

NOTES ON THE VEGETATION AND FLORA OF THE CAPE LONDONDERRY  
PENINSULA, NORTH KIMBERLEY, WESTERN AUSTRALIA

by A.S. GEORGE

(Western Australian Herbarium,  
South Perth, W.A. 6151)

## INTRODUCTION

On Tuesday, 5 August 1975, in the company of Andrew Burbidge of the Wildlife Research Centre, Wanneroo, I visited the Cape Londonderry area in the north Kimberley of Western Australia. No previous botanical collections had been made there.

Cape Londonderry, the northern extremity of the Western Australian mainland, lies at the apex of a broad peninsula in lat.  $13^{\circ}44'S$ , long.  $126^{\circ}58'E$  (Fig. 1). It was named in 1819 by Philip Parker King, probably after Londonderry in Ireland (King 1827). To the west-south-west is Cape Talbot, also named by King, after the then Lord Lieutenant of Ireland, while on the north side of the Drysdale River estuary is Curran Point. They are the only named points of the peninsula. The peninsula is uninhabited and has never been used for pastoral purposes.

In contrast to early maritime expeditions along this coast, we travelled by helicopter. The visit was part of a biological expedition to the Drysdale River National Park. The flight from the Park took us to the east coast of the peninsula in about lat.  $13^{\circ}55'S$ , thence to Cape Londonderry, westwards towards Cape Talbot, inland over the plateau, south-west to the estuary of the Drysdale River and back up the River to the Park. Three landings were made - on the east coast in lat.  $13^{\circ}53'S$ , long.  $127^{\circ}04'E$  (site 1); on the north coast in lat.  $13^{\circ}48'S$ , long.  $126^{\circ}46'E$  (site 2); and on the plateau in lat.  $13^{\circ}52'S$ , long.  $126^{\circ}57'E$  (site 3). At each of the first two sites about 45 minutes were available to record data and collect specimens, while at the third only 30 minutes were allowed. Because of the short time, much recording was done photographically, and plant collections were placed in plastic bags, to be written up and pressed in the afternoon after returning to camp. In all, 104 plant collections were made and several readily-determined species were recorded (e.g. *Bossiaea bossiaeoides*, *Grevillea pteridifolia*), resulting in a preliminary flora list of 88 species for the area. A further 10 species have yet to be determined.

It being late in the dry season, few trees and shrubs were in flower or fruit and the grasses were dead or dormant according to habit. However in the damp area behind the mangroves at site 2 many herbs made a colourful display.

## GEOLOGY AND LANDFORMS

The peninsula consists basically of three physiographic divisions - the Prince Regent Plateau in the west; the Gibb Hills in the north and

centre; and the Karunjie Plateau in the south-east (Gellatly and Sofoulis, 1969). Drainage is to the sea except in the south-west where it is to the Drysdale River estuary. Streams are mostly of intermittent flow and are relatively small.

The Prince Regent Plateau consists largely of King Leopold Sandstone, but a large proportion of it on the peninsula is overlain by Quaternary sand and colluvium. Further, there is an extensive covering of Tertiary laterite in the north-west and central area, forming a plateau of fairly even surface. Small areas of Quaternary alluvium, beach sand, silt, and mud have accumulated around the coast, with extensive deposits in the estuary of the Drysdale River.

The Gibb Hill geological province is mostly Carson Volcanics, overlain by laterite in areas near the north-east coast. Around the margins there are large pockets of Cainozoic volcanic-derived beach sand and silt. At Cape Londonderry itself is a small deposit of Quaternary shelly limestone.

The Karunjie Plateau is Warton Sandstone with small areas of sand and colluvium. A narrow band of Carson Volcanics lies along part of the east coast with pockets of beach sand and silt in bays.

Most of the peninsula is plateau-like with an elevation of about 70 metres. Some dissection by streams has occurred. In sandstone areas the surface is rugged but lateritic surfaces are relatively smooth.

The coast has a ria shoreline, irregular, and often colourful and spectacular (Fig. 2). In places the sandstone and lateritic plateau reaches the coast where it ends abruptly as cliffs or steep screes (Figs. 2, 8). Intermittent streams enter many bays. In one case, two fall into a narrow inlet over vertical sandstone cliffs: probably a spectacular sight in the wet season. At other places the plateau descends more gradually to the sea (Figs. 3,4,5). Alluvial deposits of sand or silt have built up in some bays and estuaries (Figs. 6,7).

#### CLIMATE

No weather-recording stations occur on the peninsula, the nearest being Kalumburu Mission to the south-west in about lat.  $14^{\circ}17'S$ , long.  $126^{\circ}43'E$ . Here the rainfall is about 1600 mm, most of which falls between November and March. During the remaining months little rain falls and relative humidity is low. The mean monthly maxima are about  $32^{\circ}C$  in the coolest months (June-August) and  $37^{\circ}C$  in the warmest (October-November). Mean monthly minima range from  $14^{\circ}C$  to  $25^{\circ}C$ . (Data provided by the Bureau of Meteorology). The temperature probably never falls to  $0^{\circ}C$ , though frosts have been recorded in the central Kimberley.

