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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT,
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1956/33.

PHOTO-INTERPRETATION OF THE URAPUNGA, MT. YOUNG,
BAUHINIA DOWNS AND HODGSON DOWNS SHEETS OF THE
ARMY 4-MILE SERIES, NORTHERN TERRITORY.

by

E.J. Malone.

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INTRODUCTION

This report is based on the photo-interpretation of the Urupunga, Mt. Young, Bauhinia Downs, and portion of Hodgson Downs sheets of the Army 4-mile series, and on ground observations made by geologists of Mt. Isa Mines Ltd. in the Mt. Young and Bauhinia Downs areas in 1955. The object of this work was to trace the units recognised by the Mt. Isa Mines geologists northwest onto the Urupunga sheet, and then to correlate them with other units recognised in the Urupunga and adjacent areas. The author photo-interpreted the above 4-mile sheets in collaboration with Mr. Lindsay McAlister, of Mt. Isa Mines geological staff. The results are presented as four coloured plates appended to this report.

TENTATIVE NOMENCLATURE AND CORRELATION

The area of the Mt. Isa Mines survey included part of Bauhinia Downs sheet, between the McArthur River and the Limmen Bight River, and part of the Mt. Young sheet, along the Limmen Bight River (see plates 3,4.) The rocks observed in this area are considered to be Upper Proterozoic in age.

McAlister has divided them into six units of possible formation rank, namely the Castle, Borroloola, Three Knobs, Bauhinia, McArthur and Tawallah formations. The Castle is the youngest unit of the succession. Photo-interpretation and ground observations indicate that the five younger units are conformable. The relationship of the Tawallah formation to the overlying beds is less obvious as its outcrop boundaries are commonly faulted.

The Castle formation can be traced into the Roper River area near "Urupunga" homestead. The Borroloola, Three Knobs, Bauhinia and, possibly, McArthur formations can also be recognised in this area.

Geologists of Broken Hill Proprietary Ltd. have mapped part of the Urupunga 4 mile area. They recognise the same general succession as McAlister, but refer to only two units, namely the Roper Beds and the Urupunga Beds.

The correlation between these different nomenclatures is given in Table 1 below.

TABLE 1

CORRELATION BETWEEN MT. ISA AND B.H.P. NOMENCLATURES,
URAPUNGA HOMESTEAD AREA.

<u>Mt. Isa Mines</u>	<u>Broken Hill Proprietary</u>
Castle Formation	Roper Beds
Borroloola Formation	
Three Knobs Formation	Urupunga Beds
Bauhinia Formation	
McArthur Formation	

Broken Hill Proprietary geologists have recognised three

other units in the Urapunga 4-mile area. These are the St. Vidgeon, McMinn and Moroke Beds which they consider to conformably overlie the Roper Beds. The Moroke Beds may be equivalent to the upper part of the McMinn Beds.

The Castle and Borroloola formations have been traced by photo-interpretation north from the Roper River into the area of outcrop of the Mainoru Shale. This unit was tentatively named by Opik (1952) and is considered by the Broken Hill Proprietary (1954) to be the same unit as the Showell Creek Shale of the Bulman Group. Thus, the Bulman group is probably the equivalent, in part at least, of the sequence in the McArthur River area.

The Moroke Beds extend northwest from the Roper River to the Chambers River area. The Castle formation has also been traced in a westerly direction to the Chambers River area. Here, Bureau of Mineral Resources geologists have referred to the succession as the Chambers River Beds. These are the upper part of the sequence in the Urapunga 4-mile area.

North of Beswick station the Chambers River Beds unconformably overlie the Katherine River Group. South of Beswick station they unconformably underlie the rocks of the Middle Cambrian Daly River Group. They therefore occupy approximately the same stratigraphic position as the sediments of the Tolmer Group (Plate 6). Both sequences contain Collenia bioherms and in neither sequence have Cambrian fossils been recognised.

Table 2 summarises the tentative nomenclature and the lithology of the various units noted in this report. The correlation of these units is presented in Table 3.

MINERALIZATION

Lead-zinc mineralization has been known for several years in the limestones of the Bulman area and in what are now known to be rocks of the same unit in the McArthur River area. In both places the known mineralization is confined to silicified limestone, limestone, dolomite and Collenia bioherms. This suggests the existence of a local stratigraphic control of mineralization, and, on this hypothesis, the McArthur formation is being prospected by Mt. Isa Mines Ltd. This company was successful in discovering a new deposit of "promising" dimensions and grade, west of Bald Hills on Bauhinia Downs four mile area. The deposit is being tested.

