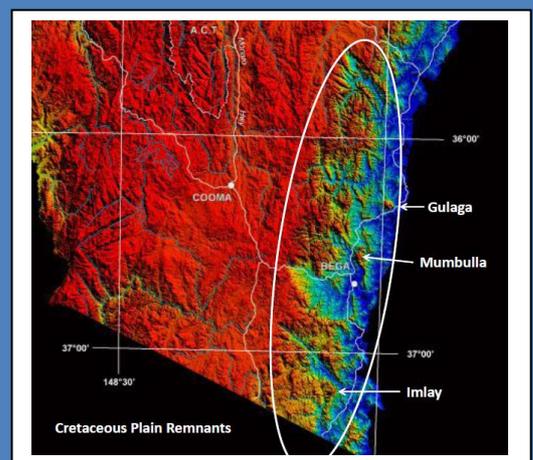


A journey through the earth history of Australia's Coastal Wilderness

Part 3 The backdrop - a 70 million year old plain



Monaro Plain



Cretaceous Plain Remnants

3. The Cretaceous Plain

The western horizon behind Moruya is dominated by darkly forested, rugged mountains rising to 900 metres or more above the gentle hills and river flats of the coastal zone. They are part of Australia's eastern escarpment where the land surface rapidly changes its elevation. The eastern escarpment extends for over 3000 km crossing many geological boundaries. The escarpment formed by erosion during the Cretaceous and Tertiary periods, from 35 to 65 million years ago (Mya), following the opening of the Tasman Sea.

The forests clothing the escarpment west of Moruya are part of the Deua National Park, and extend along the escarpment to the south as Wadbilliga National Park.



Escarpment at dawn – from Moruya River flats

Still further south, the escarpment extends through the South East Forest National Park to beyond the Victorian border as Cooperambra National Park.

The ruggedness of the escarpment is created by steep gorges cutting into a comparatively flat landscape to the west. The flat landscape of the hinterland is a key part of our landscape story, the Cretaceous Plain.

This flat far horizon behind the steep escarpment is a common feature of the region's backdrop. It is readily seen from the Cobargo-Bermagui Road, and beyond the head of the Bega Valley when viewed from the Princes Highway south of Bega. It is possible to see snow-capped ridges in winter on one side and the sea on the other.



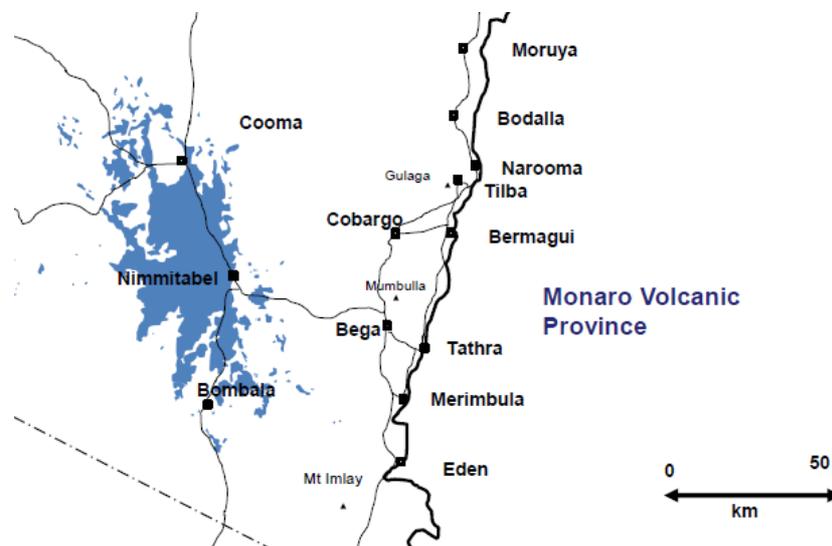
Bermagui – Cobargo Road

Beyond the escarpment to the west are the Monaro Tablelands, a rolling landscape generally at about 1000 metres in altitude. Much of this tableland consists of basalt lava flows of the Monaro Volcanic Province, which covers an area of 4200 square

kilometres. More than 630 cubic kilometres of lava poured over a generally flat landscape from some 65 eruption sites during the Tertiary period, around 58 to 34 Mya. The extent and timing of the basalt eruptions makes the region a world class volcanic province.



Monaro lava plains

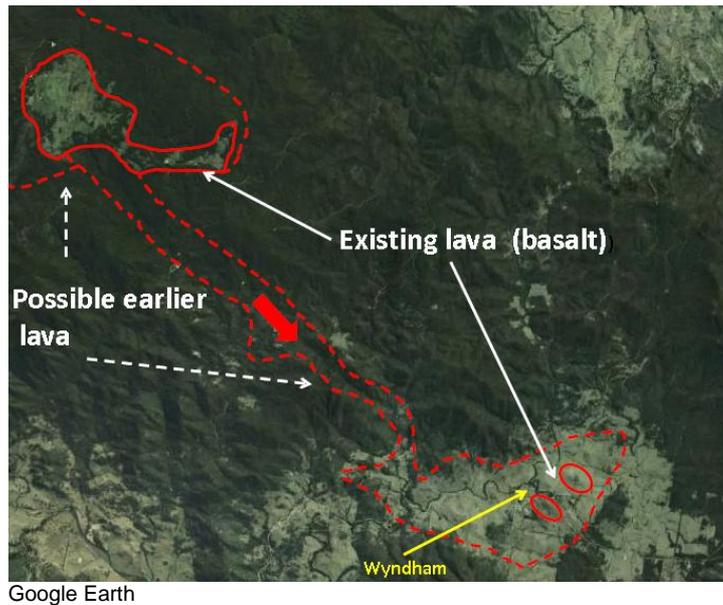


The Monaro Volcanic Province is marked in blue on the map above. It is clear from the distribution of outliers of basalt, indicated by the scattered, patchy margin, that the province once covered a much larger area.