#### VEGETATION AND FLORA

The variety of landform and geological substrate was reflected in the vegetation. On the coast, alluvial flats and some rocky shores supported mangroves in a low closed-forest or closed-scrub (Figs. 3,4,7,8,10). (Structural terminology is that of Specht *et al.* 1974). Some stands were

zoned, others very mixed. They were sampled at sites 1 and 2. Mangroves recorded were *Avicennia marina*, *Bruguiera exaristata*, *Lumnitzera racemosa* and *Scyphiphora hydrophyllacea*. This is the first record in Western Australia of the genus *Scyphiphora* (Rubiaceae). On the landward margin of the mangroves, the fern *Acrostichum speciosum* sometimes occurred.

Extensive stands of mangroves occurred on silt around the estuary of the Drysdale River (Fig. 7).

Sandy coastal flats carried open hummock grassland, sometimes with scattered shrubs and *Pandanus* (Figs. 6,8). At site 1, a spinifex (? *Triodia*) was dominant, while the shrubs were *Grevillea refracta*, *G. viscidula* and a few *Phyllanthus baccatus*.

At the edge of the Plateau, sandstone screes supported the low closed-forest formation known as vine thicket (Figs. 8,9). At site 1 it was sampled where the scree rises at the back of a sandy flat, but along the inlet nearby it occurred as a narrow belt immediately above the mangroves. The formation was rich in genera especially of Indo-Malaysian elements; typical Australian genera such as *Eucalyptus*, *Acacia* and *Triodia* were absent. The following species were recorded:

#### Trees and shrubs

*Bridelia* ? *tomentosa*, *Buchanania obovata*, *Cassine melanocarpa*, *Celtis philippensis*, *Cryptocarya* sp., *Glycosmis pentaphylla*, *Gyrocarpus americanus*, *Pithecellobium moniliferum*, *Planchonia australis*, *Pouteria sericea*, *Stenocarpus cunninghamii*, *Strychnos lucida*, *Terminalia petiolaris*, and several undetermined species.

#### Creepers

*Capparis* sp., *Flagellaria indica*, *Malaisia scandens*, *Passiflora foetida*, and two undetermined taxa.

Tall open-shrubland occupied the edge of the sandstone plateau at site 1 where the surface was rocky and rugged. There were no dominants. Part of the area had been burnt, probably about two years previously. The shrubs and small trees recorded were: *Acacia* ? *gonocarpa*, *A.* ? *retinervis*, *Brachychiton* sp., *Eucalyptus* sp. (a bloodwood), *Ficus platypoda*, *Grevillea cunninghamii*, *Owenia vernicosa*, *Planchonella arnhemica*, *Sarcostemma australe* and *Xanthostemon* sp. A spinifex (? *Plectrachne*) was common. In the burnt area were short-lived shrubs and perennial herbs, probably fire-opportunists, including *Cassia oligoclada*, *Denisonia ternifolia*, *Scaevola ovalifolia*, *Trachymene hemicarpa* and *Triumfetta* aff. *appendiculata*.

The vegetation of the plateau, whether on laterite or sandstone, was mostly woodland, low open-forest, low woodland and low open-woodland (Figs. 3,4,5,10,11). It was dominated by species of *Eucalyptus* with a sparse understorey of shrubs and a ground cover of grasses. In some rugged areas of King Leopold Sandstone to the east of the estuary of the Drysdale River, fan palms (*Livistona*) were common (Fig. 13). They were probably *L. loriphylla* which was common on similar sandstone hills near the river farther south (George & Kenneally 1977).

The woodland of the lateritic plateau was sampled at site 3 (Fig. 11). The surface here was quite level with a typical gravelly soil. The dominant trees were *Eucalyptus bleeseri*, *E. latifolia* and *E. tetradonta*. Other trees and shrubs were *Buchanania obovata*, *Calytrix microphylla*, *Grevillea agrifolia*, *Melaleuca viridiflora*, *Terminalia canescens* and

*Verticordia cunninghamii*. A rather sparse ground cover of grasses was very dry; the only herbs in flower or fruit were *Blumea* sp., *Borreria* ? *australiana* and *Buchnera urticifolia*.

At site 2, a low woodland occurred on sandy soil behind the mangroves (Fig. 10). It was dominated by bloodwood species of *Eucalyptus*. An open understorey of shrubs included *Acacia translucens*, *Bossiaea bossiaeoides*, *Burtonia subulata*, *Persoonia falcata*, *Syzygium suborbiculare* and *Verticordia cunninghamii*. Herbs among the dry grass were *Blumea* sp., *Bonamia* ? *pinnosa*, *Buchnera urticifolia*, *Pimelea sanguinea*, *Scaevola ovalifolia* and the fern *Platyzoma microphyllum*.

