AN ASSESSMENT OF THE HERITAGE VALUES OF THE MOUNT NULLUM AREA, TWEED VALLEY NORTH-EASTERN NEW SOUTH WALES

Prepared by:
National Parks and
Wildlife Service
(Northern Region)

R. John Hunter
Project Officer
(Rainforest Management)

Brian McLachlan
Ranger
(Lismore District)

March 1991.

EXECUTIVE SUMMARY

An assessment has been made of the heritage values of the Mount Nullum area which is situated 6km south-west of Murwillumbah on the Far North Coast of New South Wales. The area consists of Vacant Crown Land, land owned by Tweed Shire Council and freehold land.

Mount Nullum is the only known area of granite in the Tweed Shield and is one of only a few areas of granite in coastal south-east Queensland and north-east New South Wales.

Most of the mountain is covered in forest, and it forms part of a nearly continuous forested link between the Mount Warning National Park World Heritage Area and other areas of significant habitat to the east and south, including Nightcap National Park World Heritage Area. Forest formations present include rainforest, wet sclerophyll forest and dry sclerophyll forest. Other plant communities present include open shrubland on steep rocky slopes, communities on rock outcrops and successional communities on disturbed sites.

Subtropical, warm temperate and dry rainforest subformations are present. The two dry rainforest sub-alliances found on Mount Nullum are significant. The *Backhousia myrtifolia - Lophostemon confertus - Tristaniopsis* ssp. sub-alliance is reported for the first time for the far-north coast of NSW; this sub-alliance is inadequately conserved and not conserved at all in the north of its range. The *Waterhousia floribunda - Tristaniopsis laurina* sub-alliance is not conserved within NSW; that on Mount Nullum is the only area of this sub-alliance in the Mount Warning area which is relatively undisturbed.

Four associations are recognised in the wet sclerophyll forest on Mount Nullum. Three are considered inadequately conserved but not threatened in the forseeable future if landuses do not change.

The single dry sclerophyll forest association recognised from Mount Nullum has a similar conservation status.

Four hundred and eighty-three species of plants have been recorded from the mountain. Fourteen species are considered rare or threatened and a further 17 species are significant or noteworthy.

A number of these species either normally occur in much drier or less fertile habitat such as the Northern Tablelands or on rhyolite or, if present elsewhere in the Tweed Area, are represented on Mount Nullum in very high numbers and/or densities.

1. INTRODUCTION

Mount Nullum is a prominent topographic feature which forms part of a nearly continuous forested link between Mount Warning National Park and other areas of significant habitat to the east and south, including Nullum State Forest, Nightcap National Park, Burringbar Range, Mooball State Forest and the coastal lowlands. National Parks and Wildlife Service recognised the role of Mount Nullum as a "wildlife corridor" in making recommendations to the draft Local Environment Plan for Tweed Shire that part of area be zoned for Habitat Protection. At that time, the Service had only limited information on the heritage values of the area, although it was known that several rare or threatened plant species occurred on the mountain.

Part of the plateau section of Mount Nullum was purchased by Tweed Shire Council in 1980. Prior to purchase, the Council approached the Service to determine if it was interested in acquiring the area. The Service at that time was unaware of the values of Mount Nullum and declined the offer. It should be remembered that, at that time, the Service had not long acquired significant areas of coastal land and resources were directed towards the "rainforest debate". It is only since the gazettal of areas such as Nightcap National Park and Border Ranges National Park and the listing of five areas in and around Tweed Shire on the World Heritage List, that attention has focused on smaller areas such as Mount Nullum.

Tweed Shire Council envisaged the preferred land use of the land they purchased on Mount Nullum as being recreation of a low impact type. The proposal to rezone part of the Council-owned land from 7(e) Habitat to allow for a sanatorium, residential units, tourist accommodation, tourist facilities and other uses was vigorously opposed by many local residents and groups and highlighted the biological and cultural values of the Mount Nullum area. In response to requests from conservation groups, the Minister for Environment agreed to instruct the Service to investigate the possibility of creating a nature reserve in the Mount Nullum area.

This report provides a summary of the heritage values of the forested lands of the Mount Nullum area in the Tweed Valley. Flora of the area was investigated by Project Officer John Hunter and fauna of the area was surveyed by a four person team from the Lismore District. Additional records are drawn from the work of Glen Holmes for Mitchell McCotter and Associates, Andrew Murray (Consultant Botanist) and Harry Hines (University of New England, Armidale).

2. LOCATION AND ACCESS

Mount Nullum arises from the floor of the Tweed Valley some 6km south-west of Murwillumbah and 9km east of Mount Warning. It is bounded to the north and west by the Tweed River, to the south by Smiths Creek and to the east by Dunbible Creek.

The Murwillumbah-Kyogle Road runs around the western side of the mountain. Two 4WD roads leave this road and provide access to Mount Nullum - one running up the western slopes and onto the plateau, the other running through "Braeside" and up to the southern slopes onto the plateau (See Map One).

3. LAND TENURE AND HISTORY

The Mount Nullum area consists of a mix of private freehold land and land in public ownership.

Portions 87, 92 and 102, Parish Dunbible are owned by Tweed Shire Council. These portions were formerly Crown Land and were purchased in 1980 by the Council for development of tourist and recreation facilities.

Portions 70 and 71 are Vacant Crown Land. The remainder of the land are privately owned. (Map Two).

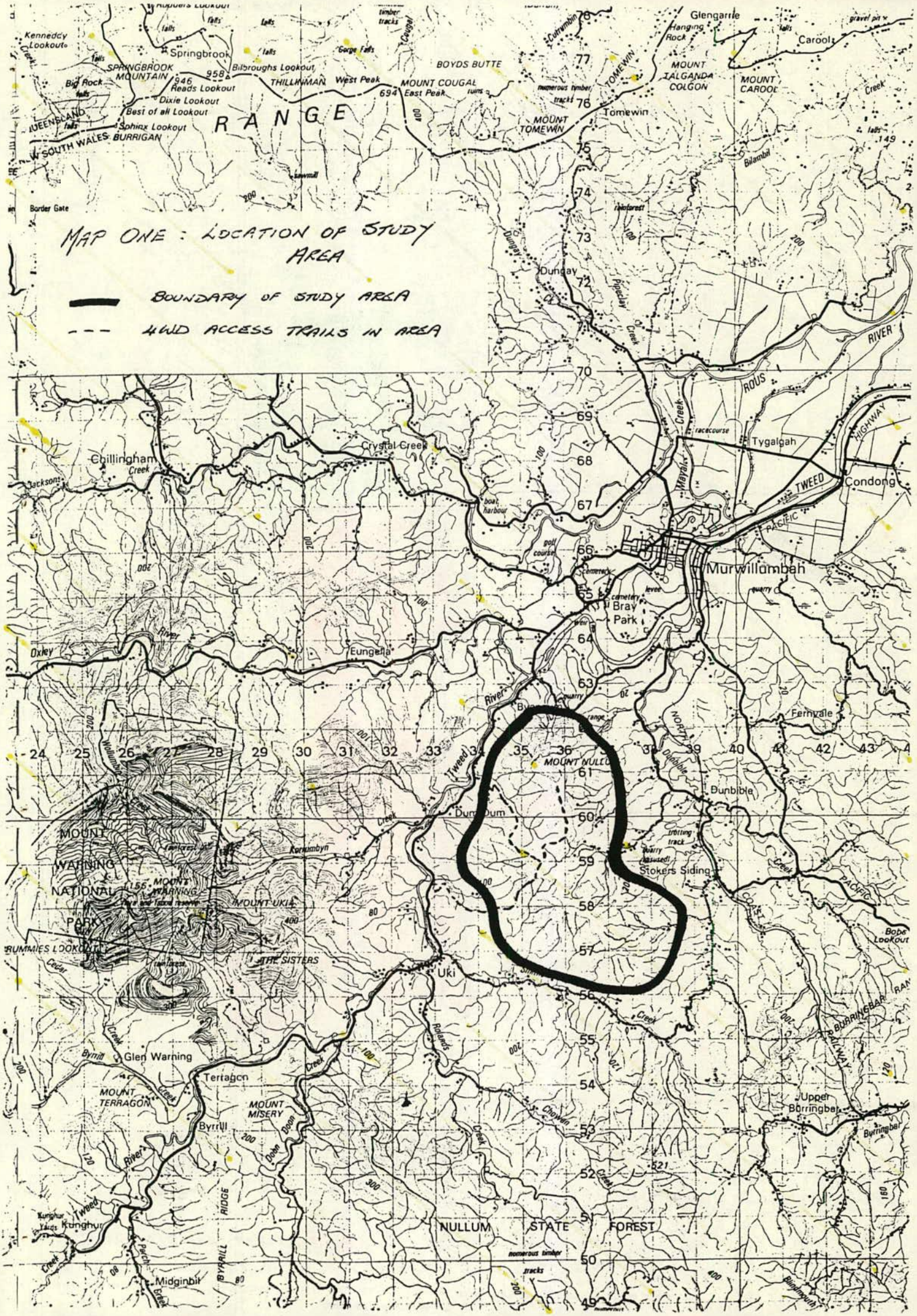
Logging has taken place in some parts over a period of many decades. Until about 40 years ago, a small sawmill operated on the plateau. Before being purchased by Council the plateau area of the Crown Land was selectively logged for "hardwoods" by Slys Sawmill. Logging on the remaining western area of the plateau and on gentler parts of the western slopes has also taken place; it seems that logging on the western part of the plateau has been more intense than on the Council land.