Sedimentary iron ore deposits have been located by geologists of Broken Hill Pty. Ltd. in the McMinn Beds. New areas of outcrop of the McMinn Beds are being sought and prospected for iron ore deposits by that company.

CONCLUSION

The Chambers River Beds, the Bulman Group and the beds in the McArthur River area are all part of the same sedimentary sequence. The complete section, however, is not present in every locality. The sequence may be correlated with the Tolmer Group of the Katherine Darwin Region, and is, therefore, uppermost Upper Proterozoic (sub-Cambrian) in age.

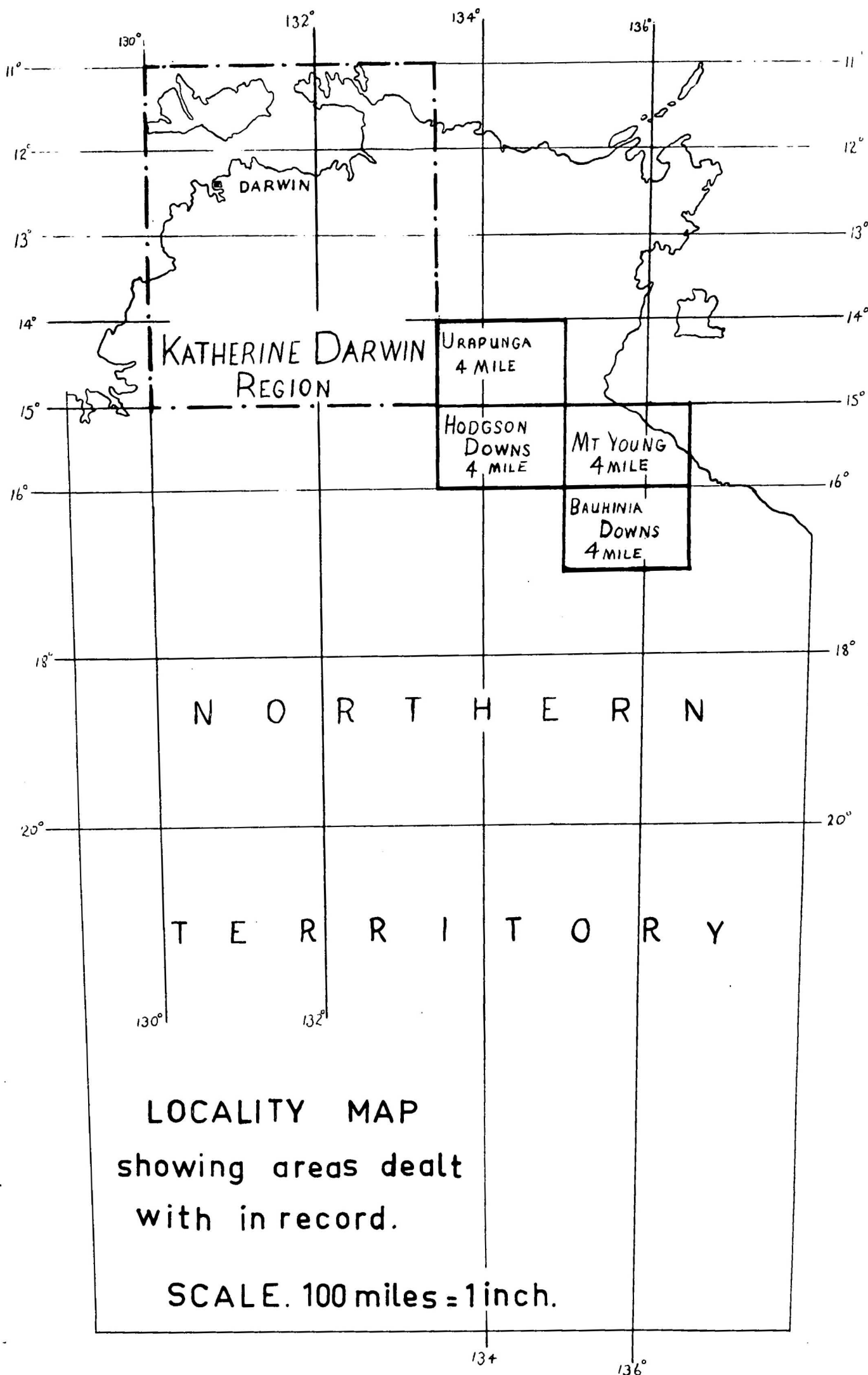
TABLE 2

LITHOLOGY OF UPPER PROTEROZOIC UNITS

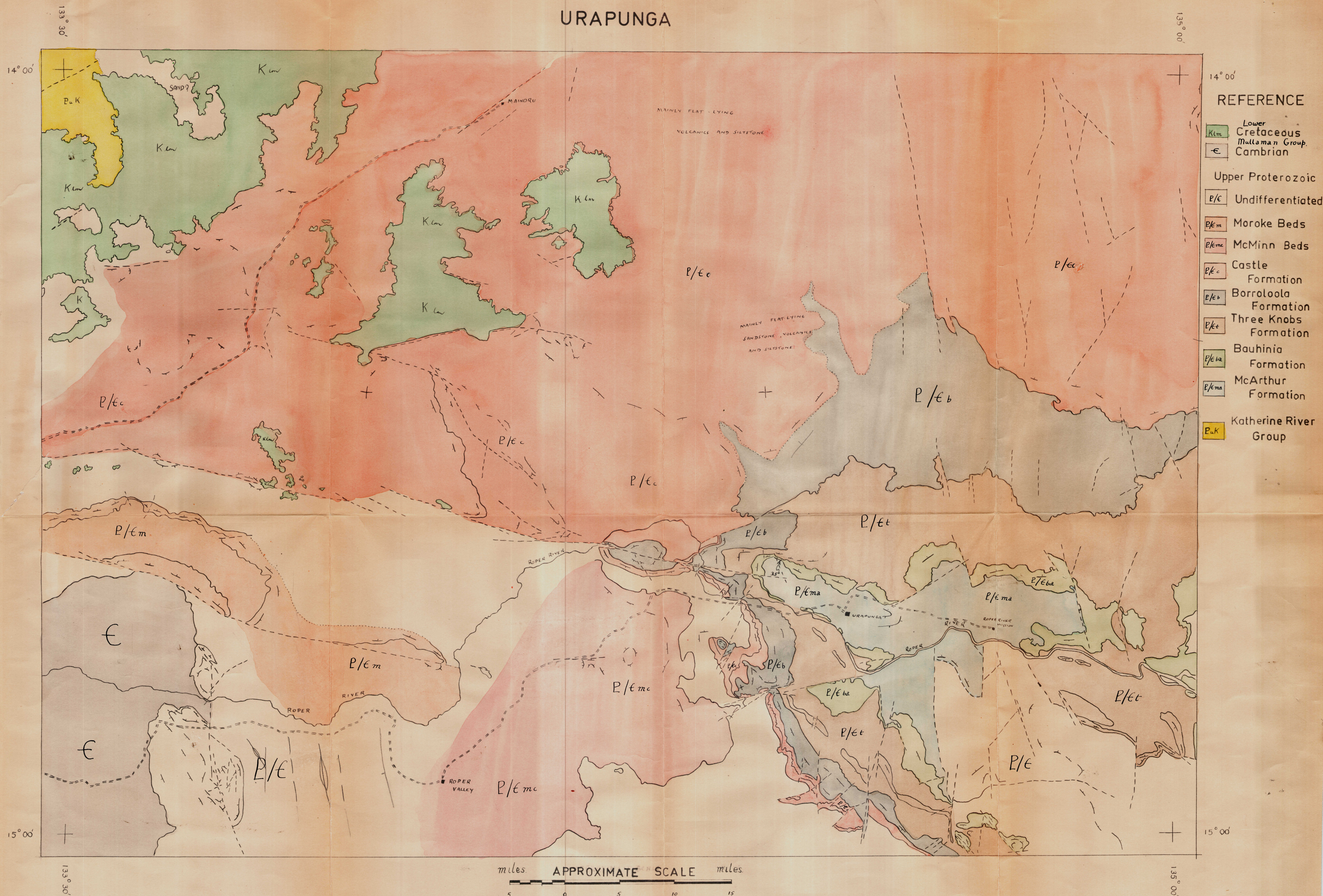
B.H.P. - Roper River Area		Mt. Isa Mines - McArthur River Area	
Moroke Beds			Siltstone, with sandstone at top.
McMinn Beds			Alternating siltstone and sandstone, ferruginous in places intruded by dolerite sills.
St. Vidgeon Beds			Soft, white, friable sandstone with some siltstone.
<hr/>			
Roper Beds	Castle Formation		Friable, calcareous, white sandstone, hematite-rich in places, siltstone.
	Borrooloola Formation		Red and white sandstone and siltstone, with some volcanics. Red shale at base.
<hr/>			
Urapunga Beds	Three Knobs Formation		Siltstone, banded siliceous shale, some hematite-rich limestone.
	Bauhinia Formation		Purple quartzite, and sandstone.
	McArthur Formation		Limestone, with <u>Collenia</u> bioherms, calcilutite, silicified limestone chert, sandstone, volcanics, conglomerate.