Two small swampy areas were sampled. One at the foot of the vine thicket at site 1, was dominated by *Melaleuca viridiflora*. The other, at site 2, lay behind the mangroves and again was dominated by *Melaleuca viridiflora* with admixture of *Pandanus darwinensis* and *Myoporum acuminatum*. Farther back, probably beyond the reach of Spring tides, were *Acacia plectocarpa*, *A. pellita*, *Grevillea pteridifolia*, *Pandanus spiralis*, *Thespesia populneoides*, *Phylidrum lanuginosum* and tall grasses. At the same site, a narrow damp area between the mangroves and the low woodland supported a colourful array of herbs in open swards between shrubs. Those recorded were *Byblis liniflora*, *Centrolepis exserta*, *Drosera indica* (with pink flowers), *Fuirena ciliaris*, *Hemiarrhena plantaginea*, *Mimulus* sp. (with yellow flowers), *Stylidium multiscapum*, *Thysanotus chinensis*, *Utricularia chrysantha*, and *Xyris* aff. *complanata*.

At the same locality two herbs grew on open sandstone rocks by the mangroves - *Eleocharis* sp. and *Pluchea rubelliflora*.

A list of the determined flora is given in Table 1. It contains 88 species - 2 ferns in 2 families, 10 monocots in 9 genera of 7 families, and 76 dicots in 63 genera of 43 families.

#### DISCUSSION

The geology and vegetation of the area is described by N.H. Speck (in Speck *et al.* 1960). Because the available data were limited his treatment is necessarily broad, and the present work has the advantage of the more detailed geological studies of Gellatly and Sofoulis (1969) as well as the opportunity to visit the area.

Site 1 is remarkable for the variety of vegetation formations within a small area. A sketch map (Fig. 12) taken from aerial photography shows the sudden changes in vegetation between shore and plateau due to soil and moisture changes. Although site 2 is less varied, a map is also provided (Fig. 14) to show the vegetation pattern. Site 3 is relatively uniform.

Several of the species collected are of special interest. The record of *Scyphiphora* brings the number of mangrove species in Western Australia to 15. A new variety of *Pandanus* has been described based on a collection from site 2 - *P. spiralis* var. *multimammillatus* B.C. Stone. It is the only collection made so far of the variety. The *Mimulus* from site 2 (also collected in the Drysdale River National Park) is apparently undescribed and is the first indigenous species with yellow flowers found in the State. The record of *Malaisia scandens* extends the range in the State of this

recently recorded species - other localities are Augustus Is., SW Osborne Is., Mt. Trafalgar and Gandjal Ck (the last two being in the Prince Regent River Nature Reserve).

*Terminalia petiolaris* is also an interesting record since the species was previously known only from the Dampier Peninsula in the south western Kimberley.

The observation of *Livistona* (not collected but tentatively named *L. loriphylla* since it appeared from the air to be the same as that species collected in the Drysdale River National Park) adds to the distributional data for a genus of restricted occurrence in the State.

The peninsula is varied in landform, geology and vegetation, the scenery in places spectacular, always colourful. In general the vegetation and flora are similar to parts of the Drysdale River National Park (George & Kenneally, 1977), but a feature is the extensive lateritic plateau, a formation which is rare elsewhere in the north Kimberley (the Mitchell Plateau to the south-west carries a completely different vegetation).

The area would be well worth surveying in and just after the wet season.

#### ACKNOWLEDGEMENTS

The visit was part of a biological survey of the Drysdale River National Park which was supported in part by a grant to the Department of Fisheries and Wildlife from the Australian Biological Resources Study. I thank Andrew Burbidge for his assistance in the field and Joe Ward for his accomplished and cheerful flying. Assistance in determining plants was received from the staff of the Western Australian Herbarium, Mrs. S.G.M. Carr (Research School of Biological Sciences, Australian National University) and Dr. B.C. Stone (University of Malaya, Kuala Lumpur). The Photogrammetry Section of the Department of Lands and Surveys provided aerial photographs for study.

#### REFERENCES

- Gellatly, D.C. and Sofoulis, J. (1969). *1:250,000 Geological Series - Explanatory Notes; sheets SD.52-5 and 9 - Drysdale and Londonderry*, W.A. Bureau of Mineral Resources.
- George, A.S. and Kenneally, K.F. (1977). The flora of the Drysdale River National Park. In: *A Biological Survey of the Drysdale River National Park, August 1975*, ed. E.D. Kabay and A.A. Burbidge. *Wildlife Research Bulletin No. 6*, pp. 32-78.
- King, P.P. (1827). *Narrative of a Survey of the Intertropical and Western coasts of Australia, performed between the years 1818 and 1822*. 2 Vols. John Murray, London.
- Specht, R.L., Roe, E.M. and Boughton, V.H. (1974). Conservation of major plant communities in Australia and Papua New Guinea. *Australian Journal of Botany, Supplementary Series No. 7*.