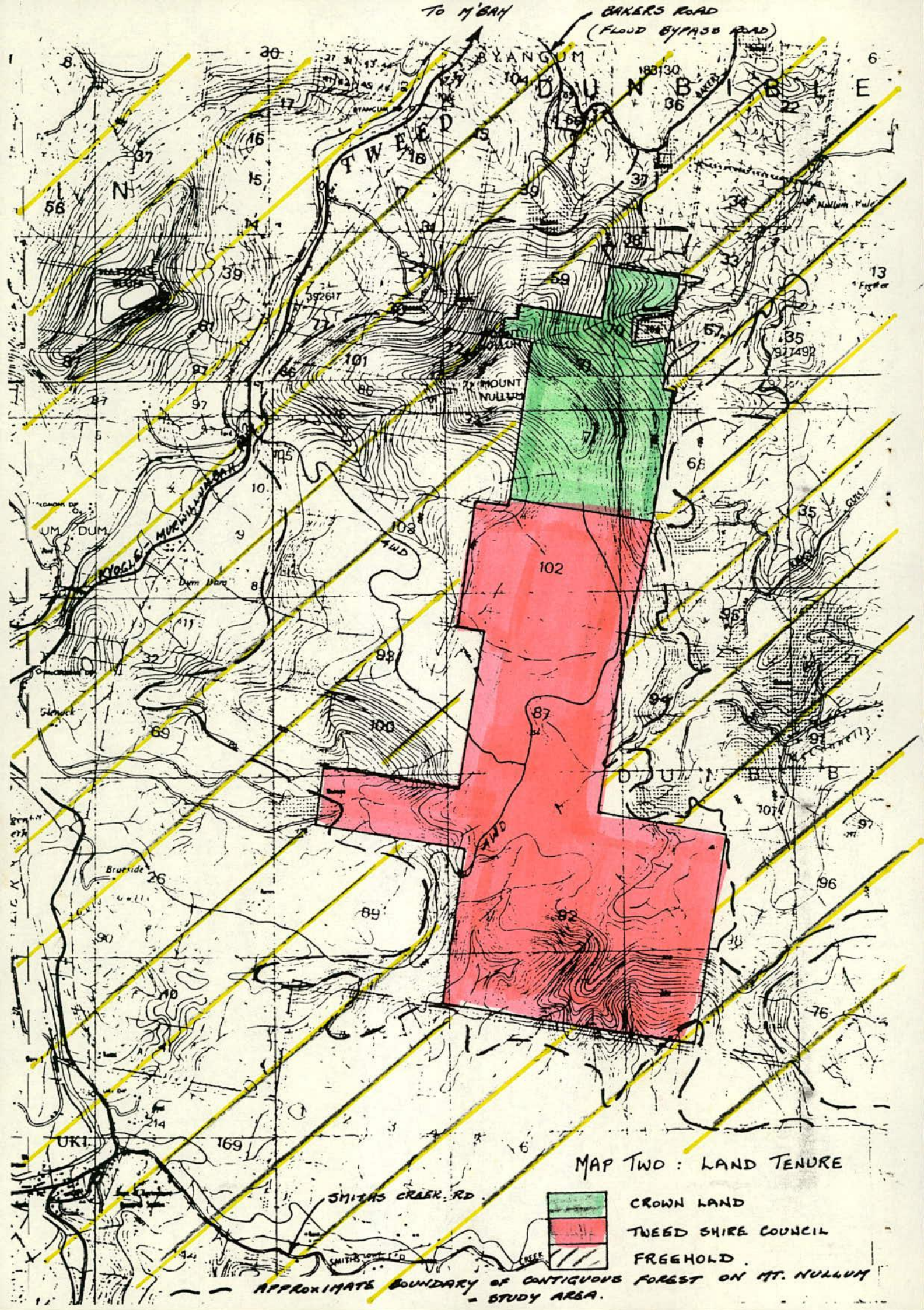
Banana growing appears to be the other major recent human activity which has taken place in the area. Plantations presently occur on the lower and mid slopes of the eastern, northern and south-western sides of the mountain. Dense stands of lantana in former rainforest areas on the southern parts of the mountain may result from old banana plantations or intensive logging or both.

4. GEOLOGY

Geology of the Mount Nullum (Map Three) area was studied by Gould (1970).

Mount Nullum is an Upper Tertiary igenous complex intruded into older Palaeozic phyllitic shales of the Brisbane metasediments. Contemporaneous volcanic phases, notably rhyolite and trachyandesite, also intrude the shales.


MAP ONE : LOCATION OF STUDY AREA
BOUNDARY OF STUDY AREA
4WD ACCESS TRAILS IN AREA
RANGE
QUEENSLAND
NEW SOUTH WALES
BURRIGAN
Springbrook
SPRINGBROOK MOUNTAIN
Kennedy Lookout
Big Rock
Reads Lookout
Dixie Lookout
Best of all Lookout
Sphinx Lookout
Bilbroughs Lookout
THILLIMAN
West Peak
MOUNT COUGAL
East Peak
BOYDS BUTTE
MOUNT TOMEWIN
Tomewin
MOUNT TALGANDA COLGON
MOUNT CAROOL
Glengarrie
Hanging Rock
Carool
Border Gate
Dungay
Dungay Creek
Pipeclay Creek
TWEED RIVER
ROUS
HIGHWAY
Tygalgah
racecourse
Condong
Crystal Creek
Chillingham
Jacksons
Murwillumbah
boat harbour
golf course
cemetery
Bray Park
levee
quarry
Oxley River
Eungella
Fernvale
Dunbible
MOUNT NULLUM
Stokers Siding
trotting track
MOUNT WARNING NATIONAL PARK
MOUNT WARNING
MOUNT UKI
RUMMIES LOOKOUT
THE SISTERS
Uki
Glen Warning
Tertagon
MOUNT TERRAGON
MOUNT MISERY
Byrrill
Upper Burringbar
Burringbar
Bogangar
Kunghur
Midginbil
BYRRILL RIDGE
NULLUM STATE FOREST
numerous timber tracks
PACIFIC COAST RAILWAY
Bore Lookout



MAP TWO : LAND TENURE

The intrusive complex consists of two phases:

- a lenticular quartz monzonite in the north-west of the complex (beyond the present study area)
- the Mount Nullum microgranite

The microgranite, which underlies nearly all of the study area, can be subdivided into four mineralogical zones:

- Zone 1 Pyroxene - hornblende plus remnant fayalite
- Zone 2 Pyroxene - hornblende - epidote
- Zone 3 Hornblende - biotite - epidote
- Zone 4 Hornblende - biotite

A metamorphic aureole is present around the microgranite, reaching the albite - epidote hornfels facies of contact metamorphism.

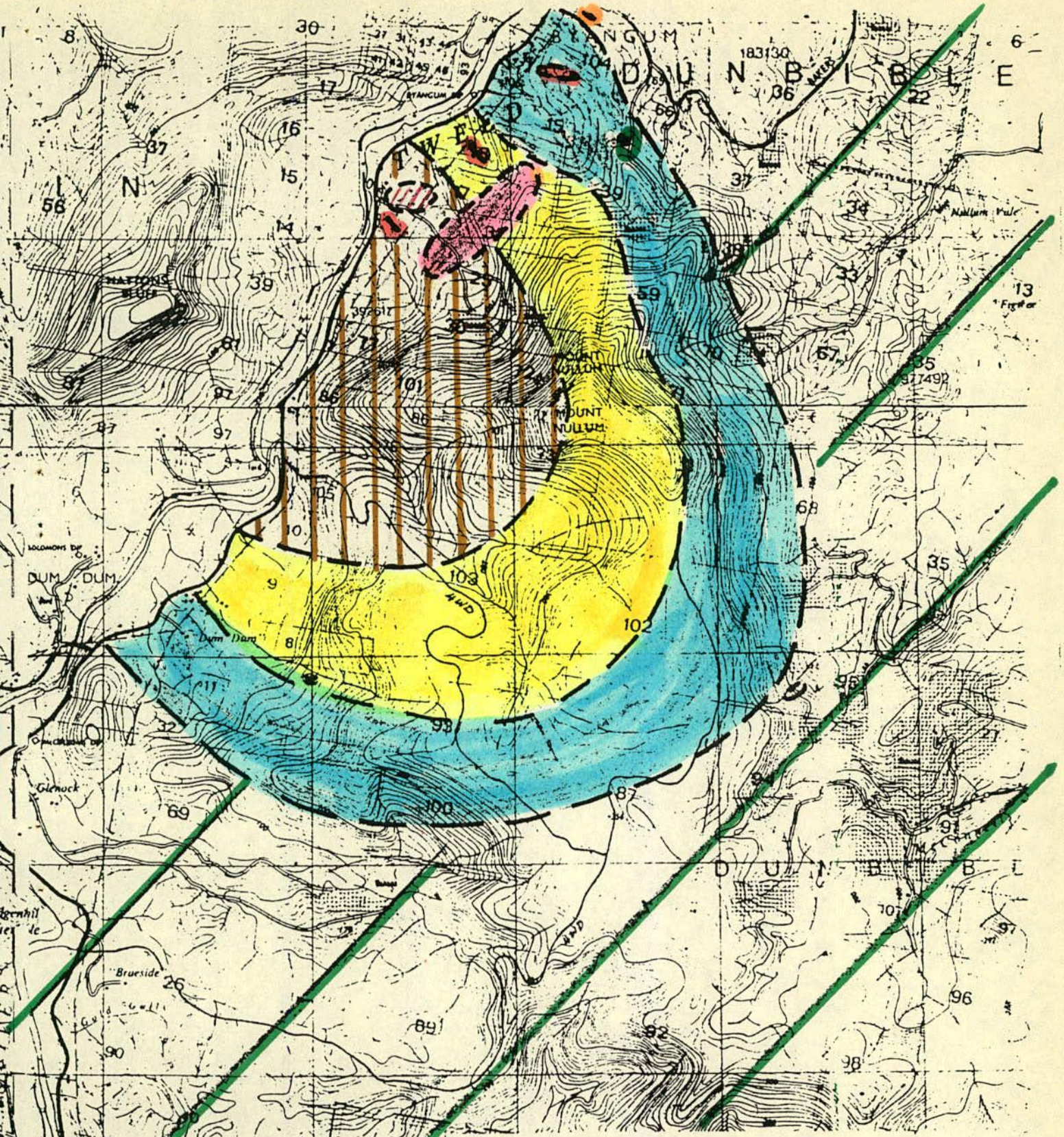
Chemistry of the rocks suggests that the Mount Nullum complex is derived from a basaltic parent by essentially fractional crystallisation processes. Compositional zoning of the microgranite is probably caused by in-situ differentiation of the magma following intrusion. It is thought that Mount Nullum may represent a phase which preceded the intrusion of the exposed part of the Mount Warning Complex 10km to the west.

