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NEW AND REVISED STRATIGRAPHIC NOMENCLATURE, CAPE YORK PENINSULA

by

B.S. POWELL, D.L. GIBSON, J. SMART AND K.G. GRIMES

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SUMMARY

Recent geological mapping and stratigraphic drilling in Cape York Peninsula(1) resulted in the recognition of:

a) the Garraway Beds, an equivalent of the Eulo Queen Group, in Cape Weymouth 1:250 000 Sheet area;

b) a shallow marine facies equivalent of the Garraway Beds and the Jurassic to Cretaceous Gilbert River Formation, here named the Helby Beds, and of several informal members of this unit, in an area north of the Garraway Beds;

c) an equivalent of the Gilbert River Formation in far north Cape York Peninsula, the Albany Pass Beds, which are separated from the main body of the Gilbert River Formation by the Helby Beds;

and (2) showed that:

the Gilbert River Formation continues from the Carpentaria Basin across the Kimba Arch into the Laura Basin, where it makes up part of the Battle Camp Formation, and that it is mappable in the Laura Basin. Use of the term Battle Camp Formation should be dropped as the Gilbert River Formation has nomenclature priority; and , it is suggested that the upper mudstone part of the 'Battle Camp Formation' and the Wolena Claystone be treated as one unit, as they cannot be distinguished lithologically;

b) the Cainozoic sediments in the headwater basin of the Archer and Wenlock Rivers, originally mapped as Lilydale Beds, form a separate deposit from the Lilyvale Beds at their type area. The deposits in this headwater basin are here named the Falloch Beds, and are thought to be equivalent to the Wyaaba Beds.

The concept of the Klyaaba Beds is revised as the result of field and air-photo studies.

INTRODUCTION

In 1972 the Bureau of Mineral Resources and the Geological Survey of Queensland continued their systematic mapping of the Carpentaria Basin, covering its northeastern part, mainly north of 15°S; they also remapped that part of the Laura Basin west of 144°E.

The additions and changes to the stratigraphic nomenclature resulting from the mapping are the subject of this paper, which is published with the permission of the Director, Bureau of Mineral Resources, and the Chief Government Geologist, Geological Survey of Queensland.

CARPENTARIA BASIN MESOZOIC SANDSTONE UNITS

General

The Mesozoic sandstone units in the southern part of the Carpentaria Basin were formally defined by Smart et al. (191), who recognized a widespread sandstone unit, the Gilbert River Formation. It is of late Jurassic to early Cretaceous age and rests on basement over much of the onshore part of the basin. Locally it is underlain by a sequence of Jurassic sandstones, the Eulo Queen Group and its equivalents, which are confined to basement depressions that are mainly erosional in origin (Doutch et al., 1970).

Subsequent work (Doutch et al., 1972; 1973) extended recognition of the Gilbert River Formation northwards to about latitude 12°S (Table 1, Fig. 1). The unit may be up to 140 m thick above the Weipa Depression in ZCL Weipa No. 1 and thickens northwards to about 200 m around Mount Glennie above the Olive River Basin in Cape Weymouth 1:250 000 Sheet area, but throughout much of Ebagoola and Hann River 1:250 000 Sheet areas to the south. In the Cape Weymouth Sheet area and to the west it overlies the arenaceous Garraway Beds (this paper).

At about latitude 12° the entire Mesozoic sandstone section changes from a largely continental to a marginal marine facies, the Helby Beds; north of latitude 11°S a further facies change is evident with a return to more continental type rocks, the Albany Pass Beds, over and around exposed basement of the Cape York-Oriomo Ridge (Figs 1 & 2).

Much of the early work of the Mesozoic and Palaeozoic sedimentary rocks of northern Cape York Peninsula was carried out by Australian Aquitaine Petroleum (AAP, 1965; 1967), who set up a tentative classification containing many informal units. All their unit names are rejected here excepting the name 'Garraway Beds', which is not used here in its original sense as a Palaeozoic unit name, and Albany Pass Formation' which is here changed to Albany Pass Beds. For reference purposes the former names are listed in the text alongside the revised nomenclature.

Garraway Beds

Proposed name : Garraway Beds (AAP: Wreath Creek member and part of the Wenlock Member). Also replaces the more recent informal usage of Wreath Formation and Wenlock Conglomerate Member by Doutch et al., 1973.

Derivation of name : Garraway Creek, Lat. 12° 41½'S, Long. 143° 02'E, Cape Weymouth Sheet area.

Lithology : Very coarse to fine-grained, argillaceous, micaceous quartzose sandstone, granule and pebble conglomerate, carbonaceous in places. The sequence generally shows massive to poor bedding, but tabular cross-bedding is an important diagnostic feature when present. Sorting is poor. Pebble clasts consist of quartzite and some igneous and metamorphic rocks. The unit becomes increasingly conglomeratic towards the base.

Distribution: Limited in outcrop, between a low cliff on the banks of the Pascoe River, 10 km south of Yam Creek, to the coast of Temple Bay in Cape Weymouth Sheet area. Extends at depth westwards at least as far as Weipa, and northwards beneath colluvium probably as far as Macmillan River, where it merges imperceptibly with the Helby Beds.