Speck, N.H., Bradley, J., Lazarides, M., Patterson, R.A., Slatyer, R.O., Stewart, G.A. and Twidale, C.R. (1960). The Lands and Pastoral Resources of the North Kimberley Area, W.A. *C.S.I.R.O. Australian Land Research Series No. 4.*

TABLE 1

LIST OF SPECIES RECORDED ON CAPE LONDONDERRY PENINSULA. All except those marked (obs.) are represented by collections in the Western Australian Herbarium (PERTH).

Species and Family	Site		
	1	2	3
<i>Acacia ? gonocarpa</i> F. Muell. Mimosaceae	x		
<i>Acacia pellita</i> O. Schwartz Mimosaceae			x
<i>Acacia plectocarpa</i> Benth. Mimosaceae			x
<i>Acacia ? retinervis</i> Benth. Mimosaceae	x		
<i>Acacia translucens</i> A. Cunn. ex Hook. Mimosaceae			x
<i>Acrostichum speciosum</i> Willd. Pteridaceae			x
<i>Avicennia marina</i> (Forsk.) Vierh. Avicenniaceae	x		
<i>Blumea</i> sp. Asteraceae		x	x
<i>Bonamia ? pamosa</i> (R.Br.) Hall.f. Convolvulaceae		x	
<i>Borreria ? australiana</i> Specht Rubiaceae			x
<i>Bossiaea bossiaeoides</i> (A. Cunn. ex Benth.) A.B. Court Papilionaceae (obs.)			x
<i>Brachychiton</i> sp. Sterculiaceae	x		
<i>Bridelia tomentosa</i> Bl. Euphorbiaceae	x		
<i>Bruguiera exaristata</i> Ding Hou Rhizophoraceae	x	x	
<i>Buchanania obovata</i> Engl. Anacardiaceae	x		x
<i>Buchnera urticifolia</i> R.Br. Scrophulariaceae		x	x
<i>Burtonia subulata</i> (Benth.) Benth. Papilionaceae		x	
<i>Byblis liniflora</i> Salisb. Byblidaceae		x	
<i>Calytrix microphylla</i> A. Cunn. Myrtaceae			x
<i>Capparis</i> sp. Capparidaceae	x		
<i>Cassia oligoclada</i> F. Muell. Caesalpiniaceae	x		
<i>Cassine melanocarpa</i> (F. Muell.) O. Kuntze Celastraceae	x		
<i>Cassytha filiformis</i> L. Lauraceae	x	x	
<i>Celtis philippensis</i> Blanco Ulmaceae	x		
<i>Centrolepis exserta</i> (R.Br.) R. & S. Centrolepidaceae			x
<i>Cryptocarya</i> sp. Lauraceae	x		
<i>Cyperus</i> sp. Cyperaceae	x		
<i>Decaisnina signata</i> (F. Muell. ex Benth.) Tiegh. Loranthaceae	x		
<i>Denisonia ternifolia</i> F. Muell. Dicrostylidaceae	x		
<i>Drosera indica</i> L. Droseraceae			x
<i>Eleocharis</i> sp. Cyperaceae			x
<i>Eucalyptus bleeseri</i> Blakely Myrtaceae			x
<i>Eucalyptus latifolia</i> F. Muell. Myrtaceae			x
<i>Eucalyptus tetradonta</i> F. Muell. Myrtaceae			x
<i>Eucalyptus</i> sp. (bloodwood) Myrtaceae			x
<i>Exocarpos latifolius</i> R.Br. Santalaceae	x		
<i>Ficus platypoda</i> A. Cunn. Moraceae	x		
<i>Ficus virens</i> Ait. Moraceae	x		
<i>Flagellaria indica</i> L. Flagellariaceae	x		
<i>Fuirena ciliaris</i> (L.) Roxb. Cyperaceae	x	x	

cont.

Table 1 (cont.)