Mount Nullum rises to over 470 metres at its summit. The mountain runs generally southerly from the summit area, and includes a central "plateau" area which dips gently to the west and gradually narrows to join the Burringbar Range to the south-east.

The eastern, northern and western sides of the complex have been exposed by erosion and the massif now stands approximately 300 metres above the surrounding countryside. Differences in the weathering resistance of the constituent rocks has affected the topography of the area.

The granite tends to weather more rapidly than the hornfels of the surrounding metamorphoic aureole, and it is the hornfels which form the major portion of the upper ridges and the steep eastern slopes. The granite is less resistant and is found on the western slopes, on the plateau and in the large, narrow drainage basin on the western side of the mountain (to the south of the summit).

Mount Nullum is the only known area of granite in the Tweed Shield and is one of only a few areas of granite in coastal south-east Queensland and north-east New South Wales.



MAP THREE : GEOLOGY (after Gould, 1970)

LEGEND

- Pyroxene - hornblende MICROGRANITE (Zones 1 & 2)
- Hornblende - biotite MICROGRANITE (Zones 3 & 4)
- QUARTZ MONZONITE
- RHYOLITE
- TRACHYANDESITE
- DYKES, XENOLITHS (Intermediate & Basic)
- HORNBLENDE HORNFELS
- ALBITE - EPIDOTE HORNFELS
- PHYLLITIC SHALE

5. VEGETATION

Most of the Mount Nullum area is covered by forest. The soils of the area are relatively infertile - being derived from microgranite and hornfels - and sclerophyll forest is generally the best developed forest type on such soils. This is the case on Mount Nullum. Due to the ample rainfall and the deep weathering of the parent rock material in most areas, wet sclerophyll forest is the most widespread vegetation type on the mountain.

Smaller areas of dry sclerophyll forest occur on skeletal soils associated with steep slopes and rocky outcrops.

Rainforest is restricted to areas of adequate soil fertility and moisture which are sheltered from fire.

The three forest types are discussed in turn, beginning with rainforest.

5.1 Rainforest

Given adequate soil and moisture, the distribution of this vegetation type on Mount Nullum is generally limited by fire. Best development of rainforest is in sheltered valleys, along streams and on steep south-facing slopes.

Three subformations are present;

5.1.1 Subtropical rainforest

This rainforest type is confined to small areas which are sheltered and where soils are moderately fertile. Such areas on Mount Nullum are generally confined to the lower gullies and along streams. Species typical of this type include Black Bean (*Castanospermum australe*), Native Tamarind (*Diploglottis australis*), Red Lilly Pilly (*Syzygium hodgkinsoniae*), Red Bean (*Dysoxylum muelleri*) and Brown Tamarind (*Castanospora alphandii*).

A number of the gullies on the lower slopes of the mountain, particularly on the southern side, would have supported this rainforest type in the past but are in many cases now covered in lantana thickets following logging or clearing.

5.1.2 Warm temperate rainforest

Warm temperate rainforest in northern NSW generally occurs on site of lower soil fertility than those which support subtropical rainforest. The soils on Mount Nullum are derived almost exclusively from microgranite and hornfels and are consequently relatively infertile.

The subform reaches its best development in the upper parts of sheltered gullies dropping off the Mount Nullum plateau and as a gallery along parts of the major stream on the plateau. In a number of areas, particularly in the gullies

on the slopes of the mountain, this subform grades into the subtropical rainforest subform and ecotonal areas of "gully rainforest" (a composite of subtropical and warm temperate rainforest species) occur. Elsewhere in the area species typical of subtropical rainforest also occur in the predominantly warm temperate rainforest type.

The warm temperate rainforest on Mount Nullum is of the *Ceratopetalum/Schizomeria - Caldcluvia* Suballiance of the *Ceratopetalum apetalum* Alliance. Coachwood (*C. apetalum*) itself is absent however. Floyd attributes the absence of this species from several areas of the suballiance elsewhere in NSW to either the soil fertility being too high or the species having been made locally extinct by fire. As the species is present on hornfels at Wollumbin Wildlife Refuge only a few kilometres to the west it is most likely that the species has been eliminated by fire in the Mount Nullum area. Coachwood, with a smooth bark, is more easily killed by fire than the rough-barked Crabapple (*Schizomeria ovata*) and is less vagile as it produces wind-borne seeds whereas Crabapple has bird-dispersed fleshy drupes.

As well as Crabapple, other characteristic species of this subform on Mount Nullum are the trees Soft Corkwood (*Caldcluvia paniculosa*), Grey Possumwood (*Quintinia verdonii*) and Pink Cherry (*Austrobuxus swainii*) and the understorey species Prickly Treefern (*Cyathea leichhardtiana*) and Walking Stick Palm (*Linospadix monostachyus*).

5.1.3 Dry rainforest

Several areas of dry rainforest occur in the Mount Nullum area. Two suballiances are present.

The steep upper section of the southerly-facing fall from the plateau in Ptn 100, carries a dry rainforest with a canopy composed primarily of Grey Myrtle (*Backhousia myrtifolia*) with Brush Box (*Lophostemon confertus*) as a common emergent and Hoop Pine (*Araucaria cunninghamii*) as an occasional emergent. Epiphytic orchids are a feature of this area, with 8 species being recorded. The steep and rocky ground supports few herbs, with Matrush (*Lomandra* sp.) being the most common.

Bill McDonald of the Botany Division of Queensland Department of Primary Industries states that he is aware of only three areas in south-east Queensland where *Backhousia myrtifolia* forms an understorey to *Araucaria cunninghamii* - Fraser Island, Cooloola and Curtis' at Canungra. Alex Floyd, former Research Scientist, New South Wales National Parks and Wildlife Service, was unaware of this forest type in the far north of New South Wales; he agrees that the type would fall into his *Backhousia myrtifolia - Lophostemon confertus - Tristaniopsis* spp. sub-alliance which generally occurs on the mid-north coast in seasonally dry gullies or on very shallow and dry soils over rock on hillsides.

Benson (1989) and Floyd (1984, 1990) considers this sub-alliance to be inadequately conserved and specifically notes that it is not reserved in the north. The writer is aware of only two occurrences of this sub-alliance in the Tweed-Richmond area - the one on Mount Nullum and another on similar very steep and rocky slopes on Mount Wollumbin about 4km to the west.

The *Waterhousia floribunda - Tristaniopsis laurina* sub-alliance of the *Castanospermum - Waterhousia floribunda* Alliance occurs on the lower section of the creek in the main western drainage basin of the mountain. This sub-alliance differs from the other two sub-alliances in the alliance in occuring on poorer alluvial soils derived from quartz-rich rocks such as granite. Both indicator species are adapted to streamside locations by being able to bend under the force of strong floodwaters and flood debris.

On the lower part of the stream *W. floribunda* is the main canopy species, while *T. laurina* tends to dominate the narrower reaches upstream.

Benson (1989) regards this association as vulnerable and likely to become extinct within a few decades if action is not taken to rectify the decline of the association and protect and manage areas and inadequately conserved.

This is the only rainforest sub-alliance which is not conserved within New South Wales. Alex Floyd (1990) states that examples of the sub-alliance at Mount Warning Road, Myrtle Creek, Tallowwood Point, Brierfield and Lower Karuah to Allyn River should be dedicated for conservation purposes to provide adequate conservation. The area on Mount Nullum is part of the Mount Warning population and the only area of the sub-alliance in the Mount Warning area which is relatively undisturbed. It is superior to the area on Mount Warning Road and hence should be given higher priority for conservation.

