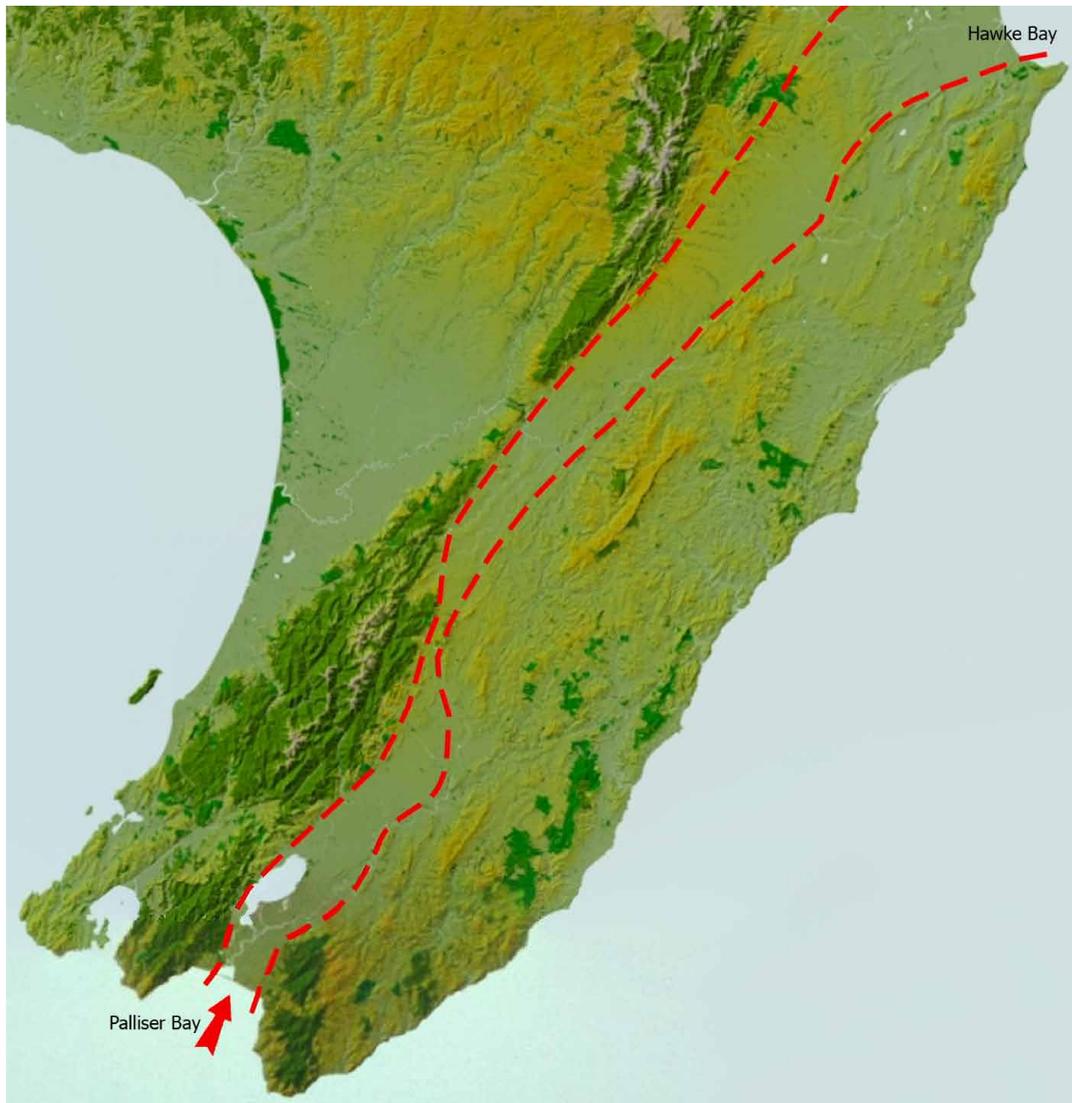


A LAND BETWEEN

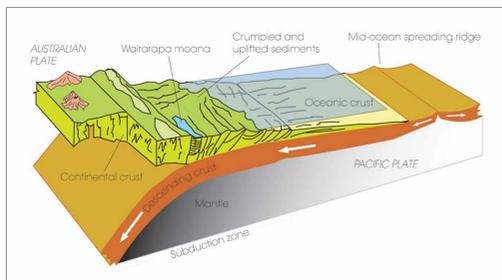
Geology of Wairarapa Moana



A great depression in the earth's surface stretches north from Palliser Bay to Hawke Bay

A Convergence of Plates

Lake Wairarapa exists because of the convergence of two of the earth's great crustal plates. This creates a pattern of parallel ridges and depressions on land and under the sea, imparting a 'grain' to the whole eastern North Island. The Wairarapa Valley is part of an immense depression that stretches from Palliser Bay to Hawke Bay, interrupted only at Mt Bruce. Lakes Wairarapa and Onoke lie in the lower valley between two ridges, the Aorangi and Remutaka Ranges.