Species and Family	Site		
	1	2	3
<i>Gardenia</i> sp. Rubiaceae	x		
<i>Glycosmis pentaphylla</i> (Retz.) DC. Rutaceae	x		
<i>Grevillea agrifolia</i> A. Cunn. ex R.Br. Proteaceae (obs.)			x
<i>Grevillea cunninghamii</i> R.Br. Proteaceae	x		
<i>Grevillea pteridifolia</i> Knight Proteaceae (obs.)		x	
<i>Grevillea refracta</i> R.Br. Proteaceae	x		
<i>Grevillea viscidula</i> C.A. Gardn. Proteaceae	x		
<i>Gyrocarpus americanus</i> Jacq. Gyrocarpaceae	x		
<i>Hemiarrhena plantaginea</i> Benth. Scrophulariaceae		x	
<i>Livistona ? loriphylla</i> Beccari Arecaceae (obs. from air)			
<i>Lumnitzera racemosa</i> Willd. Combretaceae	x		
<i>Malaisia scandens</i> (Lour.) Planch. Moraceae	x		
<i>Melaleuca viridiflora</i> W.V. Fitzg. Myrtaceae	x	x	x
<i>Mimulus</i> sp. Scrophulariaceae			x
<i>Mitrasacme</i> sp. Loganiaceae			x
<i>Myoporum acuminatum</i> R.Br. Myoporaceae			x
<i>Owenia vernicosa</i> F. Muell. Meliaceae (obs.)	x		
<i>Pandanus darwinensis</i> St. John var. <i>latifructus</i> (St. John) B.C. Stone Pandanaceae			x
<i>Pandanus spiralis</i> R.Br. var. <i>multimammillatus</i> B.C. Stone Pandanaceae			x
<i>Parsonsia velutina</i> R.Br. Apocynaceae	x		
<i>Passiflora foetida</i> L. Passifloraceae (obs.)	x		
<i>Persoonia falcata</i> R.Br. Proteaceae	x	x	
<i>Phylidrum lanuginosum</i> Banks & Solander ex Gaertn. Phylidraceae			x
<i>Phyllanthus baccatus</i> F. Muell. ex Benth. Euphorbiaceae	x		
<i>Pimelea sanguinea</i> F. Muell. Thymelaeaceae			x
<i>Pithecellobium moniliferum</i> (Hassk.) Benth. Mimosaceae	x		
<i>Planchonella arnhemica</i> (F. Muell.) C.A. Gardn. Sapotaceae	x		
<i>Planchonia australis</i> (F. Muell.) Kunth. Barringtoniaceae	x		
<i>Platyzoma microphyllum</i> R.Br. Gymnogrammeaceae			x
<i>Pluchea rubelliflora</i> (F. Muell.) Robins Asteraceae			x
<i>Pouteria sericea</i> (Ait.) Baehri Sapotaceae	x		
<i>Sarcostemma australe</i> R.Br. Asclepiadaceae (obs.)	x		
<i>Scaevola ovalifolia</i> R.Br. Goodeniaceae	x	x	
<i>Scyphiphora hydrophyllacea</i> Gaertn. Rubiaceae			x
<i>Stenocarpus cunninghamii</i> R.Br. Proteaceae	x		
<i>Strychnos lucida</i> R.Br. Loganiaceae	x		
<i>Stylidium multiscapum</i> O. Schwarz Stylidiaceae			x
<i>Syzygium suborbiculare</i> (Benth.) Hartley & Perry Myrtaceae			x
<i>Terminalia canescens</i> (DC.) Radlk. Combretaceae			x
<i>Terminalia petiolaris</i> A. Cunn. ex Benth. Combretaceae	x		
<i>Thespesia populneoides</i> (Roxb.) Kostel Bombacaceae			x
<i>Thysanotus chinensis</i> Benth. Liliaceae			x
<i>Trachymene hemicarpa</i> (F. Muell.) Benth. Apiaceae	x		
<i>Triumfetta</i> aff. <i>appendiculata</i> F. Muell. Tiliaceae	x		
<i>Utricularia chrysantha</i> R.Br. Lentibulariaceae			x
<i>Verticordia cunninghamii</i> Schau. Myrtaceae			x
<i>Xanthostemon paradoxus</i> F. Muell. Myrtaceae	x		
<i>Xyris</i> aff. <i>complanata</i> R.Br. Xyridaceae			x