5.2 Wet Sclerophyll forest

Wet sclerophyll forest covers most of the Mount Nullum area. The forest type is recognised by the shrub or small tree understorey of broad-leaved species and the open canopy of eucalypts and allied genera such as Brush Box and Turpentine.

The understorey of this forest type varies from well-developed rainforest on sheltered, moist and more fertile sites to an open cover of xeromorphic species on more exposed, drier or less fertile sites. Fire plays an important role in the ecology of the sclerophyll forest. In areas where rainforest is well developed in the understorey, seeds of the eucalypts and allied genera are unable to germinate and establish due to the low light and litter at ground level. The occasional wildfire generally either kills or burns most of the rainforest species back to ground

level. The typical sclerophyllous trees and shrubs possess adaptations such as epicormic shoots, thick bark and/or lignotubers which allow them to survive fire, and woody fruits which protect and release tiny wind-dispersed seeds following a fire, or hard seeds which may remain buried in the soil for many years until cracked by the heat of fire. Wildfire thus eliminates many of the rainforest species from the forest understorey and promotes a burst of regeneration in the sclerophyllus species. Conversely, in the absence of fire or other major disturbance for many hundreds of years, the eucalypts and allied genera would die out and rainforest would occupy the site.

The result is that the boundary between sclerophyll forest and rainforest, in the absence of major demarcation lines such as cliffs, is often indistinct and always dynamic.

In addition to forming a variety of, often broad, ecotones with rainforest, the wet sclerophyll forest associations on Mount Nullum also intergrade with each other. Additional to the floristic complexity is a diversity of structural types ranging from young regrowth forest to areas of mature 'old growth' forest. This complexity is particularly evident on the relatively flat plateau area.

Benson (1989) provides information on the conservation status of sclerophyll forest associations in NSW, and his floristic associations are followed in this report. These associations are based on Beadle (1981), with some modifications by Benson. As this is a statewide classification, particular local stands do not always fit comfortably in the associations. This is the case in some areas on Mount Nullum.

Four associations of wet sclerophyll forest have been recognised in the Mount Nullum area.

5.2.1 *Eucalyptus grandis* (Flooded Gum) Association

Flooded gum occurs as scattered specimens throughout the wet sclerophyll forest on Mount Nullum, but only in a few small areas does it occur as a recognisable assocation. These areas are adjacent to rainforest and have probably established following heavy logging or fire. The understorey in these areas consists of Blackwood (*Acacia melanoxylon*) and rainforest species.

This association is regarded as being inadequately conserved but not threatened in the foreseeable future although this could change if land uses change.

5.2.2 *Eucalyptus grandis* (Flooded Gum) - *Lophostemon confertus* (Brush Box) - *E. microcorys* (Tallowwood)

This association also commonly has a well developed rainforest understorey and adjoins and forms ecotones with rainforest.

It is scattered in occurrence in the Mount Nullum area with Brush Box and Tallowwood being the most common dominants.

This association has a similar conservation status to the *E. grandis* Association.

5.2.3 *Eucalyptus saligna* (Sydney Blue Gum) - *E. microcorys* (Tallowwood) Association

This is the most widespread wet sclerophyll forest association in the Mount Nullum area. Tallowwood is the most common dominant in the most areas with Sydney Blue Gum being more common on some sites. Turpentine (*Syncarpia glomulifera*) is frequently a very common associate. Other associated species include Brush Box and White Mahogany (*E. acmenioides*).

Forest She-oak (*Allocasuarina torulosa*) and rainforest species are common in the understorey.

Benson (1989) regards this association as being adequately conserved and not threatened in the foreseeable future but this could change if land use changes.

5.2.4 *Eucalyptus acmenioides* (White Mahogany) - *E. propinqua* (Grey Gum) Association

This association is often known as "moist pole" or "semi-moist hardwood" and can be regarded as intermediate between wet and dry sclerophyll forest. On Mount Nullum it occurs on drier, steeper or more exposed sites than the preceding associations.

White Mahogany is more common than Grey Gum in this association on Mount Nullum. Common associates are Tallowwood, Turpentine, Pink Bloodwood (*E. intermedia*), Grey Ironbark (*E. siderophloia*), Sydney Blue Gum, Brush Box and Red Mahogany (*E. resinifera*). The shrubby understorey is generally more sclerophyllous than the preceding associations and includes species such as Forest She-oak, Two-veined Hickory (*Acacia binervata*) and Tree Bitter-pea (Daviesia arborea) Rainforest species, locally common in the understorey, are generally species typical of pioneer and dry rainforest. This association is inadequately conserved, and not threatened in the foreseeable future but this could change if land use changes.

5.3 Dry Sclerophyll Forest

This forest type generally occurs on hotter and drier sites than the wet sclerophyll forest and is best developed on the steep eastern, northern and western slopes of Mount Nullum where the soil is shallow. The shrub layer in this forest type is sparse with commonly narrow or thick leaves; a grassy ground cover is often well-developed. Fires are more frequent in this forest type than in the wet sclerophyll forest.

One association occurs in the dry sclerophyll forest on Mount Nullum.

5.3.1 *Eucalyptus resinifera* (Red Mahogany) - *E. acmenioides* (White Mahogany Association)

Both of the type species occur in dry sclerophyll forest on Mount Nullum but White Mahogany is by far the most common species. Associated species include Grey Ironbark, Grey Gum, Tallowwood, Pink Bloodwood, Forest Red Gum (*E. tereticornis*) and Brush Box. Broad-leaved White Mahogany (*E. umbra*) is locally common and on a few sites may form a recognisable association. The understorey of this forest type frequently consists of Kangaroo Grass (*Themeda australis*). Bladey Grass (*Imperata cylindrica*) is common in a few areas and may indicate more frequent firing of those sites. Shrubs and small trees are generally sparse and include Forest She-oak, Black She-oak (*Allocasurina littoralis*), Prickly Beard-heath (*Leucopogon juniperinus*). Lemon-scented Tea Tree (*Leptospermum petersonii*) Crinkle bush (*Lomatia silaifolia*), and Snowy Mintbush (*Prostanthera nivea*). Shrubs such as Grass tree (*Xanthorrhoea australis*) and Tree Bitter-pea are locally common.

This association is regarded as inadequately conserved and not threatened in the foreseeable future but this may change if land use changes.

5.4 Other Plant Communities

While forest covers most of the Mount Nullum area, several other plant communities occur on very steep rocky areas, rock surfaces and heavily disturbed sites.

5.4.1 Open Shrubland on Steep Rocky Slopes

This plant community is closely associated with dry sclerophyll forest which it commonly adjoins, being developed on sites where soil is too shallow to support trees. These sites generally consist of open shrubland with a ground cover of Kangaroo Grass where rock does not outcrop. Common shrubs include Lemon-scented Tea Tree, Snowy Mintbush, Grass Tree, *Platysace lanceolata* and Forest She-oak.

5.4.2 Communities on Rock Surfaces

Rock surfaces in the Mount Nullum area frequently support well-developed communities of lithophytes and species able to grow in small pockets of soil and litter in cracks and depressions. Species present include eight species of orchid - Spotted Orchid (*Dendrobium gracilicaule*), Rock Orchid (*D. kingianum*), Tongue Orchid (*D. linguiforme*), Lily-of-the-valley Orchid (*D. monophyllum*), King Orchid (*D. speciosum*), *Bulbophyllum exiguum*, Rhubarb Orchid (*Liparis reflexa*) and *Sarcochilus hillii* - Native Hoya (*Hoya*

australis), Netted Cockspur Flower (*Plectranthus graveolens*), Silver Cockspur Flower (*P. argentatus*), Common Stonewart (*Crassula sieberana*), *Rhagodia hastata* and Commelina (*Commelina cyanea*) plus a variety of lichens.

5.4.3 Communities of Heavily Disturbed Sites

These are communities on sites heavily disturbed by human activities such as logging and clearing which have been neglected for some years. Lantana (*Lantana camara*) is by far the most conspicuous species present in larger disturbed areas which formerly supported forest. Many of the gullies dropping off the plateau, particularly in the south of the area, support areas of lantana where rainforest formerly occurred.

There are smaller areas on the tributaries of the creek in the main western valley, in a few areas on the plateau and on the lower slopes of the north-western side of the mountain. Lantana is also present in varying densities throughout the forests on the mountain.

Given time it can be expected that the communities will regenerate to essentially the same as those which formerly occupied the sites. It is recognised that very dense stands of lantana may take many years as the lantana can arrest succession for some decades. Where lantana occurs in forested areas, while it may prove aesthetically displeasing and may impede pedestrian progress, it generally dies out within a few decades as the developing canopy shades it out.

6. FLORA

483 species of plant have been recorded from the Mount Nullum area to date (this may be 485 species if the two specimens allied to *Austromyrtus acmenioides* are separate species - see Section 6.2); this includes 25 exotic species.

Fourteen species are considered rare or threatened (Briggs and Leigh, 1988) and a further seventeen species are significant or noteworthy.

A list of the species recorded from Mount Nullum is at Appendix One.