This east to west cross-section through the central part of the North Island illustrates how the Pacific Plate descends beneath the Australian Plate. Acting rather like a bulldozer's blade the sediments on top of the Pacific Plate are scraped off and crumpled, forming the hills of the Wairarapa and Hawke Bay

The Wairarapa Valley depression

The depression is filled with an enormous amount of sand, silt and gravel eroded from the mountains and deposited by rivers. Like the flat surface of water in a bath, sediment deposited by water makes a flat or nearly flat plain. However, our Wairarapa Valley is one of the most tectonically mobile places on earth, so in places its floor is already being squeezed into folds.

Lakes Wairarapa and Onoke are parts of the depression not yet filled but are the shallow, shrinking remains of a lake that was much larger.

Separating the depression from the Remutaka Range to the west is the great Wairarapa Fault. This last moved on 23 February 1855, in one of the largest known earthquakes on the planet; a colossal release of energy that moved hundreds of cubic kilometres of rock in a few seconds.

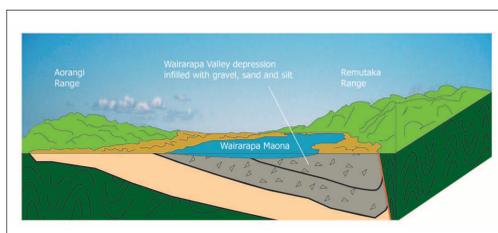


Wairarapa Moana and the Wairarapa Fault. Photograph GWRC



Wairarapa Moana, Remutaka Range and the Wairarapa Fault.

The solid rock floor of the depression is deeply buried under the gravel and other sediments that form the plain. A gravity survey in the 1970s showed that these are about two kilometres deep under the lake and 3.2 kilometres under Featherston. The surface sediments are all river or lake deposits but deeper layers are likely to be of marine origin because the valley has previously been open to the sea.



Simplified cross-section east to west showing the gravels and other sediments eroded from the Remutaka and Tararua Ranges and now forming the Wairarapa Valley plain.

An arm of the sea

Wairarapa Valley was previously an arm of the sea. Onoko Spit is formed by storm waves that sweep gravel off the shallow bottom of Palliser Bay and heap it up, cutting off Lake Onoko from the sea. The Spit is a storm beach that traps a lagoon (Lake Onoko) behind it. The Ruamahanga River has filled in the area between Lakes Wairarapa and Onoko with silt, making two lakes instead of one.



Photograph GWRC



Lake Onoko and the mouth of the Ruamahanga can be seen in the foreground. Lake Wairarapa is in the background

The Ruamahanga River and Lake Wairarapa

Although the Ruamahanga River is the main drainage of the Wairarapa Valley, it enters the lake well to the south. Te Maire Ridge (one of those pushed up by the squeezing crustal plates) has risen in the Ruamahanga's path. This diverts the river eastward towards Martinborough, so its entry to the lake now lies south of Kahutara – or did until the Wairarapa Catchment Board changed it again in the 1960s. The former course of the Ruamahanga River can be seen as a ribbon of low, swampy ground beside the Greytown-Martinborough road near Morison's Bush.



Te Maire Ridge on the road between Greytown and Martinborough. This low, swampy area beside the highway was once the bed of the Ruamahanga River. Photograph John Rhodes

From shallow to shallower

While the mountains on both sides of Wairarapa Moana are rising, the lake bed is too, but more slowly. The result is a great bending of the earth's crust. Looking south from Western Lake Road, the far skyline near Lake Ferry is warped into a broad, open 'U' like a saucer in cross-section. In the coming millennia this 'saucer' will continue to bend and rise, making Lake Wairarapa even shallower.



Photograph John Rhodes

Text by John Rhodes