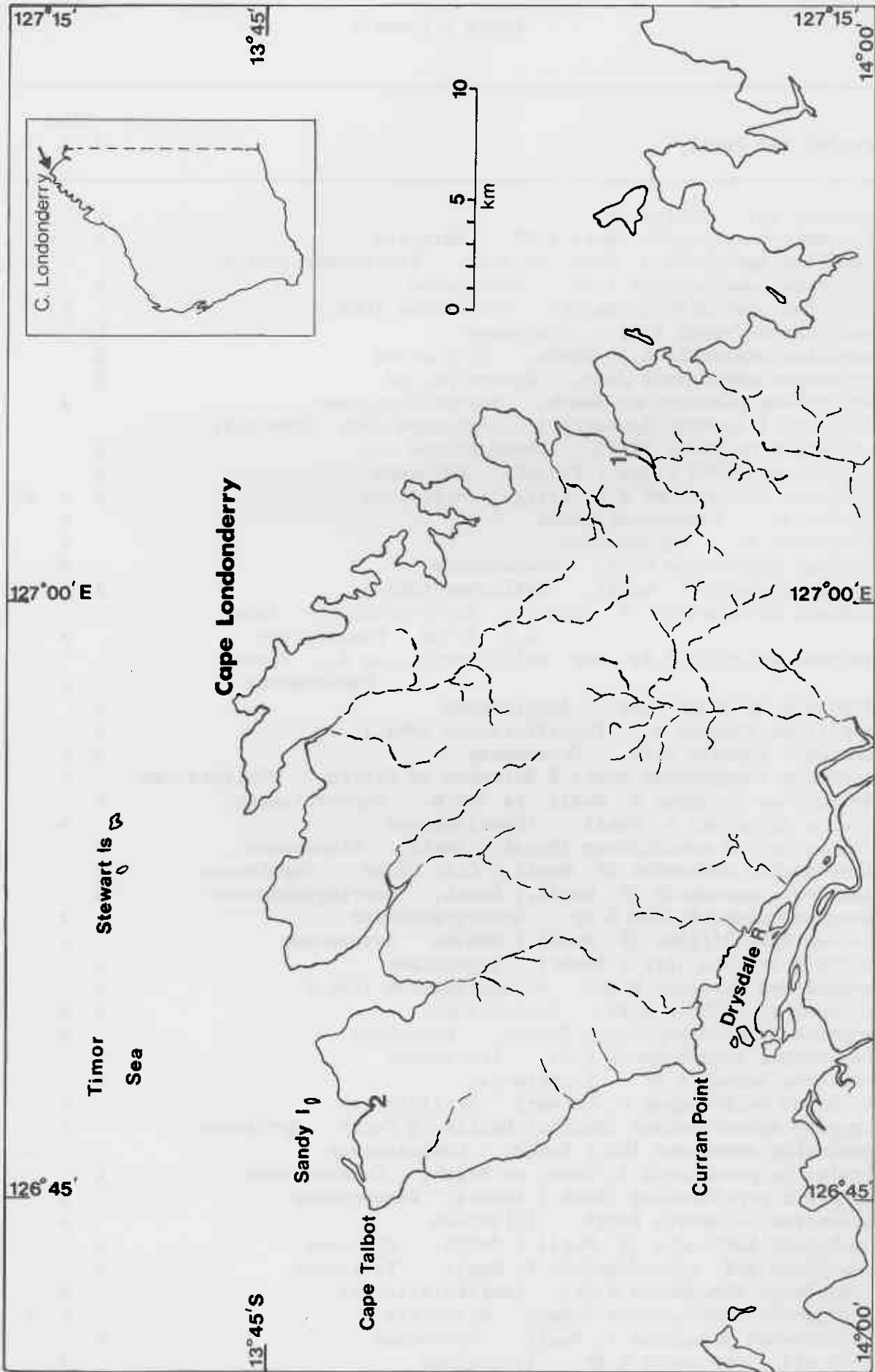


Fig. 1. Map of the Cape Londonderry peninsula. Landing sites are numbered.





Fig. 2. Coastline on the east side of the large bay in approximately  $127^{\circ}08'E$  longitude. Sandstone plateau in foreground, mangrove-covered estuary right-centre.



Fig. 3. North coast of the peninsula with mangrove fringe; low sandstone plateau behind with low woodland.

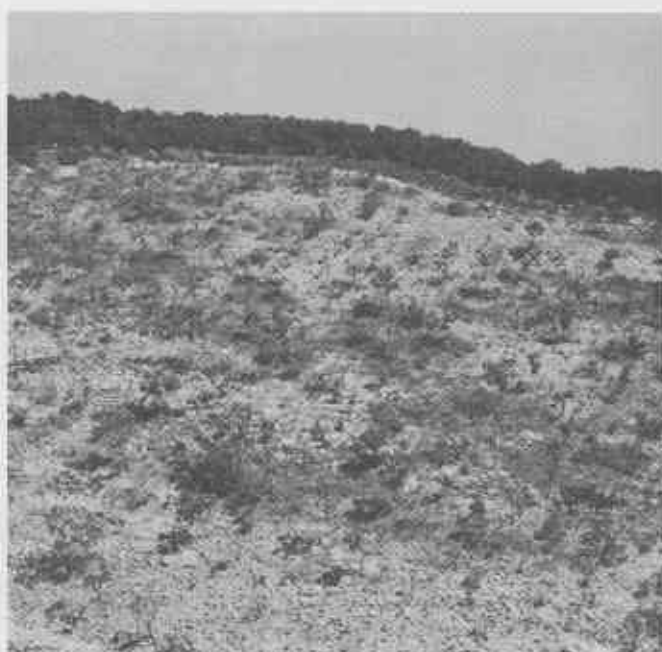


Fig. 4. Narrow mangrove fringe on the north coast of the peninsula, with low open-woodland on sandstone in foreground.



Fig. 5. *Eucalyptus* woodland near the coast west of Cape Londonderry, looking across a large bay.



Fig. 6. A sandy shore west of Cape Londonderry with ? *Triodia* and scattered shrubs including a few *Pandanus*.



Fig. 7. Mangroves in the tidal estuary of a tributary of the Drysdale River east of its mouth.