6.1 Rare or threatened species

Acomis acoma (3RC-). This rare herb is known from the far North Coast of NSW and the Moreton, Burnett and Wide Bay districts of south-east Queensland. While Floyd (1977) recorded the species from Antarctic Beech (*Nothofagus moorei*) thicket on the crest of the McPherson Range, it normally occurs in open forest or rainforest margins. This is the case on Mount Nullum where it occurs on the plateau and in the western drainage basin.

Acronychia baeuerlenii (Byron Bay Acronychia) (3RC-). This species is endemic to the Tweed Shield. It most often occurs in the warm temperate rainforest understory to Brush Box on rhyolite but on Mount Nullum was found on Ptn 100 in drier subtropical rainforest on hornfels.

Archidendron muellerianum (Veiny Laceflower) (3RCa). This species is endemic to the Tweed Shield. It occurs on Mount Nullum in rainforest and wet sclerophyll forest communities.

Argophyllum nullumense (Silver leaf) (3RCa). This species is also endemic to the Tweed Shield. It normally occurs on rhyolite. On Mount Nullum, it occurs in wet sclerophyll forest and rainforest. As the species name suggests, Mount Nullum is the type locality of the species.

Austrobuxus swainii (Pink Cherry) (3RCa). This rare tree has to disjunct occurrences - the Dorrigo area and the Tweed Shield. On Mount Nullum it occurs in wet sclerophyll forest and is one of the most common species in the warm temperate rainforest.

Cassia marksiana (Brush Cassia) (3VCi). This vulnerable tree is endemic to the Tweed Shield. Poorly represented in conservation reserves at Stotts Island Nature Reserve (NSW), Lamington National Park (Qld), Nicholls Scrub National Park (Qld) and Currumbin Environmental Park (Qld), most specimens occur outsdie reserves as isolated remnant trees in paddocks or on roadsides. The Mount Nullum population is important as the species occurs hwere in an extensive natural area and the species is successfully reproducing.

Endiandra globosa (Black Walnut) (2RC-). This rare tree is endemic to the Tweed Shield. The species is locally common in some parts of the Brunswick and Tweed Valleys but Mount Nullum supports the largest population known. The species also occurs in very high densities on Mount Nullum, and particularly on the plateau area, in many areas being the most common tree in rainforest areas and in the wet scleropyll forest understorey.

Macadamia tetraphylla (Rough-shelled Bush Nut) (2VC-). This vulnerable species is confined chiefly to the Richmond and Tweed Rivers in NSW and extends into the Numinbah Valley and Coomera River in south-east Queensland. It occurs in subtropical rainforest on Ptn 100.

Olearia heterocarpa (Nightcap Daisy Bush) (2RCa). This rare shrub is also confined to the Tweed Shield, being generally confined to rhyolite areas on the McPherson and Nightcap Ranges. It is recorded on Mount Nullum from the edge of wet sclerophyll forest on Ptn 71 and near the edge of the access road on the western slopes.

Plectranthus argentatus (Silver Cockspur Flower) (3RC-). This herb occurs in communities on rock surfaces in the summit area of Mount Nullum and on the steep eastern,

northern and western slopes. Kooyman (1988) also records the species from the western access road. It is known in New South Wales from the Dorrigo area and the Tweed Shield and extends into south-east Queensland.

Rhodamnia maideniana (Smooth Scrub Turpentine) (2RC-). This species is also restricted to the Tweed Shield. It was recorded from the main creekline on the plateau of Mount Nullum.

Syzygium hodgkinsoniae (Red Lilly Pilly) (3VC-). This species extends from the Richmond River to the Kin Kin area in south-east Queensland. It is locally common along watercourses in the western drainage basin of Mount Nullum (Ptns 103 and 105).

Syzygium moorei (Durobby) (2VCi). A Tweed Shield endemic this beautiful flowering tree occurs in the fringing rainforest along the watercourse in the western drainage basin of Mount Nullum.

Trichosanthes subvelutina (Silky Cucumber (3RC-). This rare rainforest vine is scattered in occurrence on Mount Nullum in rainforest and wet sclerophyll forest communities.

6.2 Significant and Noteworthy Species

Acacia orites (Nightcap Wattle). This species is confined almost entirely to the Tweed Shield. Thomas and McDonald (1987) believe that the species should be ranked as rare. On Mount Nullum it reaches its best development in the warm temperate rainforest fringing the main creek on the plateau. There are a number of very fine specimens in that area.

Acronychia laevis (Glossy Acronychia). This is generally a species from dry rainforests north from the Upper Clarence and Richmond Rivers. The species is common at only a few sites in New South Wales and is rare in the Tweed Valley. It occurs in wet sclerophyll forest and subtropical rainforest on Mount Nullum.

Austromyrtus spp. aff *A. acmenioides*. Specimens of two species referrable to *A. acmenioides* in the broadest sense occur in dry rainforest in a steep rocky gully on Ptn 100. Typical *A. acmenioides* also occurs in the area. These may be distinct species (A. Floyd, pers. comm.) and collection of flowering and fruiting material is required.

Brachychiton populneus (Kurrajong). This species is generally found in open woodland and dry sclerophyll forest in areas which are much drier than Mount Nullum (Northern Tablelands, Western Slopes for example). This species occurs close to the top of an escarpment on the western side of Mount Nullum. Only two other occurrences of the species are known in the Tweed Valley - one on a ridge top at Kunghur and another east of Couchy Creek.

Caesalpinea subtropica (Corky Prickle Vine). This species was formerly regarded as rare (Leigh et. al., 1981) but it now is regarded as not uncommon. Of note is the size of some specimens on Mount Nullum, and particularly in the dry rainforest on Ptn 100.

Cissus opaca (Small-leaf Water Vine). This is another species which generally occurs in much drier areas such as the Northern Tablelands and Western Slopes. On Mount Nullum it is found in dry sclerophyll forest. There is one other record for the Tweed area; on a mountain to the east of Cedar Creek in Mount Warning National Park (Kooyman, 1987).

Croton stigmatosus (White Croton). This was until recently regarded as rare (Leigh et. al. 198). It occurs in dry and semi-dry rainforest and on Mount Nullum is found in the *Backhousia myrtifolia* - *Lophostemon confertus* - *Tristaniopsis* spp. sub-alliance. There is only one other record from the Tweed Valley; in Brush Box-dominated forest on a rocky syenite slope in Mount Warning National Park.

Cupaniopsis newmanii (Long-leaved Tuckeoo). This species is endemic to the Tweed Shield from Mullumbimby to Mount Tambourine. On Mount Nullum it occurs in subtropical rainforest and wet sclerophyll forest. Thomas and McDonald (1987) believe that the species should be ranked as rare.

Dendrocnide moroides (Gympie-gympie). One specimen of this species was seen in wet sclerophyll forest near the creek in the western drainage basin on Mount Nullum. This species is most common north from Gympie in south-east Queensland but has a disjunct occurrence from Upper Tallebudgera Creek south into far north-east New South Wales. While there are old records of the species from Drake and Nimbin, all recent NSW records are from the Tweed Valley - Round Mountain, Camp Wollumbin, Reserve Creek, Crystal Creek and Urliup (now destroyed by roadside spraying).

Helicia ferruginea (Rusty Oak). This species occurs from Woolgoolga Creek in New South Wales to Lamington National Park in Queensland, and is regarded as rare by Thomas and McDonald (1987). It occurs in warm temperate rainforest on Mount Nullum.

Melodinus acutiflorus (Hairy Melodinus). This vine has its southern limit at Byron Bay and it is not common in New South Wales. It occurs in rainforest and wet sclerophyll forest on Mount Nullum.

Microcitrus australasica (Finger Lime). This edible species occurs north from the Richmond River into southern Queensland. Until recently considered rare (Leigh et. al., 1981), it is now known to be more common in drier rainforest types.

Notelaea johnsonii (Veinless Mock-olive). This species appears to be restricted to the area between the Richmond River and Gladstone, but with one old record (1868) from "Clarence River". The species was until recently regarded as rare (Leigh et. al., 1981). It occurs in rainforest on Mount Nullum.

Eucalyptus nigra (Queensland White Stringybark). Robert Kooyman of the Forestry Commission of NSW recorded this species from the access road on the western side of Mount Nullum (Kooyman, 1988). It occurs on the eastern side of the Northern Tablelands of New South Wales and adjacent areas of Queensland (Brooker and Kleinig, 1983). Kooyman (pers. comm.) reports that it is locally common on rhyolite in the Minyon Falls area of Whian Whian State Forest. The species includes *E. phaeotricha* which was recorded from Blue Knob in western Nightcap National Park by Floyd (1981). It occurs on Mount Nullum in the ecotone between wet and dry sclerophyll forests.

Omalanthus stillingiifolius. This species is very uncommon in coastal northern New South Wales. Stanley and Ross (1983) regard it is "not common, usually on the edges of rainforest" in south-east Queensland. Beadle (1982) states however that the species occurs "mostly away from rainforest and often in rocky situations on hills". It occurs among rocks in wet sclerophyll forest in the western drainage basin of Mount Nullum. There is only one other known record for the species in the Tweed area; in wet sclerophyll forest south of Bogangar.

Prostanthera nivea (Snowy Mintbush). This is typically a species of the Northern Tablelands and Western Slopes. The species occurs in dry sclerophyll forest and on rocky outcrops in the Mount Nullum area. This is the first record for the Tweed area.

