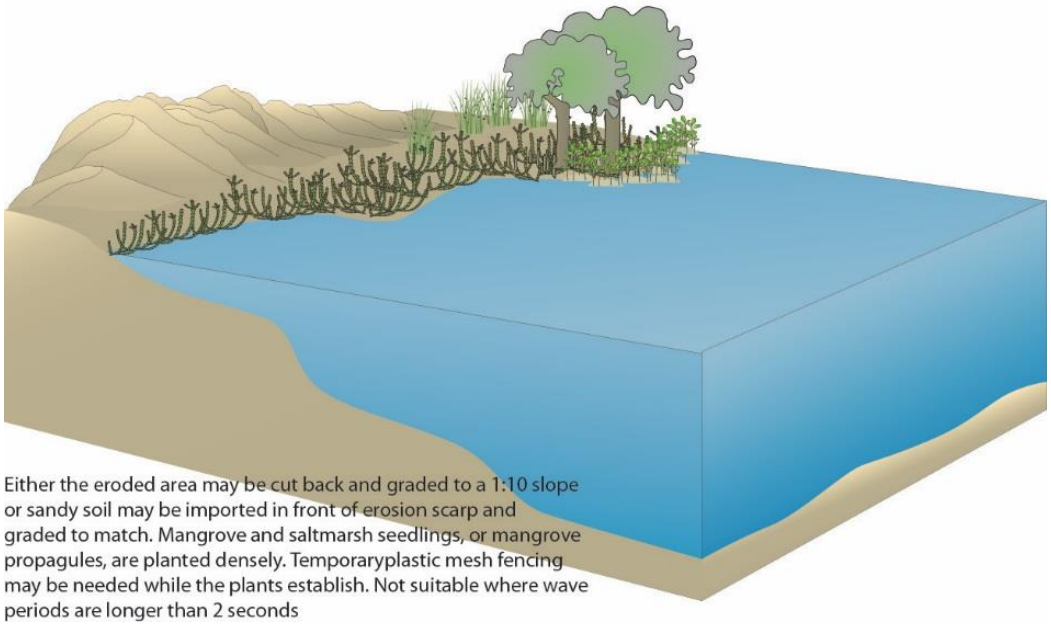
Rock fillet tied back to the bank at the upstream end and open to the water at the downstream end. Runs parallel to the eroding mangrove edge but a little offshore at about MHW. Some fill may be placed in the "corner" to allow natural regeneration of mangroves to start rapidly, then accretion of sediment should continue naturally.

Rock sill or "toes" of rocks along the erosion scarp to retain/regain mangrove area



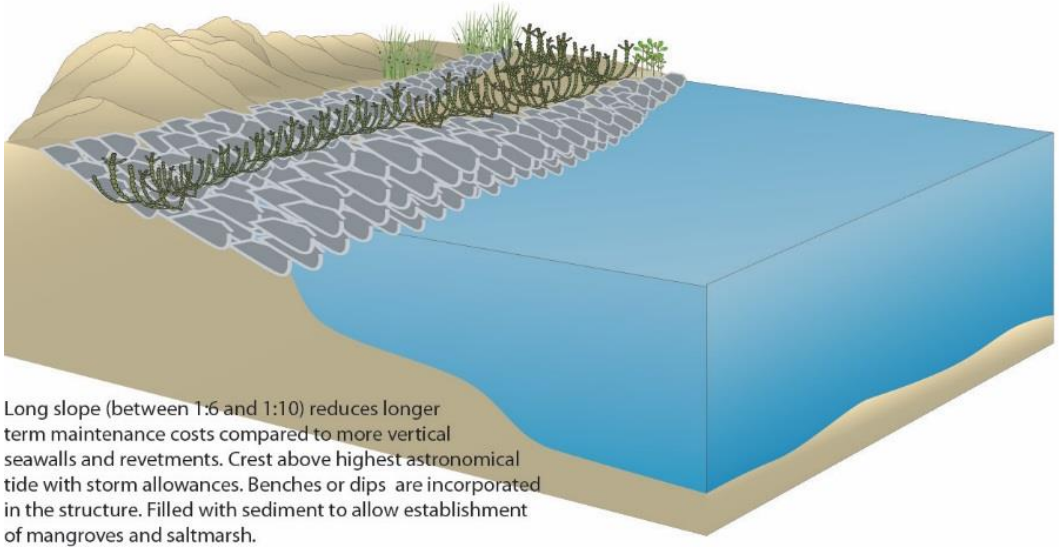
"Toes" are small piles of rocks, placed right in the erosion scarp.
"Sills" are long and conform to the scarp, but may be a little offshore if they are to be nourished initially with sandy sediment.
These structures are low, only about mean high water so the higher high tides overtop them. Sills have gaps to allow fish passage.