Fig. 8. At site 1; tall open-shrubland on sandstone plateau, vine thicket on scree (including foreground), hummock grassland with scattered *Grevillea* on sandy flat, mangrove creek (centre-left to centre), inlet beyond with sandstone cliffs on farther side. Helicopter (left) gives scale.



Fig. 9. At site 1; *Melaleuca viridiflora* festooned with *Passiflora foetida*, along small creek at edge of vine thicket.



Fig. 10. At site 2, view north; mangrove-filled inlet, with low woodland in foreground; the swampy area is just out of the picture beyond right-centre. Sandy Island offshore, top right.



Fig. 11. At site 3; woodland with *Eucalyptus bleeseri*, *E. tetradonta* and *E. latifolia*; understorey of grasses and scattered shrubs.

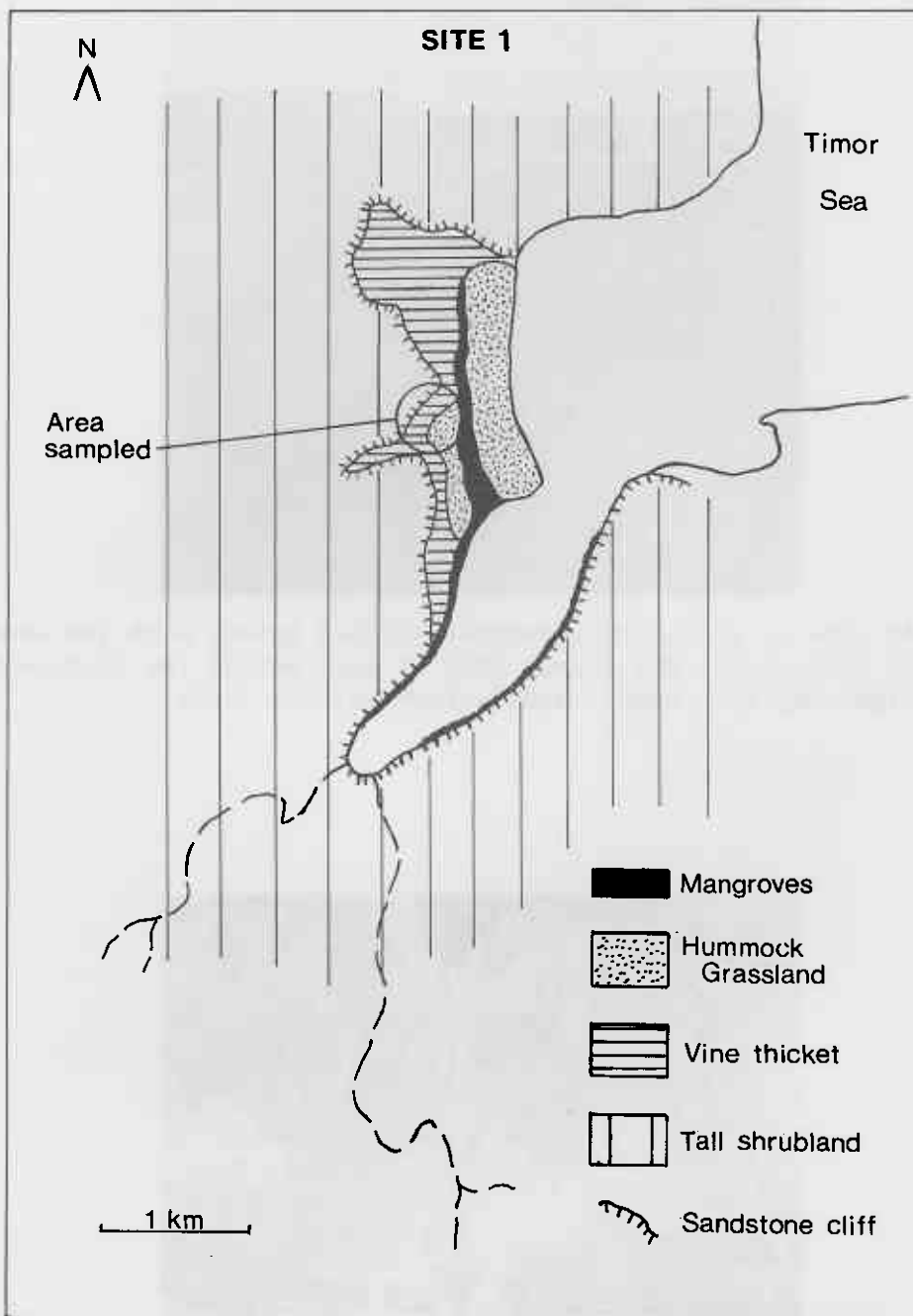


Fig. 12. Sketch map of vegetation types at site 1, taken from 1947 aerial photography.