The geological cause of these eruptions has yet to be clearly established, but their composition and the presence of inclusions of materials derived from the earth's mantle, deep below the crust, points to an origin in the mantle. The lavas have been described as 'Hawaii type', originating from a hot spot, like the Hawaiian Islands. However, the basalts of the Monaro Volcanic Province erupted through a thick continental crust, not thin oceanic crust. The thick insulating crust could have allowed excessive heat to accumulate in the mantle. Partial melting of the mantle generated basalt that rose to the surface through weak parts of the crust.

Flow upon flow filled river valleys and spread across an ancient landscape that was already well weathered and long established. By the time of the basalt outpourings, this landscape had sat at the surface for many millions of years, with the only major erosion taking place along the eastern escarpment. Indeed, basalts flowing along ancient river valleys have poured over the edges of the escarpment in some places, forming frozen rock waterfalls. The flows also buried river gravels. Lake muds and fossil wood from ancient forests are also found beneath the lava flows.

The only evidence today of this flow over the escarpment is at Wyndham, about 30 km inland from Pambula.

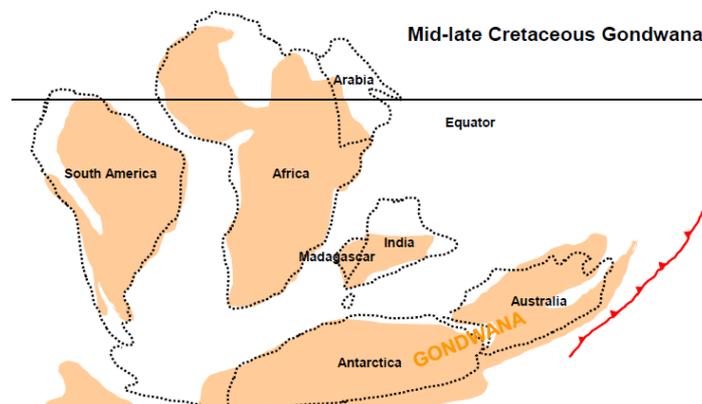


It is probable that flows similarly extended down the nearby Towamba River, Tantawangalo Creek and maybe the upper Tuross River.

Why is this volcanic province relevant to our coastal journey? Age dating of the oldest lava flows puts a minimum age of the old land surface at 58 million years, which is astonishingly old for a landscape in world terms. Australia has been stable for a long period of time, and indeed, some of the world's oldest landscapes are found in Central Australia.

Travelling across the treeless, grass-covered lava field landscape on the Snowy Mountains Highway, the flat-lying lava flows can be seen forming stepped hills. The low sun angle in the late afternoon emphasises the lava field features. Closer views are seen in road cuttings where the fractured and weathered basalt is surrounded by characteristically red-brown soil. This beautiful and interesting area is well worth exploring, perhaps visiting the *Platypus Country* of Bombala and continuing on to the Australian Alps or Canberra via this route.

Now let us turn the clock back 100 million years to the mid-Cretaceous period.



Our region was some 400 km inland from the Gondwanan Coast, being part of the Gondwana supercontinent attached to today's Antarctica. The landforms were

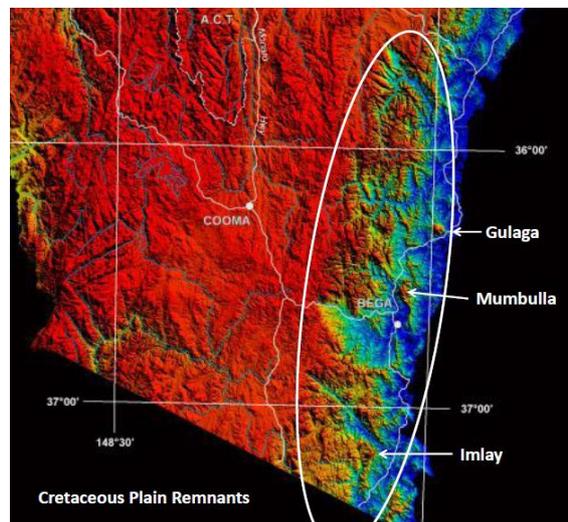
similar to the rolling hills characteristic of inland NSW today. The altitude was 1000 to 1500 metres, the latitude was polar, around 75° south and the climate wet and cool, supporting forests of ferns, mosses, cycads and araucaria pine. Many of their relatives exist today in the wet gullies of the south east forests and in eastern Australia's magnificent World Heritage Listed rainforests.

The animal life was dramatically dinosaurian. The forests contained a suite of polar dinosaurs of varying size, docility and ferocity. We will return to the Cretaceous Plain later in the journey when talking about the formation of the Tasman Sea and today's coastline.



Australian dinosaurs

As described in part 7 of this geoheritage journey the Cretaceous Plain collapsed as the crust thinned and ruptured to form today's continental shelf. It was like taking away the legs of one side of a table. The Plain remains on the escarpment (and inland) and the old plain surface extended to the coast line with an even downhill slope of about 1°. Since the collapse the forces of erosion have cut deeply into this plain surface, forming the rugged hinterland. Notwithstanding this rugged terrain there is a steadily decreasing surface of the plain remnants that remain as mountain peaks and hilltops.



DPI NSW

Evidence of the topography of this landscape has long since eroded away however many of our mountain tops in the region stood above this ancient plain. Gulaga, Mumbulla, Mt Imlay and the peaks within Wadbilliga National Park are all 2-300 metres above the plain's estimated surface level. Erosion has also worn down these peaks so these areas and their companion surrounds could have some 450 metres above the plain, creating a rolling hilly landscape rather than actual flat plain.

