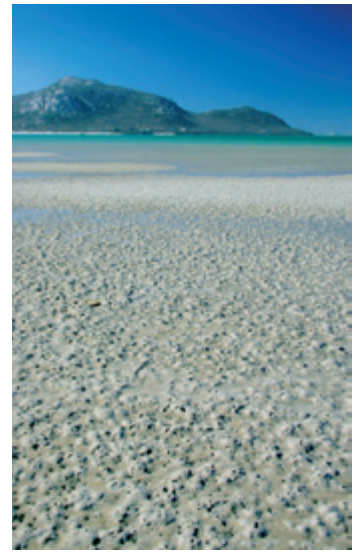
Life in the lagoon

Langebaan Lagoon is dominated by intertidal sand flats exposed at low tide (Fig. 99). From a distance these sands look uninhabited but, seen up close, the surface is often peppered with small holes. These holes are occupied by worms and sand prawns, whose burrowing activities continuously stir the upper 30 cm of sand. Some worms cultivate bacteria that thrive in the oxygenated water pumped through their U-shaped burrows. Algae are also abundant, with tiny diatoms living in the sand accounting for a significant amount of primary production in the lagoon. The burrowing animals filter out bits of organic debris, and turn over the sand frequently enough for the algae to return to the surface and grow by photosynthesis. The burrowing animals' small, round faecal pellets roll about while the ripples, burrow mounds and feeding tracks are wiped clean as the loose sand is reshuffled with the ebb and flow of each tidal cycle.



Eelgrass commonly grows in the transition from sand-bank to saltmarsh. At low tide, the thin green ribbons of eelgrass glisten as they lie upon the muddy sand, aligned by the last outgoing tide (Fig. 100, right). The incoming tide washes the mud and bits of organic matter out of the sand and these are trapped by the thick carpet of saltmarsh plants fringing the sand flats (Fig. 100, left). The salt-loving (halophytic), or at least salt-tolerant, salt marsh plants are arranged along a height gradient from mid to high tide and remain permanently exposed. Small basins, some nearly circular, occur scattered across the saltmarsh. Those filled by lagoon waters evaporate into salt pans encrusted with

Figure 99. Extensive sand flats of Langebaan Lagoon exposed at low tide looking south from Kraalbaai, with several patches of dark saltmarsh in the foreground (above). Abundant burrow mounds made by the sand prawn (lower right).

Extract from Compton, J.S., 2021. *West Coast, A Natural History*, Earthspun Books (johnscompton.com).

Figure 100. Eelgrass exposed at low tide (right) transitions inland to saltmarsh having abundant salt-tolerant stem succulents, such as *Salicornia* (left, foreground). The saltmarsh is fringed by dark rushes (*Juncus*) and cordgrass (*Spartina*), which grade into light-coloured freshwater reeds (*Phragmites*).

red bacteria, while those filled by winter rains support fleshy green algae that dries out into a dark papery mat in summer. Fringing the saltmarsh are clusters of rushes and cordgrass growing above mean high tide. Tall freshwater reeds grow where groundwater flows in river estuaries and where groundwater seeps into Langebaan Lagoon. Langebaan is South Africa's only true lagoon and makes up one-third of all its saltmarsh, but saltmarsh also thrives in river estuaries, including the Diep, Berg and Olifants. Although limited in extent, saltmarsh plays an important role as the nursery ground for many offshore fishes.

All this teeming life attracts birds (Fig. 101). Tens of thousands of migratory birds, including many curlew sandpipers, arrive at Langebaan between September and April before flying 15,000 km to their Siberian Arctic breeding grounds. These birds may be responsible for the unusual widespread presence of *Salicornia* in South African salt marshes, perhaps brought in upon their feet.[9] Besides the food and change of season, the reason birds may fly all that way is to avoid the large number of predators at lower latitudes. How do they navigate such vast distances? One possibility is that they use iron oxide minerals, such as magnetite, as an internal compass to orient themselves in Earth's magnetic field. Homing pigeons have magnetite in their beaks and appear to use it as a miniature compass.[10] We also have small crystals of magnetite located in our brains, but exactly how we make use of them is unclear.