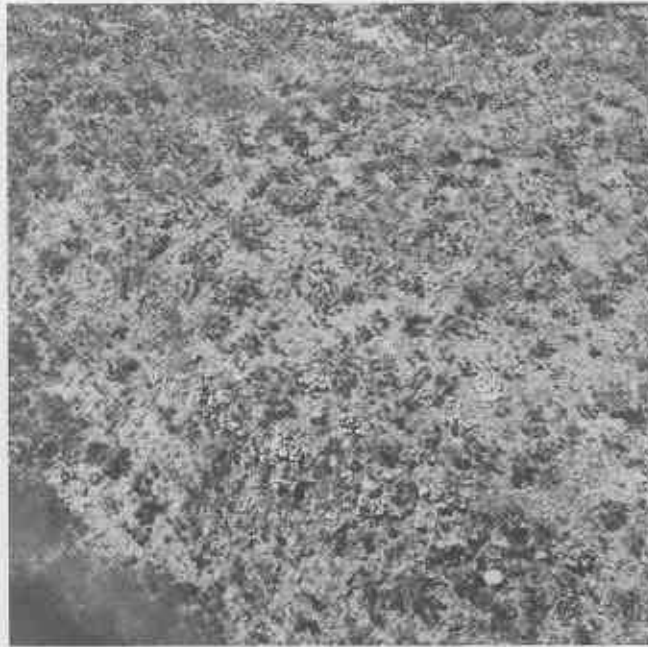


Fig. 13. Edge of the sandstone plateau east of the Drysdale River estuary; low open-woodland with many *Livistona*.

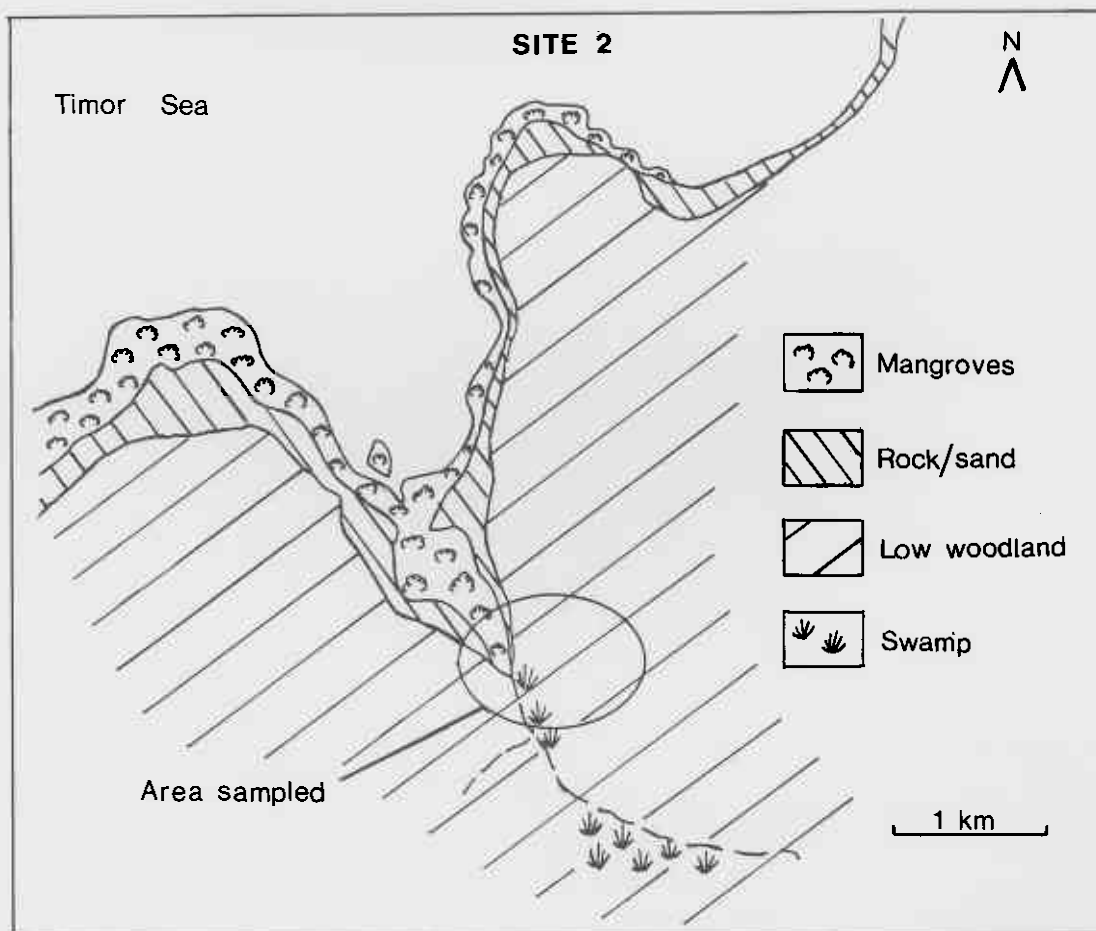


Fig.14. Sketch map of vegetation types at site 2.