Prostanthera phylicifolia. This species was recorded from along the western access road by Kooyman (1988). Stanley and Ross (1986) report that the species is known from mountains along the New South Wales - Queensland border, from the Glasshouse Mountains and from Girraween National Park near Wallangarra. Beadle (1984) states that the species occurs in gullies on the tablelands in north-east New South Wales and also to the south and in Victoria. Kooyman (pers. comm.) reports that the species occurs on rhyolite in the Minyon Falls area of Whian Whian State Forest. This is the first record for the Tweed Valley.

Sterculia quadrifida (Peanut Tree). This species is much more common in Northern Australia than in New South Wales where it is rare and occurs only on near-coastal sites from north of Coraki on the Richmond River. A specimen in dry rainforest on Ptn. 100 is the largest ever seen by Research Scientist Alex Floyd.

6.3 Exotic Species

Twenty-five of the 483 species recorded on Mount Nullum are exotic; this is about 5% of the total. Eight of the exotic species are members of the family Asteraceae, four are members of Poaceae.

Most of the exotic species occur in small numbers and would disappear as the communities in which they occur recover from disturbance. Four species are worthy of note, however, because they are present in large numbers, likely to persist or declared noxious.

Baccharis halimifolia (Groundsel Bush). This shrub is a declared noxious weed in northern NSW. Several specimens were seen on the plateau and slopes of the mountain but the species is most common in recently abandoned banana patches on the lower slopes. It can persist for many years in cleared areas but is generally displaced from forest as it recovers from past disturbance.

Cinnamomum camphora (Camphor Laurel). Specimens are uncommon and scattered throughout the wet sclerophyll forest on the mountain. This is potentially a very serious tree weed which has colonised large areas in the Tweed-Richmond area. Elimination of the small population on Mount Nullum would be most desirable.

Lantana camara (Lantana). This species is discussed in Section 5.4.3 While common on Mount Nullum this species is generally not considered to be a long-term problem.

Ligustrum lucidum (Large-leaved Privet). One specimen of this species was seen in wet sclerophyll forest in the western drainage basin. This species of tree is potentially as great or greater a problem than Camphor Laurel. It has only in recent years begun to spread rapidly in the Tweed area and all specimens found in native forests should be eliminated.

6.4 Further Work

Several areas of Mount Nullum have been poorly surveyed for plants. These include the steep lower rocky slopes on the north-western side of the mountain, the lower slopes on the eastern fall of the mountain, parts of the steep falls on Portions 92 and 100, and parts of the western drainage basin. Future survey work could profitably include these areas.

Several plants on Portion 100 require further collection of material to allow determination of their identity. These include the two specimens referrable to *Austromyrtus acmenioides* (in the broadest sense) and a species of laurel at the base of the mountain which Alex Floyd was unable to gather specimens from and which he was unable to identify by bark features.

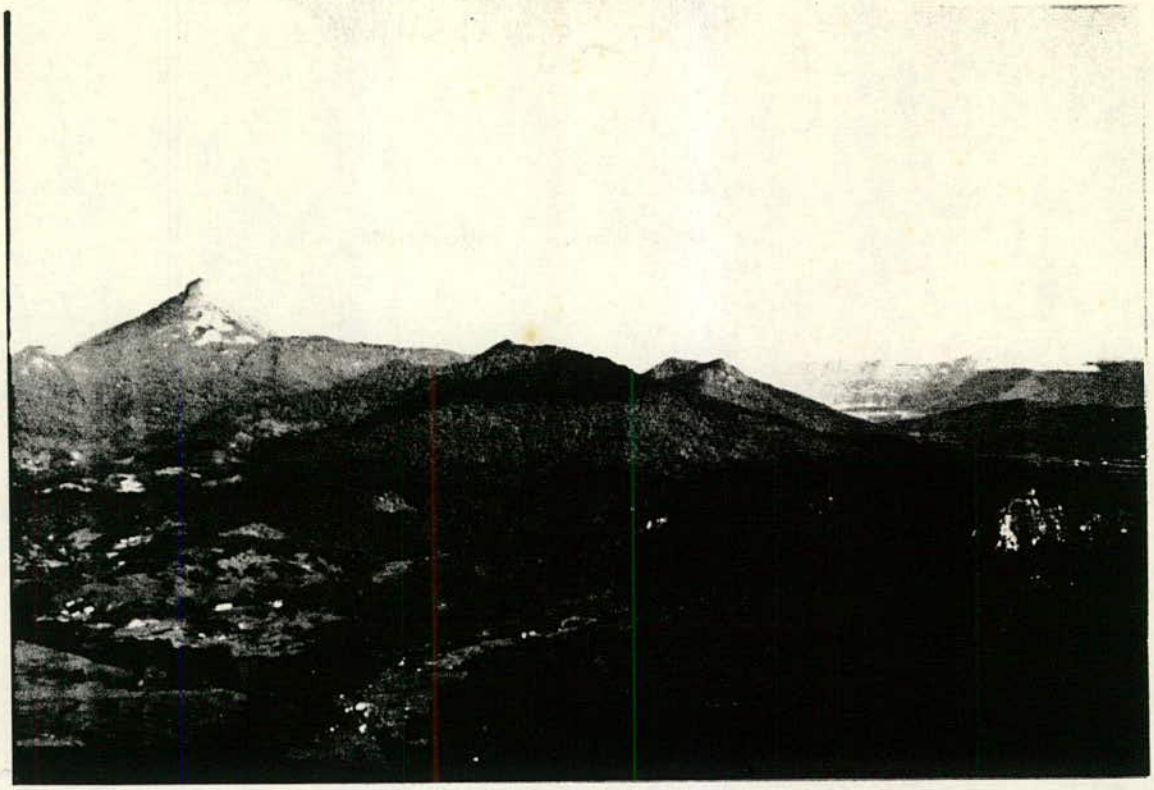


PLATE TWO
View west from a lookout on Mt Nullum. Mt Nullum is linked to Mt Warning(left at back) via a nearly continuous corridor of native forest which includes Hatton's Bluff(right at front) and Mount Wollumbin(centre). Border Ranges N.P. is in the background at right.

PLATE THREE
View of part of the north-western side of Mt Nullum, showing exposed granite faces. Dry sclerophyll forest and grassy shrubland occur on skeletal soils among the rocks.

PLATE FOUR
View of Mt Nullum from the north-west. The summit and exposed granite faces can be seen at front. The main western drainage basin is at right centre with the plateau behind and to the left. The forest on Mt Nullum is contiguous with in Nullum S.F. in the distance.

