

SECTION THREE: THE LAND RESOURCES OF BRUNETTE DOWNS STATION

A. GEOLOGY AND GEOMORPHOLOGY

Geology

Brunette Downs Station lies on the Brunette Downs 1:250,000 geological map sheet (Randal, 1966a) and the northern part of the Alroys Downs 1:250,000 map sheet (Randal, 1966b).

The geology of the area consists of poorly exposed rocks of the central-northern Georgina Basin, a large Neoproterozoic-Palaeozoic intracratonic Basin. Minor outcrops of Palaeogene-Neogene limestone (Brunette Limestone) are remnants of a thin but once fairly extensive basin.

During the middle Cambrian thin carbonate sediments formed in the shallow northern part of the Georgina Basin, which was rapidly filled in this area. Folding of these rocks during the Carboniferous had only a minor effect in this region of the Basin and consequently little topography formed.

Palaegene-Neogene calcareous rocks are known by several different names across the Tableland in both the NT and Queensland (Brunette Limestone, Austral Downs Limestone). Scattered exposures of these rocks can be traced well into Queensland and are contiguous with the famous fossil-rich Riversleigh beds.

During the latter part part of the Tertiary the already subdued landscape was further peneplained and both detrital and in-situ lateritic sheets blanketed the whole area. In recent times stripping of this surface has led to the development of the extensive cracking clay plains that characterise the region.

Geomorphology

The entire Barkly Tableland is characterised by low relief, however three main geomorphic subdivisions can be recognised on Brunette Downs- erosional plains, cracking clay plains (downs), lakes and swamps.

The erosional plains are remnants of the Tertiary lateritic plain that once covered the entire area. Weak rejuvenation of this landscape has initiated a cycle of slow stripping of this surface.

The cracking clay plains characterise the Barkly Tableland, and have developed from weak incision and erosion of the plains described above. This has included transformation to a domination of swelling clays in the soil profile as well as more typical erosion. Formerly these plains have been described as consisting of Tertiary swamp deposits (Christian *et al*, 1951), but this interpretation seems unlikely- they lack organic material and contain many small remnants of the lateritic plains.

The lakes and associated swamps are the sump for the internal drainage system of the Barkly Tableland, and are fed by rivers and large creeks. During exceptional wet seasons these lakes are filled and hold surface water for long periods. The lake shores are therefore dynamic and move considerable distances dependant on rainfall.