Reference section: On the western bank of the Pascoe River, Lat. 12°37'S, Long. 143°04'E, Cape Weymouth Sheet area.

Stratigraphic relationships: Where visible, the base of the unit rests unconformably on Precambrian and Palaeozoic basement rocks, where it is generally conglomeratic, but it can be fin-grained and silty. It is overlain by the Gilbert River Formation without apparent discontinuity, though the contact has not been seen.

Diagnostic features : Forms low rolling topography north and east of the Sir William Thompson Range; the tabular cross-bedding, and higher proportion of coarse-grained quartzose sand, clay and carbonaceous material, are the features which distinguish the Beds from the overlying Gilbert River Formation, although distinction becomes difficult in some places.

Thickness : Probably 90 m (792-881m) in ZCL Weipa No. 1 (Gibson, in Doutch et al., 1973); not more than 16 m measured in outcrop at the reference section, but probably reaches 130 m or more in the Sir William Thompson Range.

Age : Jurassic, as it apparently underlies Gilbert River Formation.

Fossils: Highly macerated wood fragments, trace fossils.

Helby Beds

Proposed name : Helby Beds

Derivation of name : Helby Hill, Lat. 11°31'S, Long. 142°48'E, Orford Bay 1:250 000 Sheet area.

Lithology : Fine to very coarse-grained quartzose sandstone, granule conglomerate, and micaceous carbonaceous siltstone. Sandstone is grey to green, very poorly sorted, clean or clayey. The siltstone is dark to medium grey with abundant flakes of mica and macerated wood and plant fragments.

The sequence can be massive but is mainly finely laminated, cross-lamination and ripply structures, and sparse glauconite and pyrite.

Distribution : The southern limit of the Beds is uncertain as the facies change into the Gilbert River Formation and Garraway Beds has not been observed. The unit is found north of a line between Palm Creek and Cape Grenville in northern Cape Weymouth Sheet area. Onshore, its northern boundary is believed to follow a northeast trend, west of Newcastle Bay, from estimations of the southeastern margin of the Cape York-Oriomo Ridge, to which the continental sedimentation of the Albany Pass Beds appears to have been confined. This trend may be structurally controlled, as joint orientation in Albany Pass and a break of slope coincident in places with air-photo lineaments indicate faulting along a north-easterly trending line.

Outcrop is generally poor because of cover of colluvium, dune sand and extensive laterite. However, the eastern coastal lowlands as well as the uplands of the Great Dividing Range are underlain by the Helby Beds. (The scarp line of the Great Divide itself is probably controlled by faults and modified by scarp retreat and does not reflect lithological variation across it). The Beds dip westwards below the Rolling Downs Group in southwest Orford Bay and southeast Jardine River Sheet areas. Farther north they are partly covered by the Bulimba Formation, to within a few kilometres of the Coen-Bamaga telephone line. The easternmost outcrop is on the coast of Margaret Bay, 5 km west of exposed basement.

Reference section : On the western bank of an unnamed north-flowing creek, Lat. 11°29'S, Long. 142°47½'E, Orford Bay Sheet area.

Stratigraphic setting : The lower contact of the Helby Beds has not been seen, but they are presumably unconformable on pre-Mesozoic rocks. The upper contact with the Rolling Downs Group is not exposed.

The Beds represent a time equivalent to both the Gilbert River Formation and Garraway Beds to the south. The facies changes over the northern Cape Weymouth Sheet area.

Diagnostic features : The Helby Beds exhibit many rapid changes in lithology, but taken as a whole the flaser-bedding, presence of glauconite, high proportion of carbonaceous siltstone, and bioturbation throughout the sequence, distinguish them from the more continental sandstones to the south.

Thickness : 30 m at the reference section. At least 325 m (5.330 m) in BMR Orford Bay 1 (Gibson et al., 1974). Possibly over 600 m in the Peninsula Trough, and over 1500 m in the Olive River Basin (Fig. 1),

based on geophysical evidence (Pinchin, 1973); however, some of this thickness may be due to Triassic rocks as reworked Triassic spores were found in BMR Cape Weymouth No. 1 (Burger, pers. comm.).

Age : Spores and pollen from core from BMR Cape Weymouth 1 and Orford Bay 1 (Gibson et al., 1974) overall indicate a Jurassic age (Burger, pers. comm.).

Remarks : The change of facies to, and a thickening of, these estuarine and shallow marine Jurassic sediments near the margin of a northern sea is consistent with fossil evidence from Papua (Evans, 1966).

Along the coastline of Orford Bay Sheet area, outcrop of the Helby Beds is thin and discontinuous. The thickest section is at No. 2 Point, where the Beds can be divided into Sub-units which can be traced in cliffs as far south as Shelburne Bay. The Sub-units, numbered 1 to 4 are of Jurassic age, as they dip westwards under the known Jurassic rocks of the two BMR bores mentioned above. (See Table 1)

Sub-unit Jb_4 of Helby Beds

Lithology : Fawn, poorly sorted clayey quartzose sandstone, well bedded with low-angle lenticular cross lamination, and thin banded argillite; resistant, khaki-coloured, poorly sorted massive slightly clayey sandstone and granule conglomerate; soft, white, slightly micaceous siltstone, very finely laminated with ripple structrues. Worm burrows.