TABLE 3
STRATIGRAPHIC CORRELATION

Katherine Darwin Region	Chambers River Area B.M.R. nomenclature	Urapunga Area. B.H.P. nomenclature	McArthur River Area Mt. Isa Mines nomenclature.	Wilton River Area B.M.R. nomenclature	Wilton River Area Bulman Group. B.H.P. nomenclature.
		Moroke Beds			
		McMinn Beds			
Mt. Tolmer Group	Chambers River Beds	St. Vidgeon Beds			
		-----	Castle Formation	Mainoru Shale	Showell Ck. Shale
		Roper Beds			
			Borroloola Formation	Emu Creek Shale	
		-----	Three Knobs Formation	Wilton River Sandstone	Wilton River Sandstone
		Urapunga Beds	Bauhinia Formation		
			McArthur Formation	Mt. Marumba Beds	{ Upper Mt. Marumba Lower Mt. Marumba



URAPUNGA

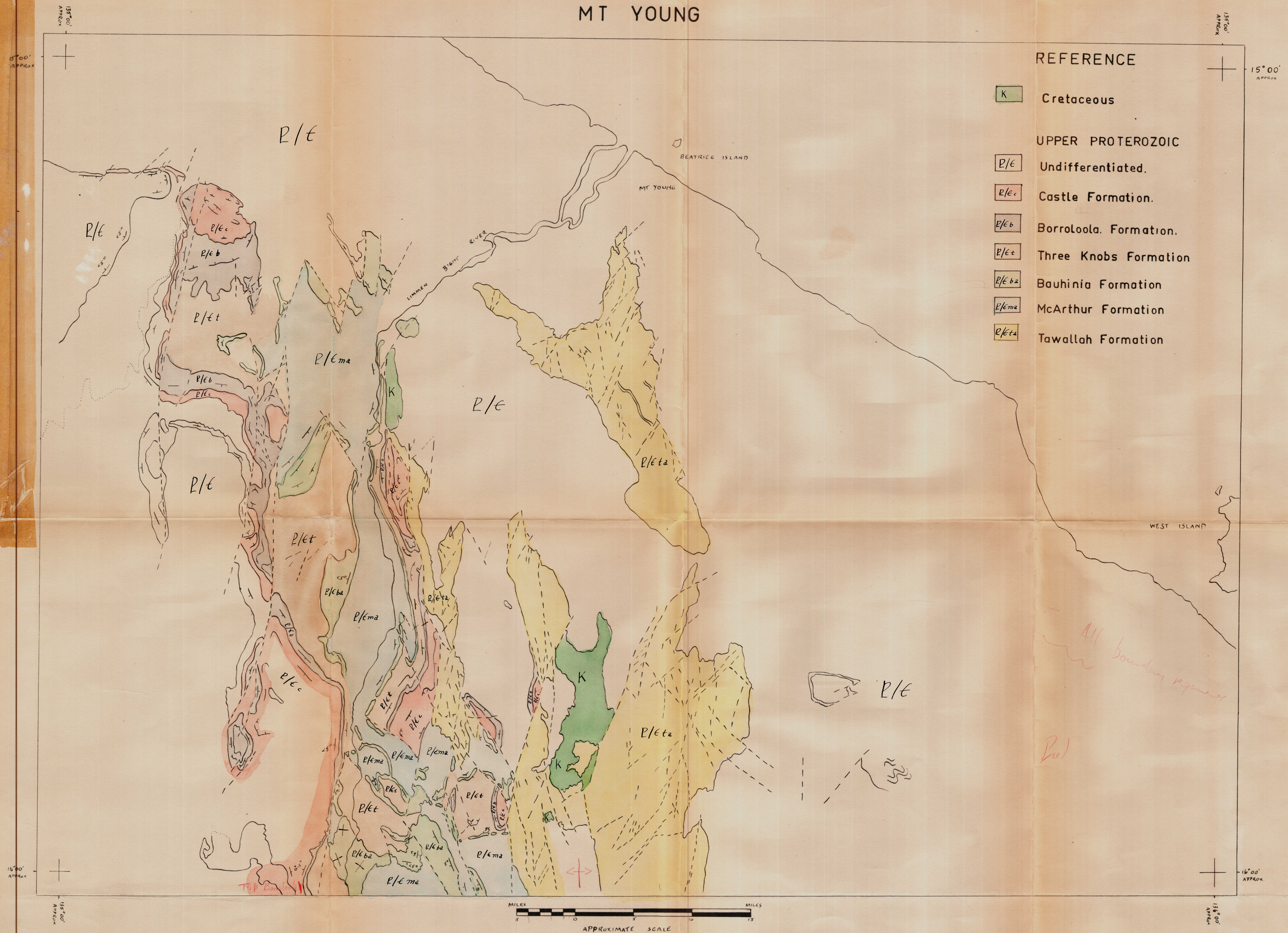


MT YOUNG

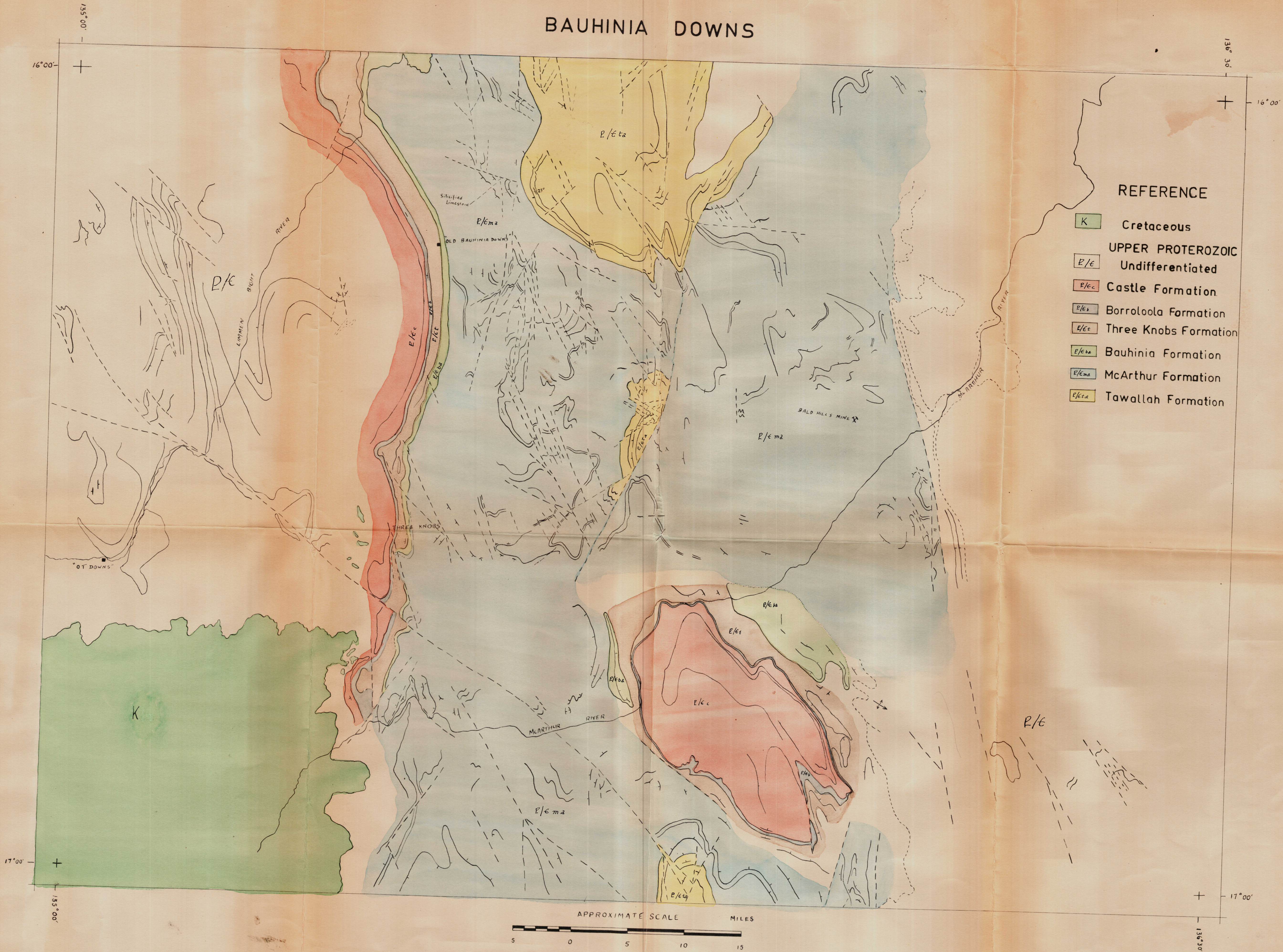
PLATE 3.