Grading and planting to restore eroded areas



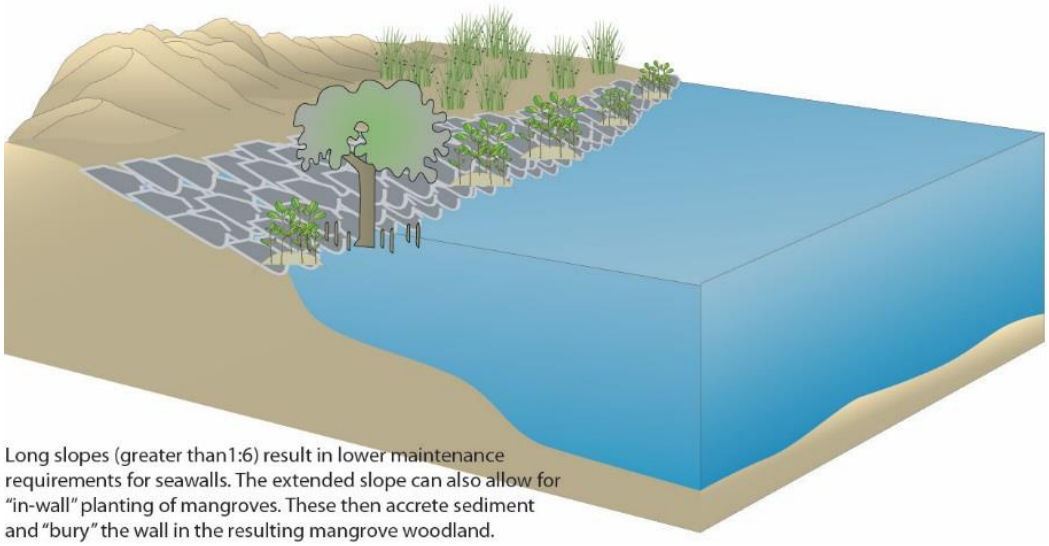
Either the eroded area may be cut back and graded to a 1:10 slope or sandy soil may be imported in front of erosion scarp and graded to match. Mangrove and saltmarsh seedlings, or mangrove propagules, are planted densely. Temporaryplastic mesh fencing may be needed while the plants establish. Not suitable where wave periods are longer than 2 seconds

Benched revetment for biodiversity gain and reduced wave impacts on the revetment



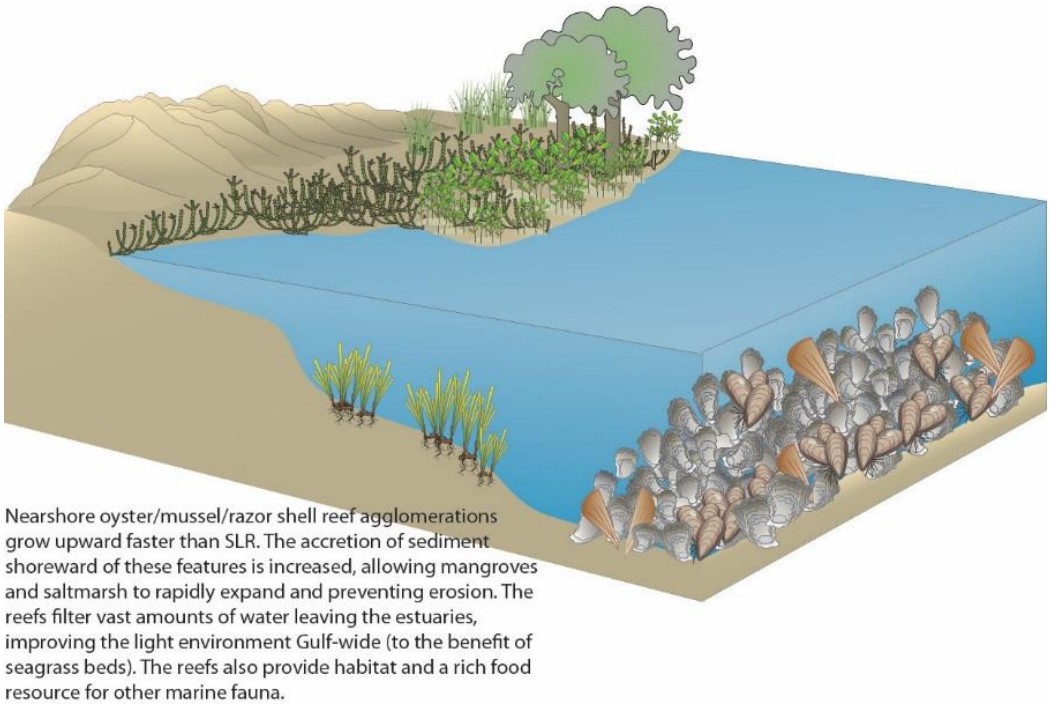
Long slope (between 1:6 and 1:10) reduces longer term maintenance costs compared to more vertical seawalls and revetments. Crest above highest astronomical tide with storm allowances. Benches or dips are incorporated in the structure. Filled with sediment to allow establishment of mangroves and saltmarsh.

In-wall mangrove planting for lower maintenance and higher biodiversity values



Long slopes (greater than1:6) result in lower maintenance requirements for seawalls. The extended slope can also allow for "in-wall" planting of mangroves. These then accrete sediment and "bury" the wall in the resulting mangrove woodland.

