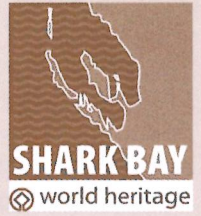


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Shark Bay World Heritage Notes



ENVIRONMENT AND CONSERVATION DISTRICT OFFICE, DENHAM, WESTERN AUSTRALIA

SHELL BEACH

The millions of small white cockle shells which have accumulated on Shell Beach are the bivalve Cardiid Cockle (*Fragum erugatum*). This species is found in relatively low numbers in the coastal waters between Dampier and the Abrolhos Islands in Western Australia.

However, like cyanobacteria, a particular strain of this species has adapted to the harsh hypersaline conditions in Hamelin Pool and L'hardon Bight.

Minute organisms called dinoflagellates live in the gills of the *Fragum* cockles. These are photosynthetic, meaning they produce food from sunlight. They also share this food with their *Fragum* host. This allows the *Fragum* cockles to survive in the nutrient poor waters of Hamelin Pool and L'hardon Bight where other shellfish would starve.

Scientists estimate that *Fragum* shells wash up on the beaches of L'hardon Bight at a rate of 467kg per metre of coastline per year! In Hamelin Pool, the rate is much less, at 64kg of shell per metre of coastline per year.

Cockles of this species from Shark Bay differ from others in their shape and smaller size.

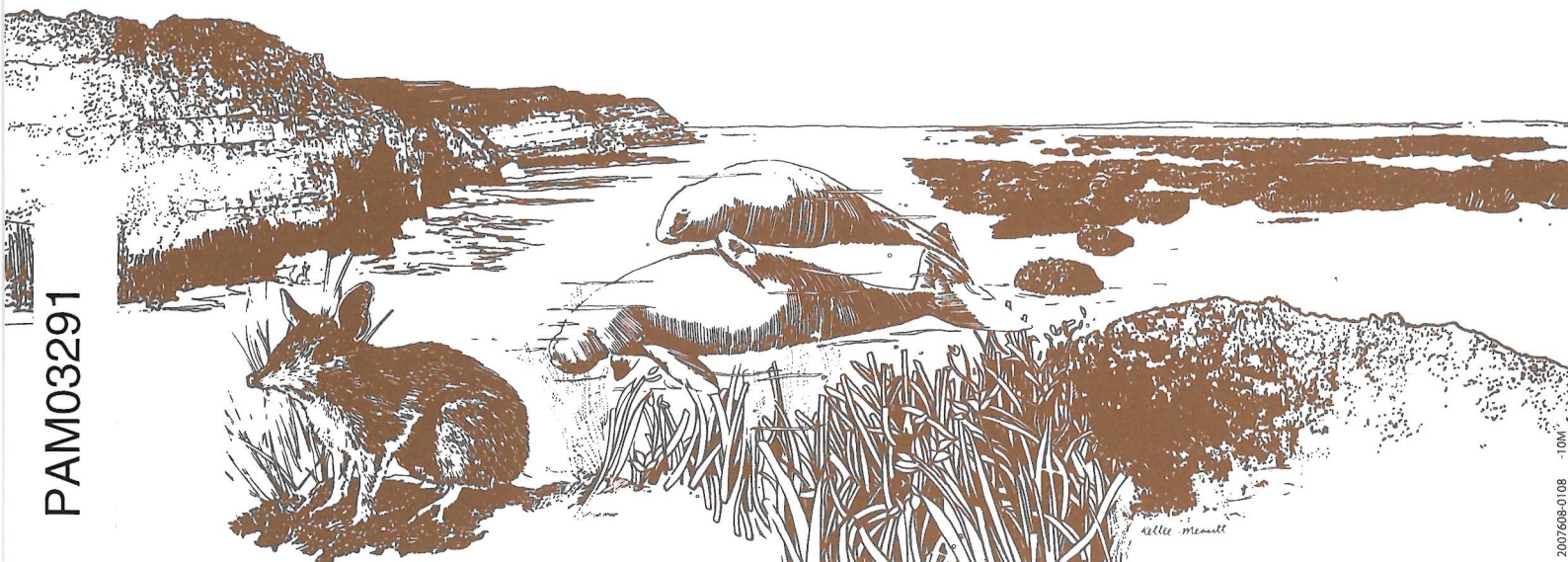
The high water salinity (salt concentration) levels in this area have resulted in the proliferation of this particular species and lead to the accumulation of millions of these tiny shells along the shore of L'hardon Bight and Hamelin Pool.

A combination of the local climate the geomorphology (depth and shape) of the bay, circulation, and the restricted water, has caused the increase in salinity.

The winds and high temperatures at Shark Bay cause the water to evaporate at very high levels. L'hardon Bight has only two deep water channels that bisect the seagrass sandbank. This has resulted in a low water exchange rate because the tides are unable to completely flush the large shallow bay, and this has therefore lead to a high salt concentration.

Unlike many other species, the Cardiid Cockle is particularly tolerant to increased salinity. It's predators, such as the shell drilling gastropods, do not cope well in this environment. The small white shells live untroubled in their millions in scattered areas of the two shallow bays.

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Occasionally storms cause the banks of sediments from the floor of the Bay to be deposited on the shoreline.

The strong winds blow away the sediment and sand and leave extensive deposits of the shell, which are most abundant at Shell Beach.

It is thought that this cockle was first deposited here about 4000 years ago. Over the years the shell deposits have cemented to form soft coquina limestone. Rainwater repeatedly dissolves small quantities of calcium carbonate of which the shells are composed.

As the water evaporates, the calcium carbonate is precipitated as calcite crystals, which bind the shells together.

In the past, coquina limestone blocks have been used to build some of Shark Bay's old buildings. These blocks have very good insulations characteristics.

A coquinite quarry can be visited at Hamelin Pool, adjacent to the historic Telegraph Station.