REFERENCE

- K Cretaceous
- UPPER PROTEROZOIC
- P/ε Undifferentiated.
- P/εc Castle Formation.
- P/εb Borroloola Formation.
- P/εt Three Knobs Formation
- P/εbz Bauhinia Formation
- P/εma McArthur Formation
- P/εta Tawallah Formation



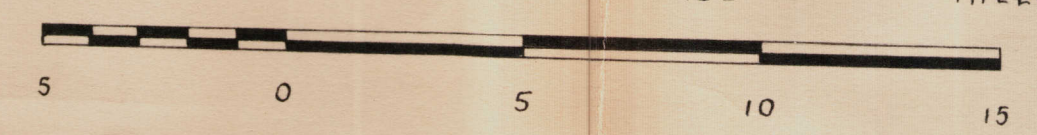
BAUHINIA DOWNS



REFERENCE

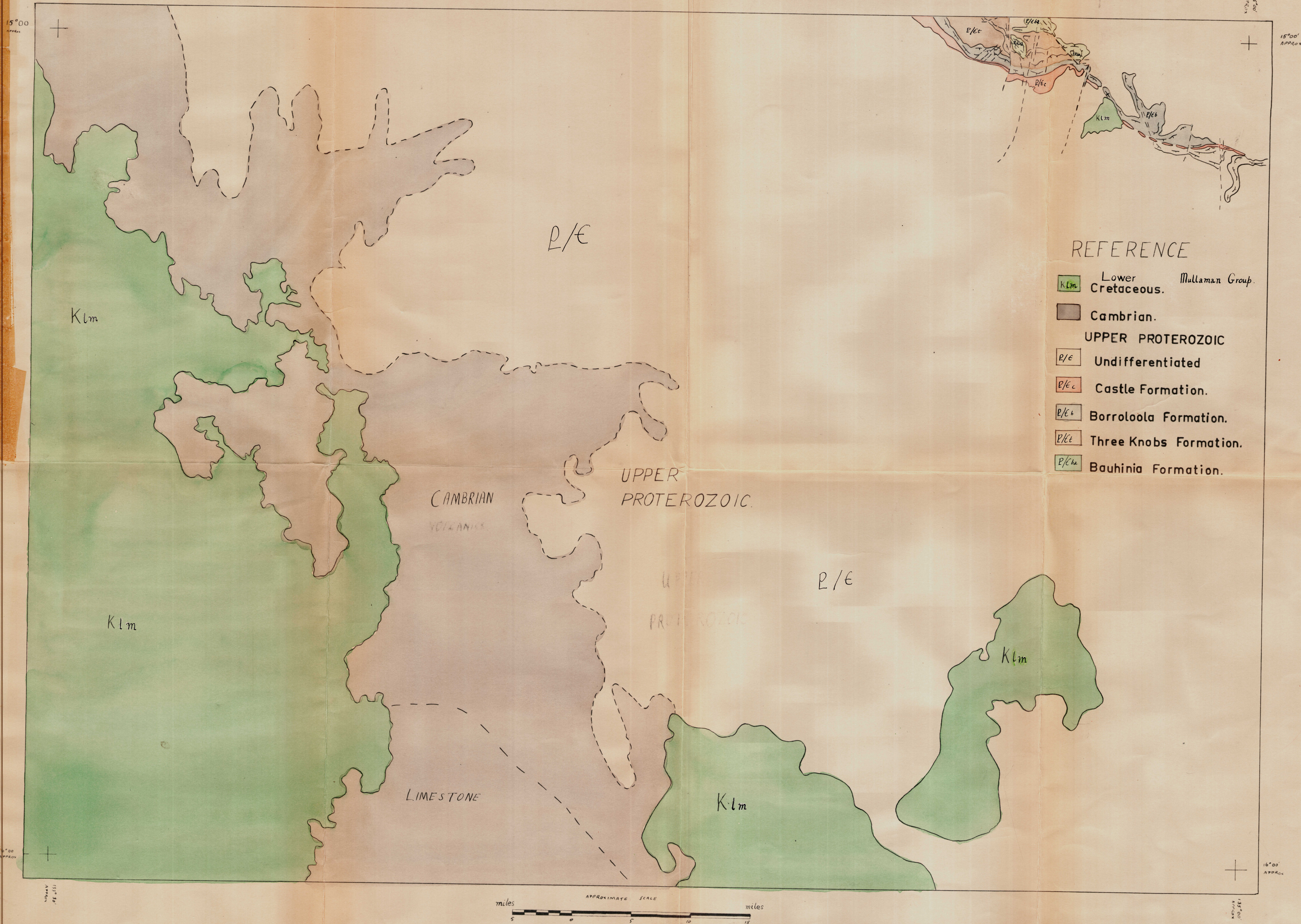
- K Cretaceous
- P/e UPPER PROTEROZOIC Undifferentiated
- P/e c Castle Formation
- P/e b Borroloola Formation
- P/e t Three Knobs Formation
- P/e ba Bauhinia Formation
- P/e ma McArthur Formation
- P/e ta Tawallah Formation