Distribution : Caps the Mesozoic section at No. 2 Point and is present at sea level north of Captain Billy Creek.

Reference section : No. 2 Point, Lat. 11°06'S, Long. 142°47½E, Orford Bay, Sheet area.

Stratigraphic relations : Overlies Unit Jb_3 conformably.

Diagnostic features : The distinctive weathering configuration of the well-bedded to massive cliff-forming sandstone underlain by soft, etched thinly laminated bioturbated siltstone.

Thickness : 21 m at the reference section.

Age : Jurassic, by superposition.

Fossils : Worm burrows in the finer bands (Planolites?)

Sub-unit Jb_3 of Helby Beds

Lithology : Soft, fawn to white, coarse to medium-grained quartzose sandstone and granule conglomerate which is massive, well sorted and graded, with well-developed tabular cross-lamination.

Distribution : Cliff sections at No. 2 Point and at Double Point.

Reference section : No. 2 Point, Lat. 11°06'S, Long. 142°47½'E, Orford Bay Sheet area.

Stratigraphic relationships: Conformable between unit Jb_2 and unit Jb_4.

Diagnostic features : Low clay content, high percentage of well-sorted quartz grains, well developed tabular cross-lamination; unfossiliferous.

Thickness : 15 m at No. 2 Point.

Age : Jurassic.

Fossils : None found.

Sub-unit Jb_2 of Helby Beds

Lithology : Massive, fawn, poorly sorted coarse-grained sandstone and granule conglomerate, light purple mottled medium to fine-grained slightly clayey micaceous sandstone, khaki and fawn very poorly sorted clayey quartz granule conglomerates; in part horizontally laminated and bioturbated.

Distribution : Base of cliff section at No. 2 Point, northwards to Tern Cliffs (and possibly Cliffy Point on Torres Strait Sheet area), and south to False Orford Ness.

Reference section : No. 2 Point, Lat. 11°06'S, Long. 142°47½'E, Orford Bay 1:250 000 Sheet.

Stratigraphic relationship : Conformably overlain by unit Jb_3 and underlain by unit Jb_1.

Diagnostic features : Massive cliff-forming habit, poor sorting, and intensity of bioturbation.

Thickness : 12 m at No. 2 Point.

Age : Jurassic.

Fossils : Worm tubes (Planolites?, Rhizocorallium?)

Sub-unit Jb_1 of Helby Beds

Lithology : Medium to fine-grained quartzose sandstone and soft, thinly cross-laminated, highly contorted grey claystone; one sparsely worm-bored thin carbonaceous band.

Distribution : Limited in outcrop to a small area at Ussher Point.

Reference section : Ussher Point, Lat. 11°09½'S, Long. 142°48'E, Orford Bay Sheet area.

Stratigraphic relationship : The base of the unit was not seen and the upper contact with unit Jb_2 was masked by scree. It is assumed to be conformable.

Diagnostic features : Distinct sedimentary brecciation (slide-slump bedding) of the once hydroplastic sediments.

Thickness : 5 m at Ussher Point.

Age : Jurassic

Fossils : Minor worm burrows (Planolites?).

Albany Pass Beds

Proposed name : Albany Pass Beds (AAP: Albany Pass Formation, Member).

Derivation of name : Albany Pass, Lat. 10°44'S, Long. 142°36'E, Torres Strait Sheet area.

Lithology : Fine to coarse clay-rich quartzose sandstone, pebble and granule conglomerate, white, or dark brown when ferruginized, poorly sorted, massive or well bedded, with lenticular cross-lamination and clay bands; several scattered boulder-sized clasts of laminated clay.

Distribution : Along the sides of Albany Pass, Mai Island, Albany and Pitt Rocks, and southwest as a highly ferruginized capping to the Great Dividing Range north of the Jardine River.

Reference section : Albany Pass, Lat. 10°44'S, Long. 142°35½'E, Torres Strait Sheet area.

Stratigraphic relationship : Where visible around the islands north of Albany Pass, the base of the unit rests unconformably on basement. On the mainland, apart from the cliffs below Somerset, the only remnants of the Albany Pass Beds are highly ferruginized rubble cappings to the uplands of the Great Dividing Range which stretch as far south as Biffin Creek. The Beds are considered to be generally younger than the outcrops of the Helby Beds at Cliffy Point. The boundary (facies change) between them is inferred to lie along a northeast-trending line, possibly structurally controlled, from Fly Point to Biffin Creek.

Although widely separated in outcrop, the Albany Pass Beds and Gilbert River Formation are similar lithologically (Table 1) and have similar depositional locales.

Diagnostic features : Cliff-forming habit; lack of bioturbation compared with the adjacent Helby Beds; high clay content; included fragments of older laminated claystone.

Thickness : 12 m measured in Albany Pass.

Age : Whitehouse (1955) reported that marine beds with Aptian mollusca as well as beds with only plant fossils occur "a few miles south of Cape York". This record has not been verified.

Fossils: Wood fragments (AAP, 1965); pelecypods and plants (Whitehouse, op. cit.).