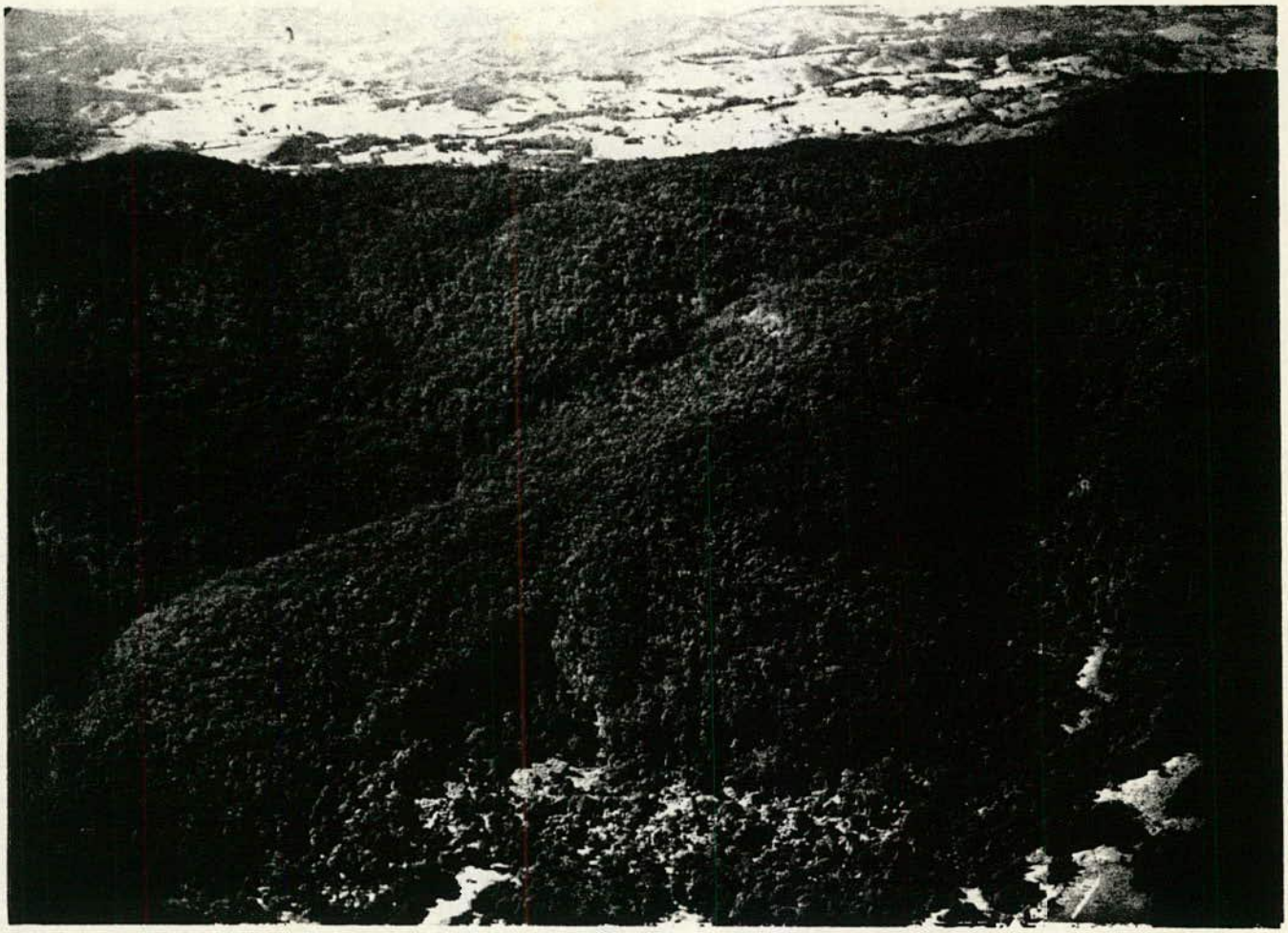


PLATE FIVE

View from the west showing the main western drainage basin (left centre). The rainforest on Portion 100 is in the smaller basin at right centre (see also PLATE SEVEN). Lantana-infested heavily disturbed subtropical rainforest can be seen at front centre.

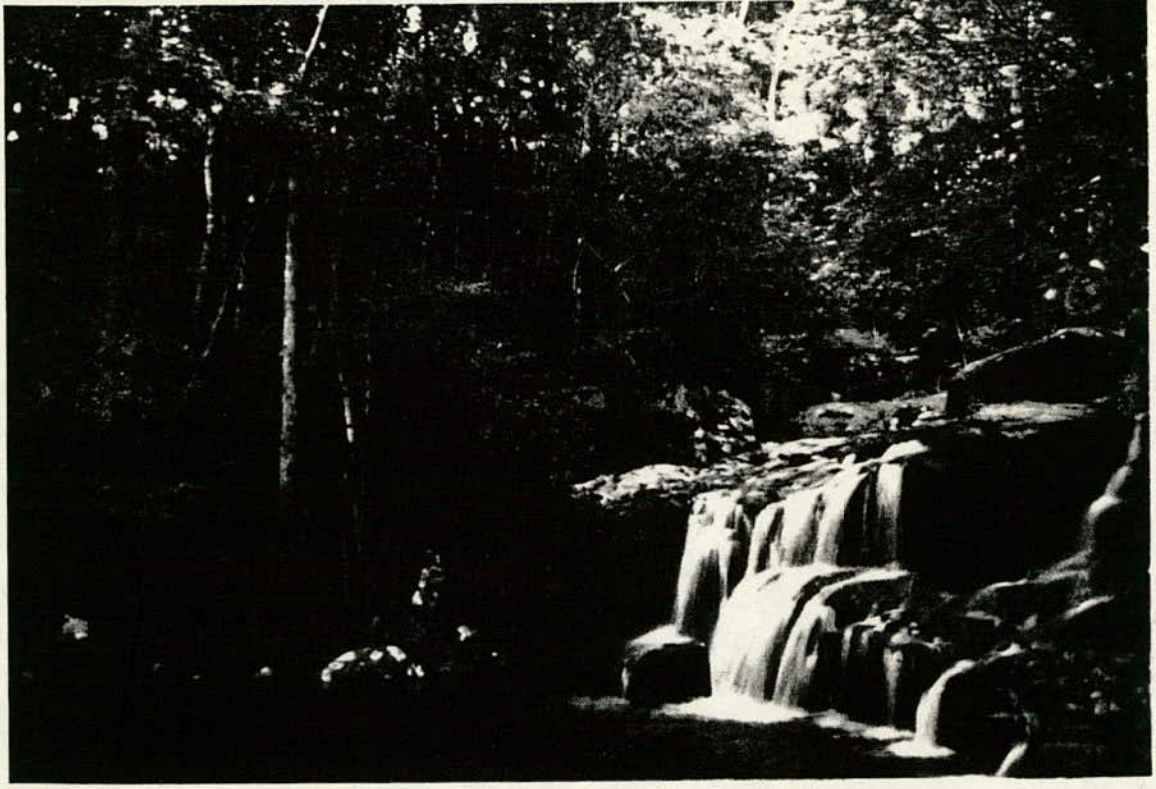


PLATE SIX
small waterfall on the exposed granite pavement in the main western drainage baisin. Two much larger waterfalls occur further up the creek where it leaves the plateau.

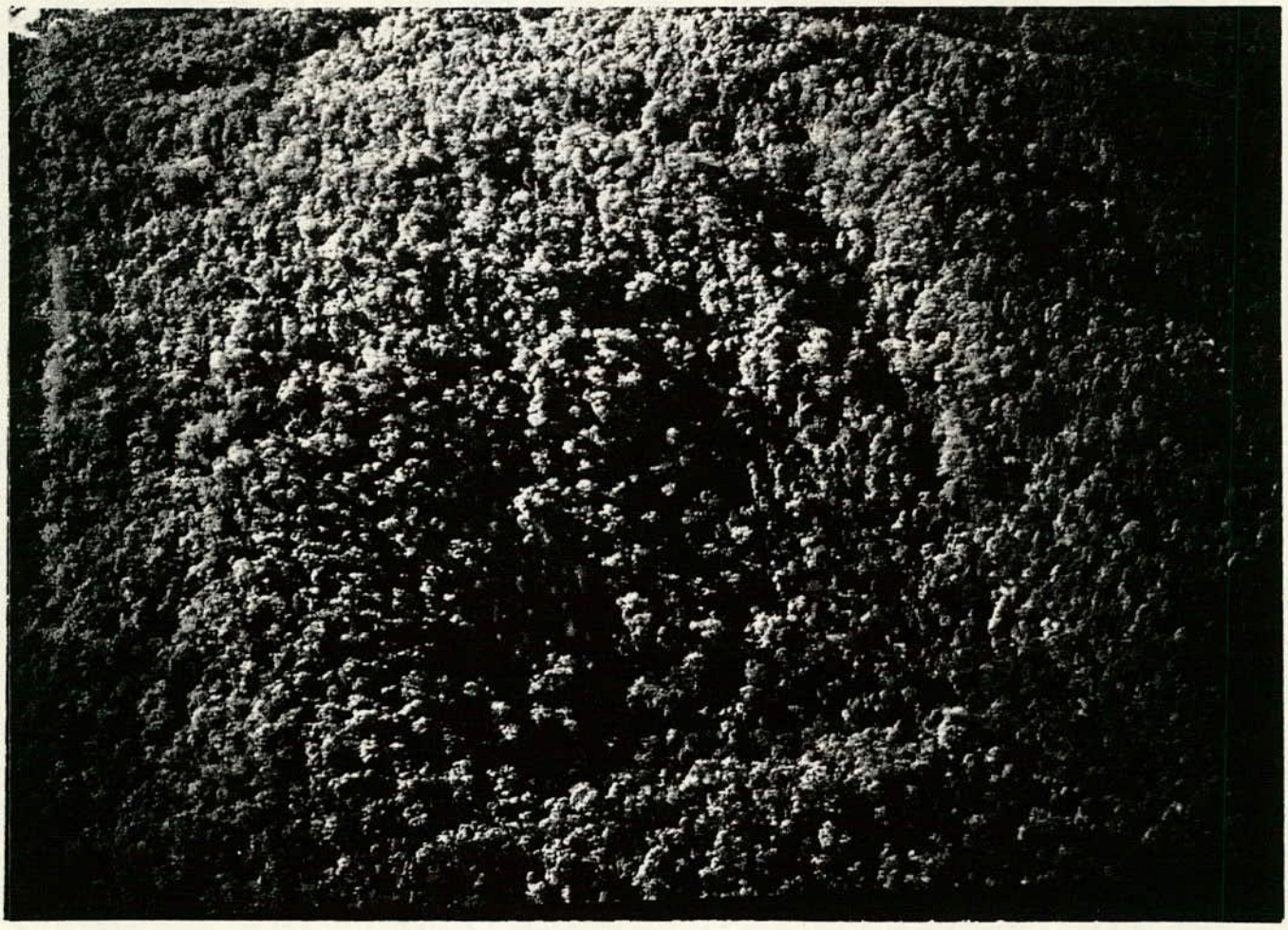


PLATE SEVEN
View of the rainforest on the southern fall of Mt Nullum in Portion 100. Crowns of Hoop Pine can be seen to the left below centre of the photo.