APPROXIMATE SCALE MILES



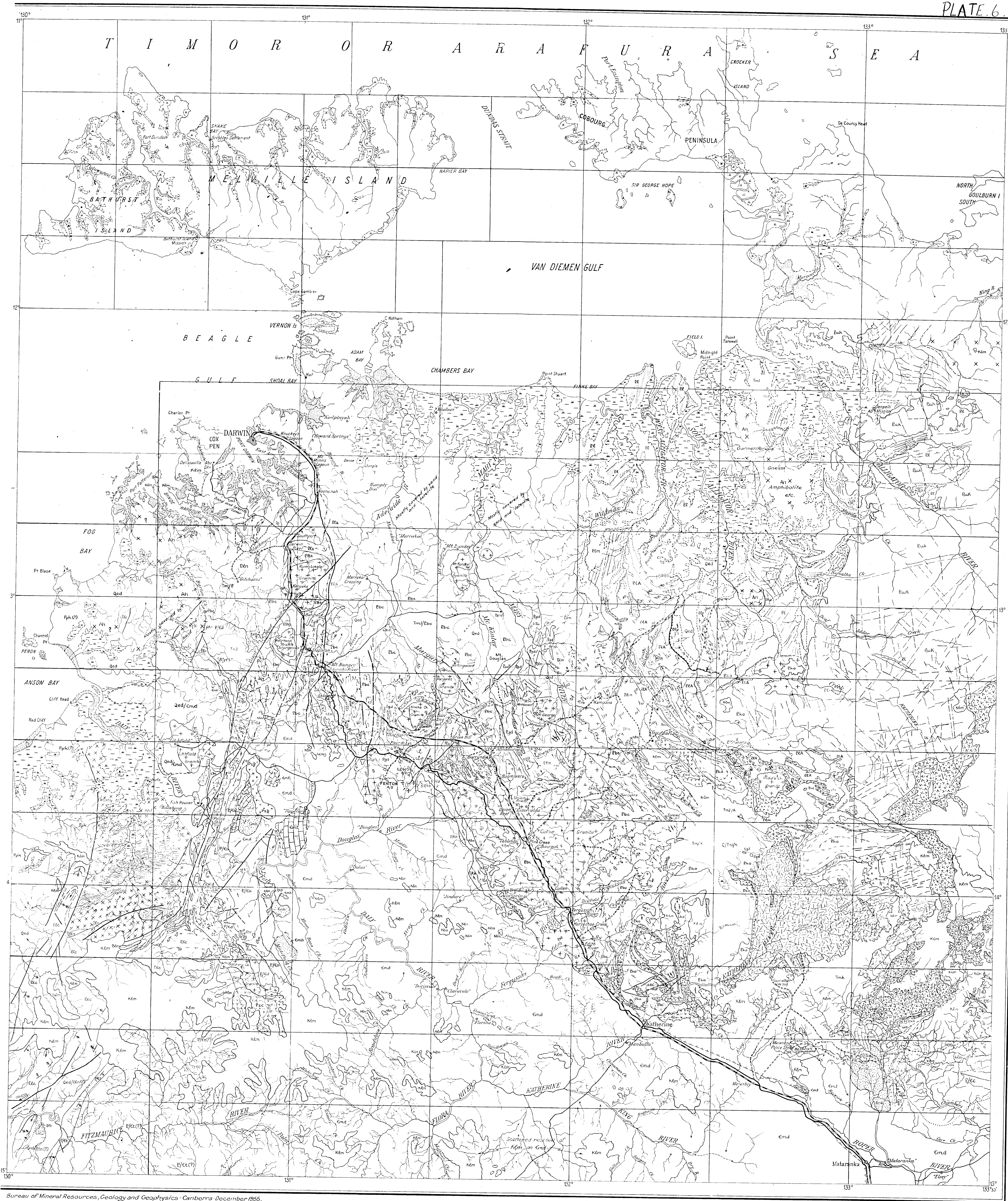
HODGSON DOWNS

PLATE 5.



REFERENCE

- Klm Lower Cretaceous. Mullaman Group.
- Cambrian.
- P/E UPPER PROTEROZOIC Undifferentiated
- P/Ec Castle Formation.
- P/Ei Borroloola Formation.
- P/Et Three Knobs Formation.
- P/Eha Bauhinia Formation.