LAURA BASIN MESOZOIC ROCKS

Lucas and de Keyser (1965a, b), and de Keyser & Lucas (1968) used a tripartite division of the Mesozoic sedimentary sequence of the Laura Basin: the basal, Jurassic, Dalrymple Sandstone, the Lower Cretaceous Battle Camp Formation, and the Albian Wolena Claystone.

They described the Dalrymple Sandstone as consisting of an upper unit of thick-bedded unstratified cross-bedded sandstone and a lower unit of coarse-grained conglomerate and grey and brown shale, with minor sandstone, mudstone and coal; the overlying Battle Camp Formation as an upper unit of siltstone and a lower unit of glauconite-rich sandstone, quartz sandstone and conglomerate; and the Wolena Claystone as consisting of olive and grey shale with an Albian fauna.

The Battle Camp Formation and the Dalrymple Sandstone are easily distinguished in the eastern part of the Laura Basin, and have a sharp boundary which is a 'disconformity', and in some places an angular unconformity. In the southwestern part of the Basin, the two units become lithologically similar, and the delineation of the boundary is more difficult. The Wolena Claystone seems to have been originally erected on the basis of its distinctive Albian fauna and because its outcrop area is an inlier surrounded by Cainozoic sediment (Lucas, 1962); no surface or subsurface boundary with the Battle Camp Formation was observed, but the distribution of the formation suggests that it overlies the Battle Camp Formation.

Recent field mapping in Hann River Sheet area (Doutch et al., 1973) has

shown that the Gilbert River Formation is continuous with the lower part of the Battle Camp Formation in the region of the Kimba Arch where the Laura and Carpentaria Basins are connected, and that the boundary between the Dalrymple Sandstone and the Battle Camp Formation can be mapped (with effdifficulty) in the southwestern part of the Laura Basin.

The Dalrymple Sandstone can therefore be said to be lithostratigraphically equivalent to beds underlying the Gilbert River Formation elsewhere, i.e. to the Eulo Queen Group of Smart et al. (1971), and to the Garraway Beds (this paper).

The recent mapping has also shown that the boundary between the lower sandstone part and upper siltstone part of the Battle Camp Formation can be mapped.

As Laura and Carpentaria Basin Stratigraphic sequences are broadly similar overall, with marine siltstone or mudstone overlying marine and continental quartzose sandstone, the siltstone unit of the Battle Camp Formation of the Laura Basin is very likely to be a part equivalent of the mudstone overlying the Gilbert River Formation of the Carpentaria Basin, i.e. of the Rolling Downs Group; outcrop distribution of 'Battle Camp siltstone' and Rolling Downs Group in Hann River Sheet area suggest the two were once a continuous rock body, and that the sea joined the two Basins then.

Therefore it appears that the sandstone unit of the Battle Camp Formation is lithostratigraphically the Gilbert River Formation. We suggest it is desirable that the term Battle Camp Formation be dropped, particularly as the name Gilbert River Formation has priority: de Keyser and Lucas first used 'Battle Camp Formation' in 1965 (a & b), and defined it in 1968, whereas Laing & Power erected the name Gilbert River Formation in 1959.

The recent mapping has also shown that the siltstone unit of the 'Battle Camp Formation' cannot be lithologically distinguished from the nearby Wolena Claystone, and that the two taken together are litho-stratigraphically equivalent to part, if not all, of the Carpentaria Basin Rolling Downs Group. Chronostratigraphically the Wolena Claystone as mapped by de Keyser and Lucas in 1968 is a time equivalent of the Allaru Mudstone of the Rolling Downs Group, but the microflora of the two are different, (D. Haig, pers.comm.), and the Laura and Carpentaria Basins may not have had a sea connection at this time. Systematic drilling in both Basins is needed before the stratigraphy of their marine mudstone and siltstones can be more usefully organized.

CAINOZOIC SEDIMENTS

A variety of names has been used for poorly consolidated clayey sandstone and sandy claystone units which unconformably overlie the early Cretaceous Rolling Downs Group of the Carpentaria Basin, its equivalents in the Laura Basin, and older rocks. Lithological differences between the units are slight and cannot be used as the criteria for separating them. The distribution of the units is shown on Figure 3.

In the southern part of Cape York Peninsula Smart et al. (1972) defined two units, the Bulimba Formation and the Wyaaba Beds, separated by a major period of deep weathering. The older unit, the Bulimba Formation, can be recognized along the western part of the peninsula as far north as Vrilya Point in Jardine River Sheet area (Fig. 1). It underlies the bauxite in the Weipa-Aurukun area. The Wyaaba Beds are present mainly in the south of the peninsula within the Gilbert-Mitchell Trough (Doutch et al., 1972). The presence of both units offshore from the Weipa area has been established by drilling (Zwigulis, 1971).

Bulimba Formation and Fairview Gravel

The Bulimba Formation extends eastwards as far as longitude 142°50'E. in all but the southern part of the area discussed here. Further east nomenclature and stratigraphic relations of units of similar lithology are less simple.