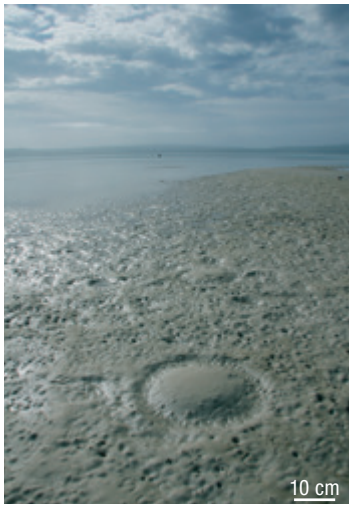


Figure 101. Distinctive circular feeding trough of the flamingo.

Radiocarbon dating indicates that saltmarsh grew soon after the lagoon was most recently flooded by the sea 7500 years ago. However, present-day saltmarsh dates back only to the last 700 years, reflecting just how dynamic saltmarsh is – expanding in some areas while it erodes back in other areas. Examples of saltmarsh in various stages of growth can be seen throughout the lagoon. Because saltmarsh grows within such a narrow range near sea level, even slight

changes in sea level can result in significant shifts in saltmarsh distribution. It is for this reason that the dating of older, fossil saltmarsh deposits, along with fossil shells, can be used to reconstruct how West Coast sea level has varied in the past (Fig. 82).[11]

Along with sea level, life in the lagoon has changed considerably over time. Few of the fossil shellfish that thrived in the lagoon when it last existed 120 thousand years ago are found living there today. And the razor clam (pencil bait) and a pink-shelled oyster – both abundant soon after the lagoon was re-established 7500 years ago – are no longer found in the lagoon (Fig. 102). The pink-shelled oyster (*Ostrea atherstonei*) is named after William G. Atherstone, a surgeon as well as geologist who helped identify the first South African diamond from Hopetown. Together with Andrew G. Bain, he also discovered many fossils in South Africa. Initially, the oyster was thought to be extinct, probably because it went unnoticed, living as scattered individuals on rocky substrates below mean low tide. An oyster shell gravel bed several metres below the surface extends throughout much of the southern lagoon that for a brief period was mined for use as chicken feed and lime from the east side of the lagoon at Oesterval. The demise of the oyster from the lagoon resulted from a drop in sea surface temperatures combined with the smothering of hard calcrete substrates by sand, both of which made it difficult for oyster larvae to survive. A few oysters were reported living near the mouth of Saldanha Bay on concrete barriers, placed there during World War II to block German U-boats from entering the bay, but today the oyster and razor clam mostly live in warmer waters of False Bay and the South Coast. Growing this tasty oyster commercially was explored in the 1950s but was abandoned because it grew too slowly compared to oysters that were imported from elsewhere.

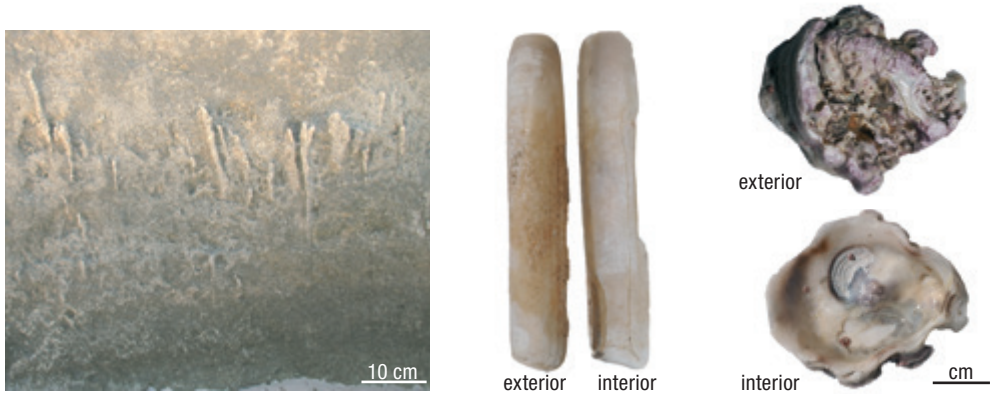


Figure 102. Fossil burrows 120 thousand years old in the Velddrif Formation exposed at Kraalbaai (left). The razor clam (centre) and pink oyster (*Ostrea atherstonei,* right) were once both abundant in the lagoon, but no longer live there today.