

GINS LEAP GAP HYDROGEOLOGICAL WONDER: UPPER NAMOI VALLEY, NSW, AUSTRALIA

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Coming to Gunnedah as a young Soil Conservationist in the early seventies, I became fascinated with The Gap. I soon realised that surface water, at this narrow point in the valley, became dammed-up in flood times. There had been three floods by 1976 and I soon developed a passion to learn more about the hydrogeology of this place they call The Gap.

The Gins Leap Gap is located approximately 9 Km north of Boggabri on the Kamilaroi Highway in New South Wales. The major tributaries of the Namoi River, including Cox's Creek, the Mooki, Peel, Cockburn, Manilla and McDonald rivers all flow through The Gap as well as the groundwater associated with the unconsolidated sediments of the alluvial aquifer. The Gap also forms the major constriction in the Upper Namoi Valley and represents the northern extent of the Liverpool Plains (Plate 1).

Recent hydrogeological investigations at The Gap demonstrate how geological controls, such as faulting, fracturing and volcanic events, can constrict the alluvial aquifer and limit groundwater flow. A better understanding of major constrictions in hidden valleys is strategically important to measure and monitor groundwater. The Namoi CMA Gins Leap Gap Project revealed some surprises and geological problems that make me wonder at the features of the underground landscape.

I marvel that so many geological controls of the bedrock topography exist in this one place. I often wonder about its geological history and stories the rocks could tell. Imagine: The Boggabri Thrust Fault predetermining the path of the Namoi River or even perhaps an earlier valley glacier. The paleochannel sides are very steep and the two ridges may have been pushed up as the valley glacier terminated at this point. This is could well be the toe of a Tertiary glacier.

Dr David Allen of Groundwater Imaging produced an image using Google Earth Professional (see Plate2). The polished rock on the eastern side looks like a glacial rock as if the rock face has been sheared off. Erratics, each side of The Gap were found where rocks appear to have been carried along and dumped. These boulder rocks or drop stones are Permian conglomerates and are strikingly different to the volcanic bedrock ridges suggesting a glacial origin.

The longitudinal profile of the valley bedrock topography also suggests a stepping down feature along its length typical of a valley glacier. The infilling in later Tertiary times provided large boulders and cobbles from a high energy, fluvial environment. A Drillers nightmare! Jurassic and Tertiary intrusions also complicate the picture; however the geophysical survey discovered an inferred lava flow (see Plate 3). Drilling control confirmed this. Notice that the lava flows over the earlier alluvial sediments post dating them. This is a recent lava flow, geologically speaking, and caused further damming of the Namoi River. The lava flow may have originated from the Mount Kaputar volcano.

Think about it! Depth to bedrock is only 27meters to 37 meters below ground level on the western side and 98 meters in a gorge to the east where the lava flow has been eroded by the Namoi River. The Gap with its geological history is an integral part of the formation of the Liverpool Plains and explains why the fertile black soils overly alluvial sediments containing precious groundwater. The underground dam is 160 metres deep in places.

The early explorers searched for an inland sea but couldn't find one. Ironically, the sea was just beneath their feet in the form of a hidden valley containing huge quantities of precious groundwater. It was covered by some of the best Black Earth soils in the world. There may be other scenarios of geological history than the one which I have proposed; however, the features of the underground landscape at The Gap certainly make you wonder. This area is unique.



Plate 1: Sunlight on The Gap. Photo credit Ken Crawford 2008

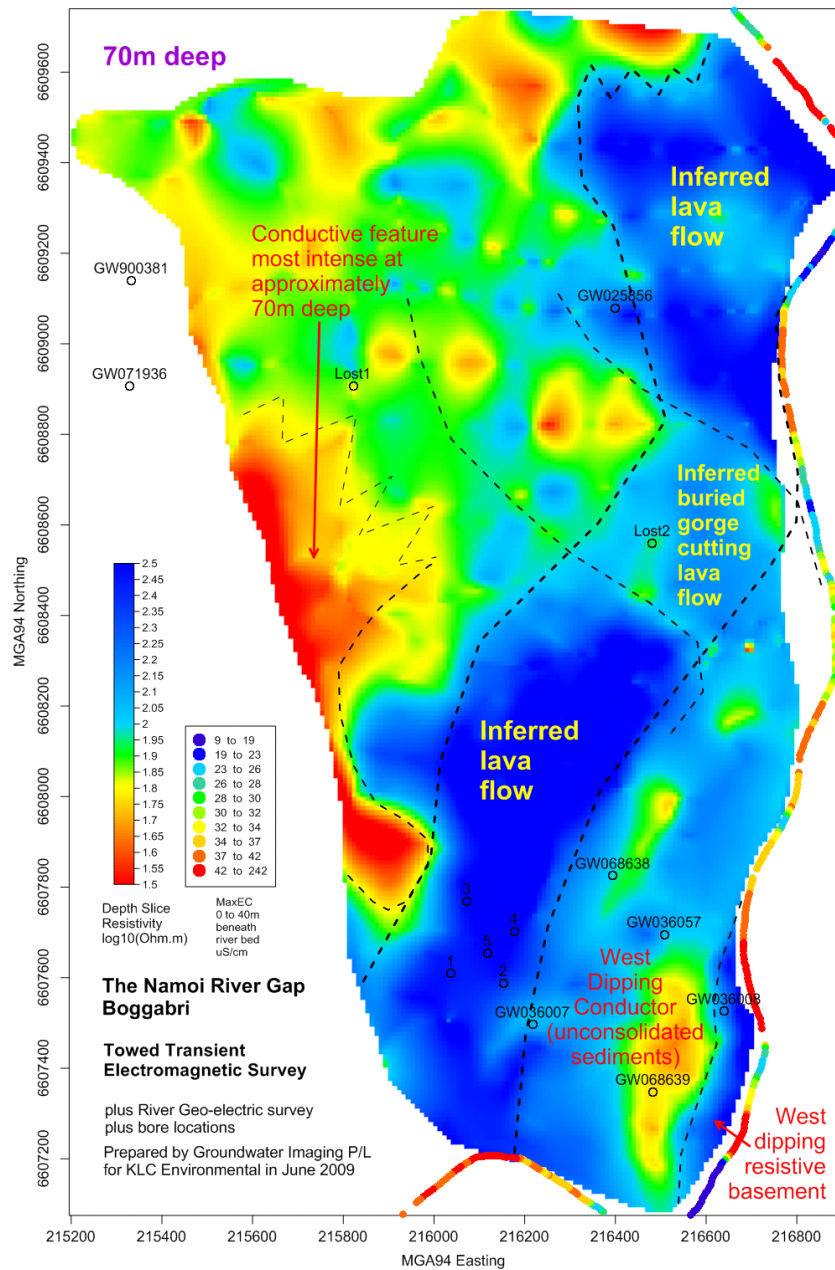


Plate 3: Towed Transient Electromagnetic Survey 70 m depth slice plus Namoi River Geo-electric survey
Bore locations are included and interpretation by Groundwater Imaging Pty Ltd. Image credit: David Allen
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