The name Fairview Gravel was used by Lucas (1962, 1964), Lucas & de Keyser (1965a, b), and de Keyser & Lucas (1968) for quartzose gravels of limited extent occurring to the northwest and north of Laura township. The unit rests unconformably on Mesozoic rocks, and occurs as mesas standing above 'Brixton Formation' deposits (see below). Our recent mapping identified outcrops of Bulimba Formation of similar quartzose gravel about 45 km to the west of the Fairview Gravel, and it is possible that the two units originally formed a continuous rock body.

Wyaaba Beds and equivalents

The Wyaaba Beds were defined by Smart et al., (1972). The following summarizes what has been found out about them since. They are for the most part poorly consolidated quartzose sands and clays occurring mainly in the Gilbert-Mitchell Trough and under the Gulf of Carpentaria, Queensland. Onshore they are probably deposits of the ancestral Gilbert, Staaten, Mitchell and other nearby rivers. Marine fossils in the Wyaaba Beds suggest that the Gulf of Carpentaria existed when the beds were being deposited, the sea providing a transgressing base level for the rivers. Both eustatic sea level rise and tectonic down warping could have caused transgression.

In the Gilbert-Mitchell Trough the Wyaaba Beds overlie an eroded down warped lateritic weathering zone at the top of the Bulimba Formation. The Beds are shown on 1:250 000 BMR - GSQ geological maps Rutland Plains, Galbraith, Normanton, Millungera and Gilberton as cropping out. Subsequent more detailed air photo interpretation, geomorphologically oriented, (Doutch, in prep.), suggests the Beds are covered by Pliocene to Holocene colluvia and alluvia associated with following regressions and transgressions; the beds crop out

rarely, mostly in creeks. The Beds appear to be absent from the Gilberton Sheet area, and may not be present in Millungera Sheet area (Grimes and Doutch, in prep.).

The thickness of these overlying deposits is unknown, but is likely to be small. In the type section in Frome-Broken Hill exploration well Wyaaba No. 1 (Smart et al., op. cit.) the deposits between the surface and approx. 28m which were originally included in the Wyaaba Beds are now considered to be a younger unit (or units) overlying the Beds. Units younger than the Wyaaba Beds are discussed by Grimes and Doutch (ibid.).

The ferruginization of the Wyaaba Beds mentioned by Smart et al. (op. cit.) can be seen in some creek bed outcrops and in auger holes (Smart et al., 1974). Ferruginization of the overlying units also occurs.

The marine fossils already mentioned came from calcareous strata in the lower part of the Wyaaba Beds (generally below the level of the present greatest depth of the Gulf of Carpentaria). The fossils have been discussed by Day and Palmieri in Doutch et al., (1973) and Palimieri (pers. comm.). They could indicate a Pliocene to Pleistocene age for the strata. Geomorphological interpretation suggests the Wyaaba Beds are no younger than early Pliocene (Doutch, ibid.). However, Doutch (in prep.) shows that the Strathgordon Surface atop the Wyaaba Beds is at least 4.5 million years old, to the south-east close to radiometrically dated Nulla Basalt (Wyatt and Webb, 1970), so that the unit is unlikely to be younger than early Pliocene, and might be as old as Miocene.

Whitaker & Willmott defined the Lilyvale Beds in 1968. This unit forms a blanket deposit in the low country surrounding Princess Charlotte Bay, and lies to the east of an escarpment of Mesozoic and older rocks formed consequent on uplift and block faulting after early Cretaceous times; the Beds result from erosion of the higher ground. They can be traced northward as far as the northeastern part of Coen Sheet area. Whitaker & Willmott (1969) extended the term Lilyvale Beds to include deposits in the headwater basin of the westerly flowing Archer and Wenlock Rivers in Coen Sheet area,

and also stated that 'small outcrops' of the Lilyvale Beds are scattered over granitic and metamorphic rocks west of the escarpment. These deposits are discussed later.

The Lilyvale Beds are older than the Strathgordon Surface in the area (Doutch, op. cit.), and younger than the Fairview Gravel (see discussion on Brixton Formation below). The Lilyvale Beds thus appear to be pene-contemperaneous with the Wyaaba Beds.

The Brixton Formation of Lucas (1962), further discussed by Lucas (1964) and de Keyser & Lucas (1968), was mapped, but not named, on the first editions of the Cooktown and Cape Melville Sheet areas and on the 1:500 000 map accompanying de Keyser & Lucas, (1968). They extended it into Hann River and Ebagoola Sheet areas where the recent mapping demonstrated its strata there to be coincident with, and make up the same body of rock as, the Lilyvale Beds.

The undefined name Brixton Formation is superseded by the defined name Lilyvale Beds where the latter has been applied by Whitaker and Willmott (op. cit.), but elsewhere the possibility of an unconformity of disconformity in the 'Brixton Formation' needs further investigation before formal naming proceeds in these areas.

Lucas (1964) and de Keyser & Lucas (1968) suggested that the "Brixton Formation" is divisible into an older, mottled, dominantly clayey unit and a younger less consolidated sandy unit, although they imply that the distinction is best seen in the east. Doutch et al. (1973) suggested that these units might be equivalent to the Bulimba Formation and Wyaaba Beds, respectively but evidence of a lateritic weathering event affecting the 'Brixton Formation' is poor, and Lucas (1964) has commented on complicating factors in the matters of original clay content and iron-staining. These problems have not arisen with the Lilyvale Beds in the Ebagoola, Hann River and Coen Sheet areas.

