PEEL-HARVEY

The Decline and Rescue of an Ecosystem

Excerpt from book by Keith Bradby
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An Estuary Forms

Chapter 1, 'Shifting Sands and Serpent Streams: Evolutionary forces before European settlement', pp. 10-12.

Estuaries are places, within the coastline, where fresh river water mixes with salt water before finally reaching the sea. They take on a variety of shapes and sizes. The Peel-Harvey is broad and consists of two shallow lagoons, the tidal reaches of three rivers, and a narrow channel to the sea.

Today's estuaries have had a short life. They formed only 6-8,000 years ago, when the rising sea flooded them, and most are now slowly filling with sand and silt from rivers and the sea.

The sea-level 18,000 years ago was about 130 metres lower than it is today. Peel Inlet was a shallow valley across which the Murray River flowed to a channel carved through the sand dunes near Halls Head, then on across a wide coastal plain to the sea. Harvey Estuary was a long valley between the dunes, through which river water flowed to join the Murray. Over the next 12,000 years, the sea-level rose rapidly (in geological time), until sea water had flooded the valleys. The sea-level was then 1-2 metres above its present level and water was spread out over low-lying land and up the rivers, making the estuary even larger than now.

At first, it would have been 7-8 metres deep, but a combination of the small drop in sea-level about 4,000 years ago and the build-up of silt has caused the water to shallow to no more than two metres. Immense amounts of sediment have been deposited in it: sand and silt carried in by the rivers and by the daily influx of sea water, as well as sands blown in from dunes flanking the estuary. All this has combined with decomposing organic matter from plants and animals.

These bottom sediments have left us a record of changes to the environment since the estuary was flooded. The deeper sediments are rich in shells of marine species of cockles and other molluscs, and radiocarbon dating has shown them to be 4,200-7,000 years old. This is evidence that Peel Inlet was once a bay where marine animals flourished in sea water, just as they do today at Oyster Harbour on the south coast. Cockle shells from this time still wash up in great numbers on the beaches of Peel Inlet. In the upper sediment, material deposited in the last 4,000 years, there are only the shells of the few 'estuarine' species of mollusc that still live in the Peel-Harvey.

The change from a marine embayment to a shallow estuary dominated by a seasonal change from fresh water to salt water was largely caused by the 2metre drop in sea-level.

The sea-level drop greatly decreased tidal exchange between the estuary and the sea. When the estuary first formed, the entrance channel was wide at both ends and at least 12 metres deep. Sea water flowed freely in and out with the tides, and the fresher river water had little effect on the water of the estuary.

Sand washing into the channel with the tides was another factor that restricted water flow. The sand shallowed the channel, and flood tides dropped sand where the channel met the open water of Peel Inlet. There it built a large delta, almost four km across. The slight drop in sea-level of 4,000 years ago stranded much of this delta at water-level, forming the Creery wetlands on the east shore. It also left a shallow sill where the channel opened into Peel Inlet.'

Chronology

Around 18 000 years ago, during the last glacial period, the sea level was about 130 metres lower than it is today and the Swan Coastal Plain extended west to more than three times its present width.

By 6 000-8 000 years ago, melting ice sheets had raised the sea-level again, shifting the coastline to its present position and creating the Peel-Harvey estuary. About 4 000 years ago a 1-2 metre drop in the sea-level determined the size and shape of the current estuary.

And so the estuary sat for the next 4,000 years, with the bar at the entrance being open during winters of heavy rainfall. Periodically the sandy bar would be broken by digging a channel but it was only when in 1993 when the ocean streamed through the Dawesville Channel and salt water and strong tides again dominated the Peel-Harvey. *Photos courtesy of Mandurah Community Museum.*