Restoration of native oyster/mussel/razorshell reefs

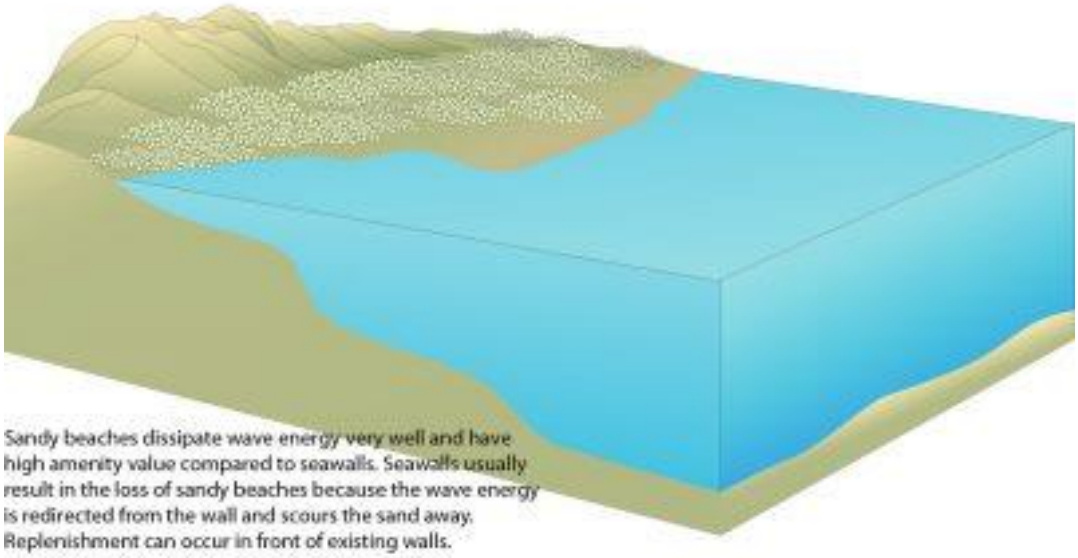


Nearshore oyster/mussel/razor shell reef agglomerations grow upward faster than SLR. The accretion of sediment shoreward of these features is increased, allowing mangroves and saltmarsh to rapidly expand and preventing erosion. The reefs filter vast amounts of water leaving the estuaries, improving the light environment Gulf-wide (to the benefit of seagrass beds). The reefs also provide habitat and a rich food resource for other marine fauna.

A Living Shoreline approach to sandy beaches

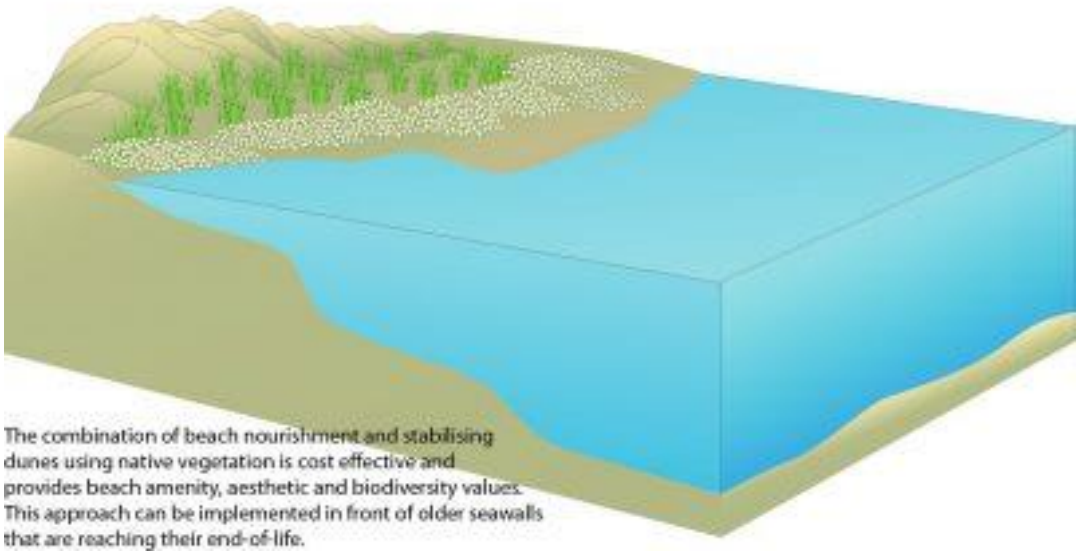
While sand replenishment is widely recognised and used to protect sandy beaches, native vegetation can also contribute to dune stabilisation.

Beach nourishment or replenishment for sandy beaches



Sandy beaches dissipate wave energy very well and have high amenity value compared to seawalls. Seawalls usually result in the loss of sandy beaches because the wave energy is redirected from the wall and scours the sand away. Replenishment can occur in front of existing walls.

Beach nourishment and vegetative dune stabilisation



The combination of beach nourishment and stabilising dunes using native vegetation is cost effective and provides beach amenity, aesthetic and biodiversity values. This approach can be implemented in front of older seawalls that are reaching their end-of-life.