We have separated the deposits in the headwater basin of the Archer and Wenlock Rivers from the Lilyvale Beds as the identity of these deposits as an individual rock body is clear in terms of their position in the landscape. They are named here the Falloch Beds, and are described below. The Strathgordon Surface developed locally on them (Doutch, in prep.) We also suggest that 'small outcrops' noted by Whitaker & Willmott (1969) west of the escarpment should not be included in the Lilyvale Beds, as they occupy a position in the landscape analogous to the Falloch Beds. We do not propose a name for them as they have not yet appeared on maps.

The Yam Creek Beds (Whitaker & Willmott, 1969) occur in the Pascoe River area in Cape Weymouth 1:250 000 Sheet area. The Strathgordon Surface developed locally on them (Doutch, in prep.) They are ferruginized, but a lateritic profile is only poorly developed. In contrast, the Bulimba Formation which crops out within about 30 km of the Yam Creek Beds, shows the effects of lateritic weathering quite strongly. This and the position of the Yam Creek Beds in the landscape suggests that the unit is probably of a similar age to the Wyaaba Beds, rather than to the Bulimba Formation as suggested by Doutch et al., (1973).

Falloch Beds

Derivation: Falloch Creek, a headwater tributary of the Archer River, 13°23'S, 143°15'E.

Reference area: Croll Creek, at the crossing of the track to the Blue Mountains; 13°41'30"S, 141°07'30"E; 8 km north of Coen airport (Coen Sheet area. 1:250 000.

Distribution: Restricted to the headwater basin of the Archer and Wenlock Rivers.

Lithology: Poorly consolidated medium to very coarse-grained poorly sorted, angular, clayey quartzose, sandstone (feldspathic in places); sandy clay; local clayey granule and pebble conglomerate.

Colour is off-white where not iron-stained.

Thickness: Maximum known thickness 55 m (0 - 55 m) in BMR Coen 24 (Gibson et al., 1974) which bottomed in Falloch Beds. Average thickness probably about 30 m.

Stratigraphic relationships: Overlies Proterozoic? metamorphic rocks and Palaeozoic granitic rocks. Overlain by alluvium and residual sand.

Age: Cainozoic (Miocene to Pliocene). The Falloch Beds show some ferruginization, but not development of a lateritic profile. They were deposited on an erosion surface cutting into the older surface which tops lateritized Bulimba Formation in places elsewhere. It therefore seems likely that they are younger than the Bulimba Formation, and that they are of a similar age to the Wyaaba Beds.

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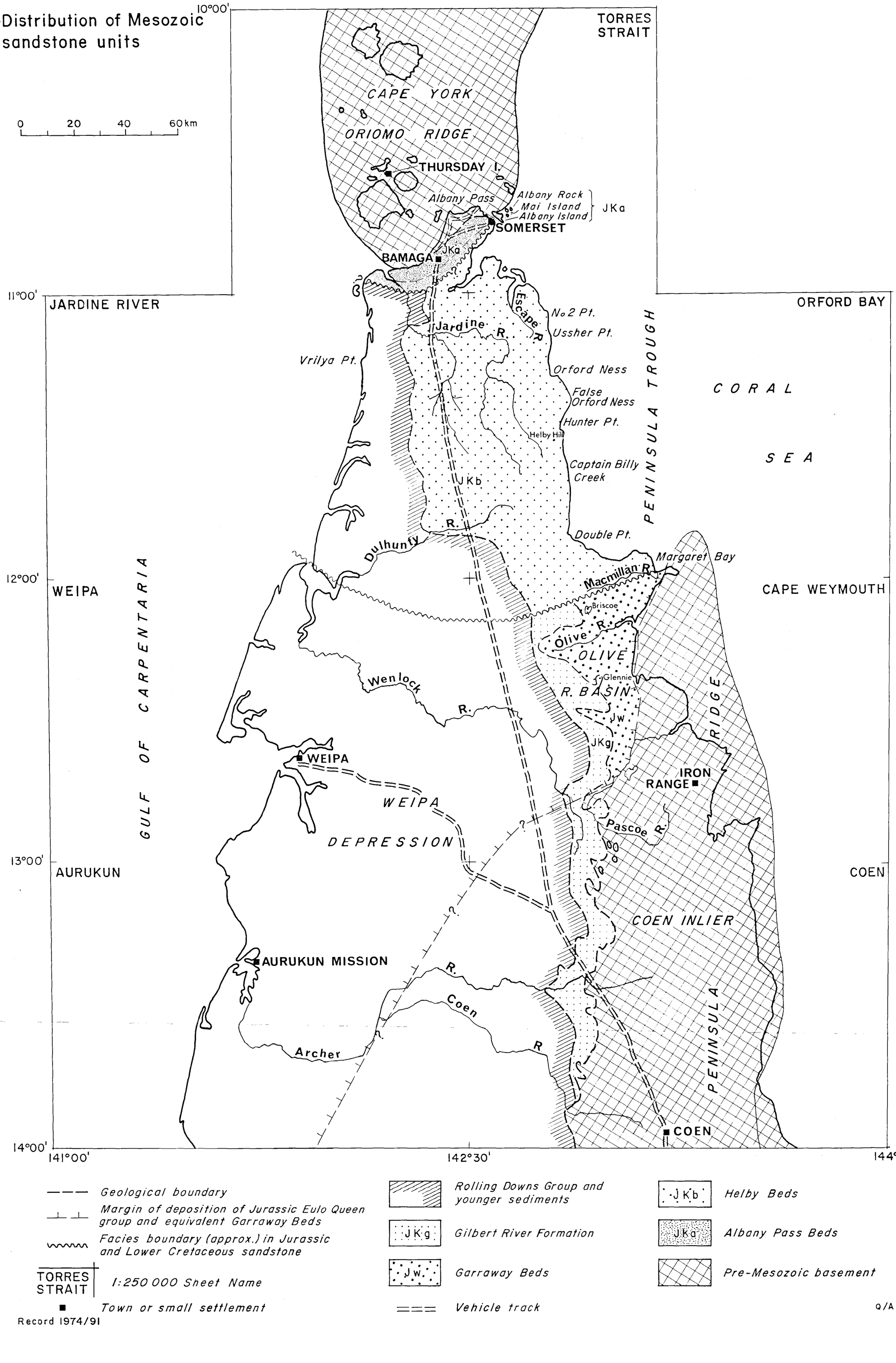
TABLE 1 MESOZOIC FORMATIONS OF THE NORTHERN CARPENTARIA BASIN

