THE DERWENT ESTUARY AND D'ENTRECASTEAUX CHANNEL – A SHORT GEOLOGICAL HISTORY

The Derwent Valley and the D'Entrecasteaux Channel are very similar features. They started forming around 50 to 70 million years ago in Tertiary times with the final breakup of the Gondwanan Supercontinent, when the worlds continents where evolving into the configuration they have today, just after the extinction of the (non-avian) dinosaurs.

The Derwent has not always been an estuary and the D'Entrecasteaux Channel was once a broad river system. Their common feature is that they are the flooded parts of more extensive valley systems which stretch from Storm Bay up towards Mount Field National Park and sub-alpine Lake St Clair. The Derwent rises from the southern end of Lake St Clair which is 160 m deep, approximately 200 km from the coast at an altitude of about 700 m. The headwaters are on Cephissus Creek which flows out of an alpine bog at 1400 m near Mount Geryon and then joins the Narcissus River flowing into the northern end Lake St Clair.

The valley foundations of the Derwent and the D'Entrecasteaux is a long and fairly narrow geological feature, the Derwent Graben (amalgamation of down faulted blocks – valleys surrounded by up faulted blocks - the higher hills and mountains - similar to a rift valley). It developed in association with many other Tasmanian grabens (for example the Midlands, Tamar, Coal River Basin, Macquarie Harbour, Bass Strait and Oyster Bay) at the time of the final break up of Gondwana, or more accurately after Australia broke away from the Antarctic continent.

All of these structural features are indicative of the tremendous stresses which occurred in the earth's crust during break up. They provided the valley systems and lowlands in which the Derwent and the Huon River and their tributaries could subsequently develop. It also provided the low ground towards the coast which could be flooded when sea levels rose in the Derwent Estuary and D'Entrecasteaux Channel.

The gross form of the Derwent Graben was probably well developed by about 40 to 50 million years ago. The proto Derwent River occupied this broad valley system with active erosion and large quantities of sediment provided by tributaries eroding highland areas. Over the last 30 to 40 million years water erosion through fluvial action (rivers and creeks etc.) and deposition has been the most significant landforming process in Tasmania. Tertiary sediments up to 600 m deep occur in parts of the Derwent Estuary, some below current sea level. The Tertiary was a wetter and more humid period and it is quite likely that erosive processes associated with water were more actively occurring than at present.

Part of Great Bay, Bruny Island and the D'Entrecasteaux Channel which would have been drained during four or five glaciations over the last two million years.

Over the last 2 million years as a result of various glaciations and resultant sea level fluctuations the Derwent Estuary and D'Entrecasteaux Channel have been drained on four or five occasions. The channel and the estuary would have developed into a series of valley systems with water ways meandering across them when the ice caps and glaciers formed. Glacial meltwaters could have flowed down the Derwent and the Huon sporadically carrying larger and coarser sediment loads to be deposited in the alluvial plains, creating river terraces and perhaps wide but shallow braided river systems, similar to those in New Zealand today.

During the last glaciation it is estimated that sea levels dropped about 120 m exposing the Channel and the Derwent flowing across broad plains and into the ocean south of Storm Bay between south Bruny Island and the Tasman Peninsula. The Huon River entered the ocean about 25 km south of Cape Bruny to the west of the Derwent.

In the channel area lower sea levels would have exposed broad lowlands between Bruny Island and the Tasmanian mainland. It is possible that a topographic high just west of Isthmus Bay on Bruny Island may have been a drainage divide with creeks and rivers south of the divide flowing into the Huon and those to the north into the Derwent River through the narrows between Tinderbox and Dennes Point. If the topographic high is a recent sandy deposit then the North West Bay River may have flowed out past Great Bay to the ocean via a gap where the Bruny Isthmus is today. A 30 m deep closed depression off Apollo and Barnes Bay which is over 30 m deep may be a partially infilled palaeochannel, which could have formed a system of lakes during the last glaciation.

In its lowest reach's the Derwent could have had levee bank/backswamp landforms which formed in response to large seasonal flows and high sediment loads. Grassy savannah and open forest may have covered the undulating plains similar perhaps to the Midlands before clearance. Dune barred lakes and swamps are likely to have occurred close to the coast.

As sea levels rose following the end of the last glaciation around 10 000 years ago flooding of the broad plains would have commenced and sandy coastal landforms would have been eroded

and reworked as coastal processes such as rising sea levels, winds and tides redistributed and pushed some of the sand landward.

Dune barred wetlands on Bruny Island. Similar wetlands may have formed around the Storm Bay coastal areas prior to and during sea level rise.

Around 6000 years ago sea level rise stopped at about the current level (disregarding climate change induced sea level rise) and sandy coastal landforms and dune barred lakes started forming again while on harder (rock) coasts shore platforms, sea cliffs, sea stacks, sea caves, blowholes, gulches and rock arches would have started forming again as well.

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