Bureau of Mineral Resources, Geology and Geophysics · Canberra · December 1955.

PROGRESS MAP
REGIONAL GEOLOGY · KATHERINE-DARWIN AREA
NORTHERN TERRITORY

10 0 10 20 30 40 MILES
SCALE

GEOLOGICAL INFORMATION TO 1955

RECENT	Qal Soil and alluvium	Euk KATHERINE RIVER GROUP - Undifferentiated	Fin FINNISS RIVER GROUP
	Tnl Laterite developed on rocks of known age of Proterozoic	Eko KOMBOLGIE FORMATION - Alternating arenaceous and volcanic rocks	Ptc Chilling Creek Sandstone - Quartz sandstone
LOWER CRETACEOUS	Km MULLAMAN GROUP - mainly sandstones with some shale and siltstone	Pbv Penwood Creek Volcanics - Basic lavas with pyroclastics	Ptn Noltenius Formation - Conglomerate, quartz greywacke, sandstone, siltstone
PERMIAN	Ppk Port Keats Group - sandstone, shale, limestone	Pbv Macdenn Creek Volcanics - Amygdaloidal basalt, acid lavas, pyroclastics	Pta Acacia Gap Formation - Quartz sandstone, carbonaceous siltstone, pyritic in places
PALAEOZOIC	Ppb Byrnes Creek Volcanics - Basalt	Pbv Birdie Creek Volcanics - Andesite	Pbv Berinka Volcanics - Rhyolite and pyroclastics
	Ppc Collia Volcanics - Intermediate to basic lavas and pyroclastics	Pbv Dinner Creek Volcanics - Rhyolite, andesite, basalt	Ah Hermit Hill Complex - Garnetiferous granite, gneiss, schist, granulite, quartzite
	Cnd DALY RIVER GROUP	Pku Kurrundie Member - Buffaceous sandstone, conglomerate, greywacke	An Nanambu Complex - Garnetiferous granite, gneiss, amphibolite, greenstones, greenstone agglomerate
MIDDLE CAMBRIAN	Cnh Hayward Creek Sandstone - Ferruginous sandstone with pebbles	Pdu EDITH RIVER VOLCANICS - Lavas and pyroclastics with local arenaceous members	G Granite and gneiss
	Cht Boswick Creek Formation - Flaggy sandstone, siltstone, basalt flows	Pup Phillips Creek Member - Greywacke conglomerate with pyroclastic lenses	M Migmatite and schist
	Cml Tipperary Limestone - Fossiliferous limestone with minor sandstone lenses	BROCKS CREEK GROUP	
	Cev Leight Creek Volcanics - Basalt and sandstone	Pbc Burrell Creek Formation - Greywacke, greywacke siltstone	
SUB-CAMBRIAN	B/Et TOLMER GROUP - Undifferentiated	Pgd Golden Dyke Formation - Chert, carbonaceous siltstone, limestone, quartz siltstone	
	B/ch Hinde Dolomite - Dolomite and collaniferous	Ptg George Creek Formation - Quartz greywacke, quartz siltstone, carbonaceous rocks	
	B/DV BUILDIVA SANDSTONE - Quartz sandstone, siltstone	Ptm Masson Formation - Quartz greywacke, siltstone, banded iron formation	
	B/Es Stray Creek Sandstone - Quartz sandstone, flaggy siltstone and shale	PBA SOUTH ALLIGATOR GROUP - Quartz greywacke, banded iron formation, algal reef dolomite, sandstone, siltstone, chert	
	B/Gd Depot Creek Sandstone - Quartz sandstone	Ptp Mt. Partridge Beds - Quartz sandstone, arkose, conglomerate, siltstone, sericite schist	
	B/Sc Chambers River Beds	PBT BATCHELOR GROUP - Conglomerate, sandstone, siltstone, sedimentary breccias, silicified reef breccias, limestone	
		BE Undifferentiated	

IGNEOUS ROCKS	F Granite Rocks	FV Fergusson Volcanics	F Fault or fracture	R Railway
	B Basic Rocks	GP Marany Greywackes and Porphyries	+ Thrust fault	M Main Road
	GR Grace Creek Porphyry	UV Undifferentiated Volcanics - probably Upper Proterozoic	~ Dip and strike	S Subsidiary Road
			→ Direction of plunge	W Swamp
			— Trend Lines	
			— Schists	

RELIABILITY DIAGRAM

A Detailed Mapping
B Reconnaissance and Air-Photo Interpretation
C Sketchy