PERIOD		ROCK UNIT	MAP SYMBOL	THICKNESS (metres)	LITHOLOGY	DEPOSITIONAL ENVIRONMENT & PROCESS	STRATIGRAPHIC RELATIONS CORRELATIONS
South of latitude 12°S	LATE JURASSIC AND EARLY CRETACEOUS	Gilbert River Formation (cf. Smart et al., 1971)	JKg	90 to max. 200(?)	Grey-white poorly sorted subangular medium to coarse grained sandstone, granule conglomerate, minor siltstone and pebble conglomerate; massive to poor bedding, lenticular cross lamination; trace fossils in shale bands. Overlain by glauconitic bioturbated muddy fine to coarse grained quartzose Sandstone with trace fossils.	Shallow marine, following fluvial	unconformable on basement; conformable on Garraway Beds
	JURASSIC	Garraway Beds	Jw	0 to max 150(?)	Very coarse to fine, clay-rich micaceous quartzose sandstone granule and pebble conglomerate. Carbonaceous in part. Very poorly sorted, sub-angular, friable. Well developed tabular cross-bedding.	Continental-fluvial	Overlies basement unconformably.
between latitudes 11° & 12°S	JURASSIC AND EARLY CRETACEOUS	Helby Beds	JKb	330 + (max. 600?)	Fine to very coarse quartzose sandstone, granule conglomerate and micaceous carbonaceous siltstone. Flaser bedded, cross-laminated, highly bioturbated.	Shallow marine following estuarine	Overlies basement unconformably. Conformably overlain by Rolling Downs Group. Equivalent in part to Gilbert River Formation and Garraway Beds.
		East coast Sub-units					
			Jb_4	21	Clayey quartzose sandstone, granule conglomerate, and soft, micaceous, worm-bored ripple-laminated siltstone.	Estuarine	Conformable within Helby Beds. Overlies unit Jb_3 conformably.
			Jb_3	15	Coarse to medium quartzose sandstone and granule conglomerate. Well-developed tabular cross-lamination.	Fluvial	Conformable between unit Jb_4 and unit Jb_2.
			Jb_2	12	Clayey coarse micaceous sandstone and quartzose granule conglomerate, very poorly sorted, massive with minor lamination, extensively bioturbated.	Estuarine	Conformable between unit Jb_3 and unit Jb_1.
			Jb_1	5+	Medium to fine quartzose sandstone and claystone, thinly cross-laminated, slide-slump bedded, sparsely worm-bored, thin carbonaceous band.	Estuarine	Conformably overlain by unit Jb_2 Conformable within Helby Beds.
north of latitude 11°S	LATE JURASSIC AND EARLY CRETACEOUS	Albany Pass Beds	JKa	12 minimum	Fine to coarse clayey quartzose sandstone, pebble and granule conglomerate. Cliff-forming, white poorly sorted, massive or well bedded, lenticular cross-laminated; included boulders of laminated claystone.	Continental-fluvial	Unconformable on basement; change of facies into Helby Beds. Lower part equivalent to the Helby Beds.

Fig.1-Distribution of Mesozoic sandstone units



Geological boundary

Margin of deposition of Jurassic Eulo Queen group and equivalent Garraway Beds

Facies boundary (approx.) in Jurassic and Lower Cretaceous sandstone

TORRES STRAIT — 1:250 000 Sheet Name

■ Town or small settlement

Rolling Downs Group and younger sediments

JKg — Gilbert River Formation

JW — Garraway Beds

=== Vehicle track

JKb — Helby Beds

JKa — Albany Pass Beds

Pre-Mesozoic basement

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Fig.2-Diagrammatic relationship of Mesozoic units

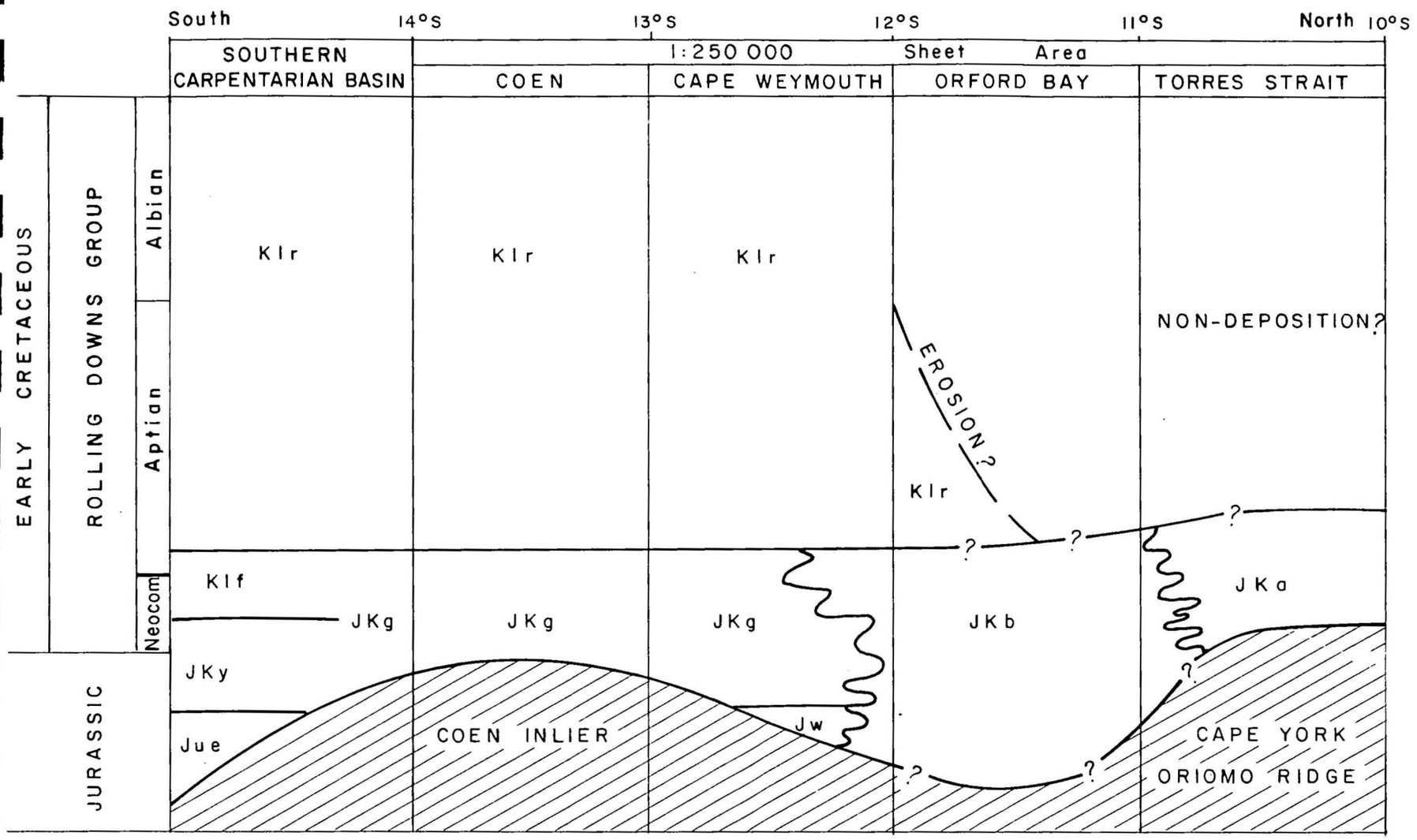

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Figure 3-Distribution of Cainozoic units, Cape York Peninsula

141°45'
143°15'
141°00'
144°00'
11°00'
12°00'
13°00'
14°00'
15°00'
16°00'

TORRES STRAIT
CAPE YORK
BAMAGA
JARDINE RIVER
ORFORD BAY
Vrilya Point
KTi
Wenlock
River
WEIPA
CAPE WEYMOUTH
Pascoe R
IRON RANGE
Czk
Czv
GULF OF CARPENTARIA
CORAL SEA
AURUKUN
COEN
AURUKUN MISSION
R
Coen
Archer
Czh
COEN AIRPORT
COEN
HOLROYD
CAPE MELVILLE
Czy
River
Holroyd
Cape Melville
Princess Charlotte Bay
Kennedy R
EDWARD RIVER MISSION
Tf
COOKTOWN
North
LAURA
To Cooktown
To Cairns

0 20 40 60 80 100
Kilometres

Road
Vehicle track
Town

HOLROYD 1:250000 Sheet area

Geological boundary (? inferred)

Czy Wyaaba Beds
Czv Lilyvale Beds
Czk Yam Creek Beds
Czh Falloch Beds

Tf Fairview Gravel
KTi Bulimba Formation

Q/A 528

Record 1974/91