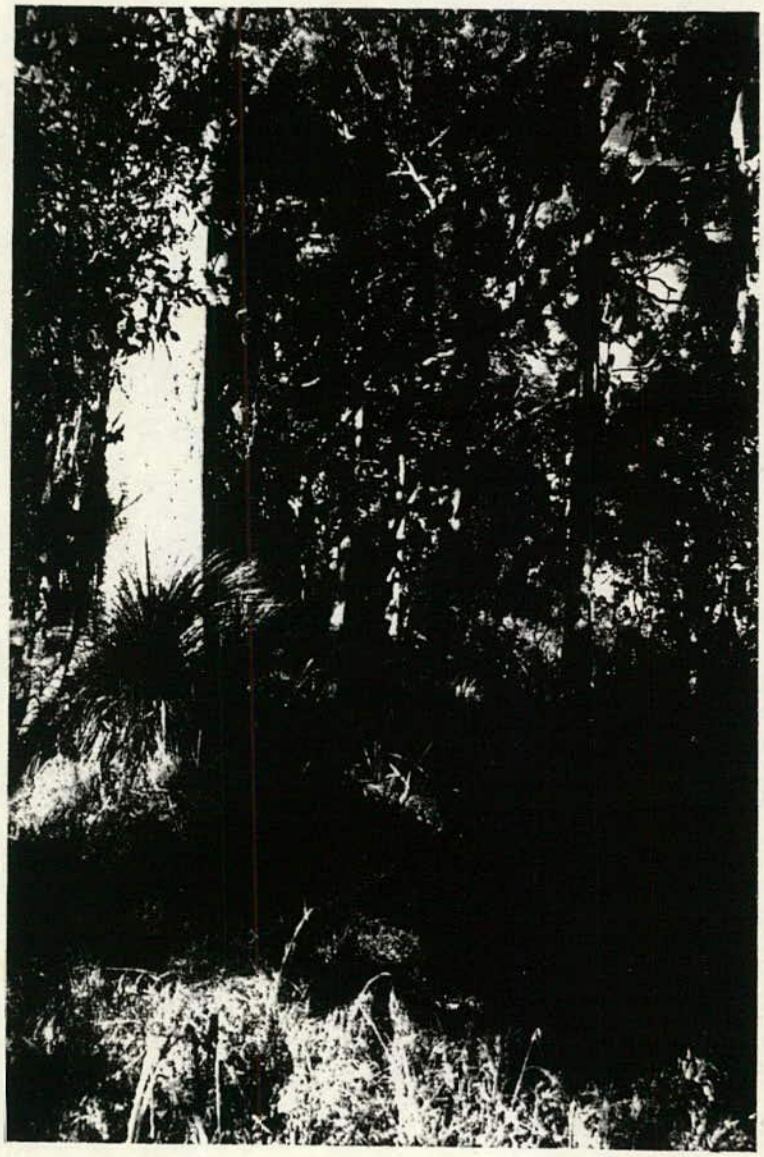


PLATE EIGHT
Dry sclerophyll forest with an understorey of scattered Grass Tree and a ground cover of Kangaroo Grass in the summit area of Mt Nullum.

PLATE NINE
View of the steep eastern fall of Mt Nullum. Banana plantations are common on the lower slopes on this side. Heavily disturbed rainforest with severe lantana infestation can be seen on the southern slopes and gullies in the foreground.

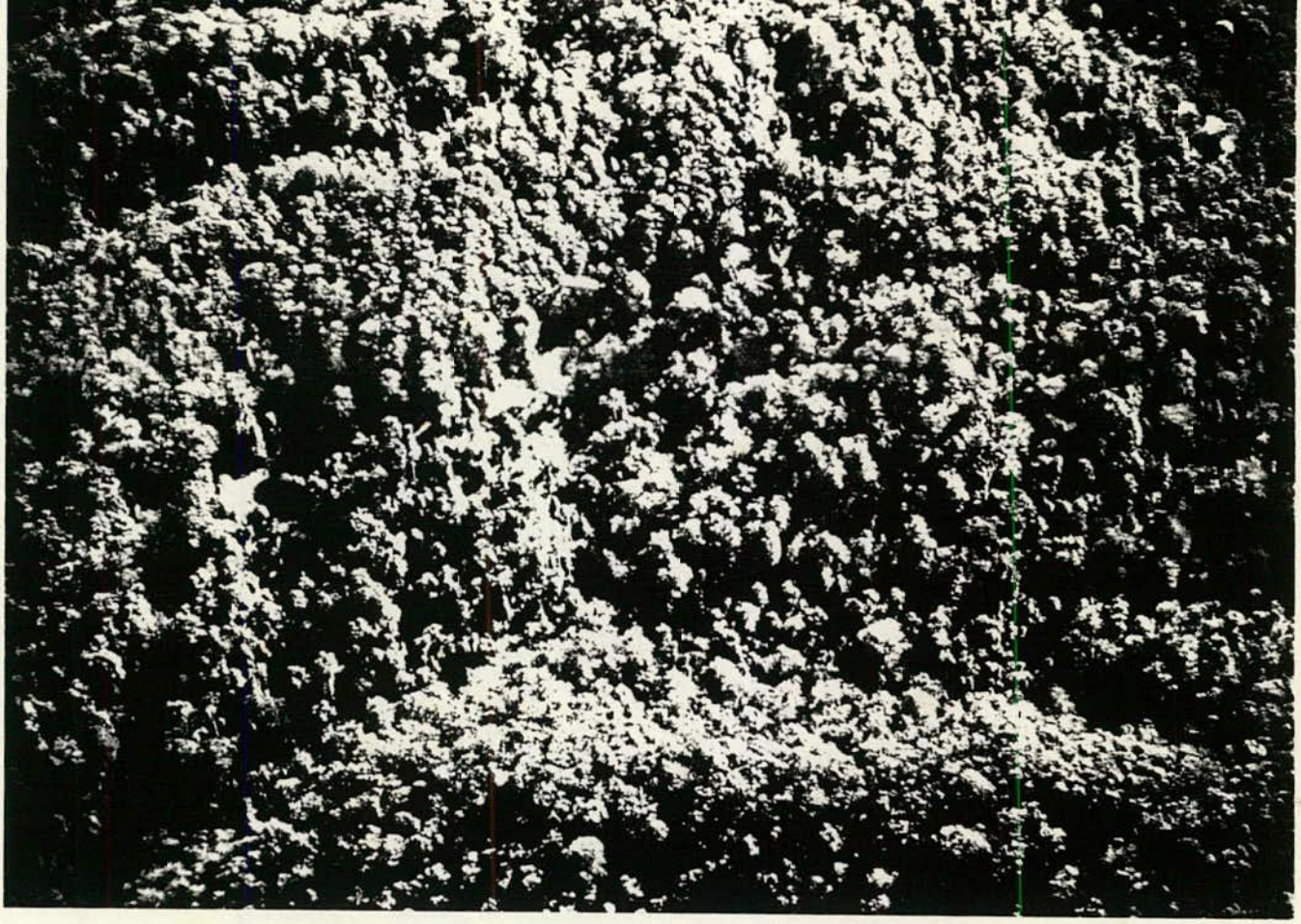


PLATE TEN
Part of the southern fall of Mt Nullum. Eucalypt forest covers the ridges; many areas of rainforest in gullies and on southern slopes have been heavily disturbed and are now heavily infested with lantana.

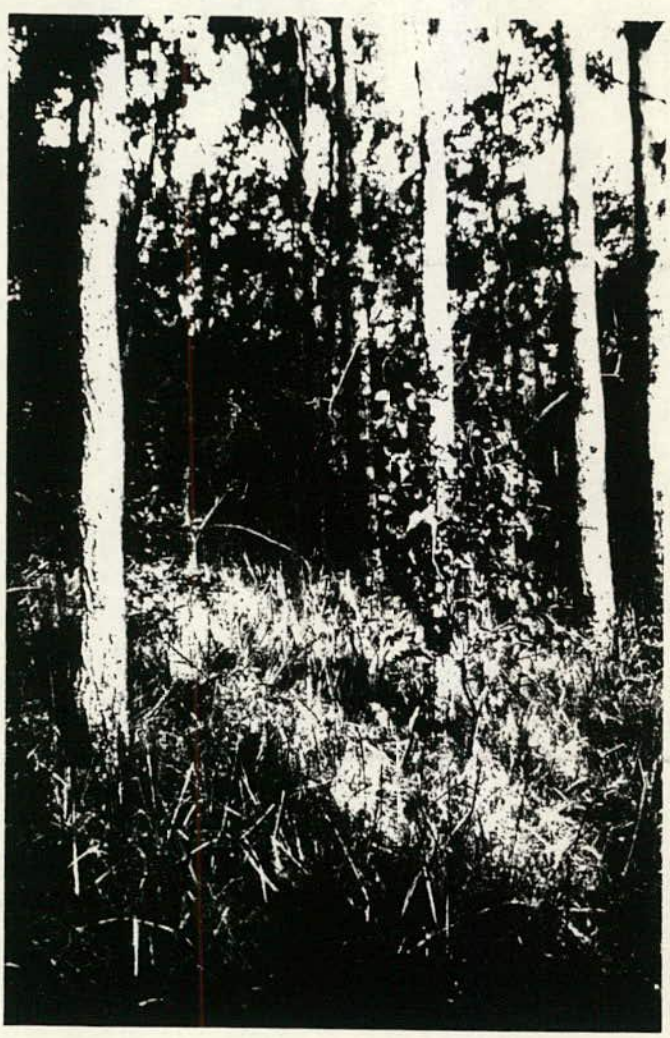


PLATE ELEVEN
Dry sclerophyll forest with Bladey Grass & ground cover.

PLATE TWELVE
Snowy Mintbush (Prostanthera nivea) in Dry Sclerophyll Forest on Mt Nullum.

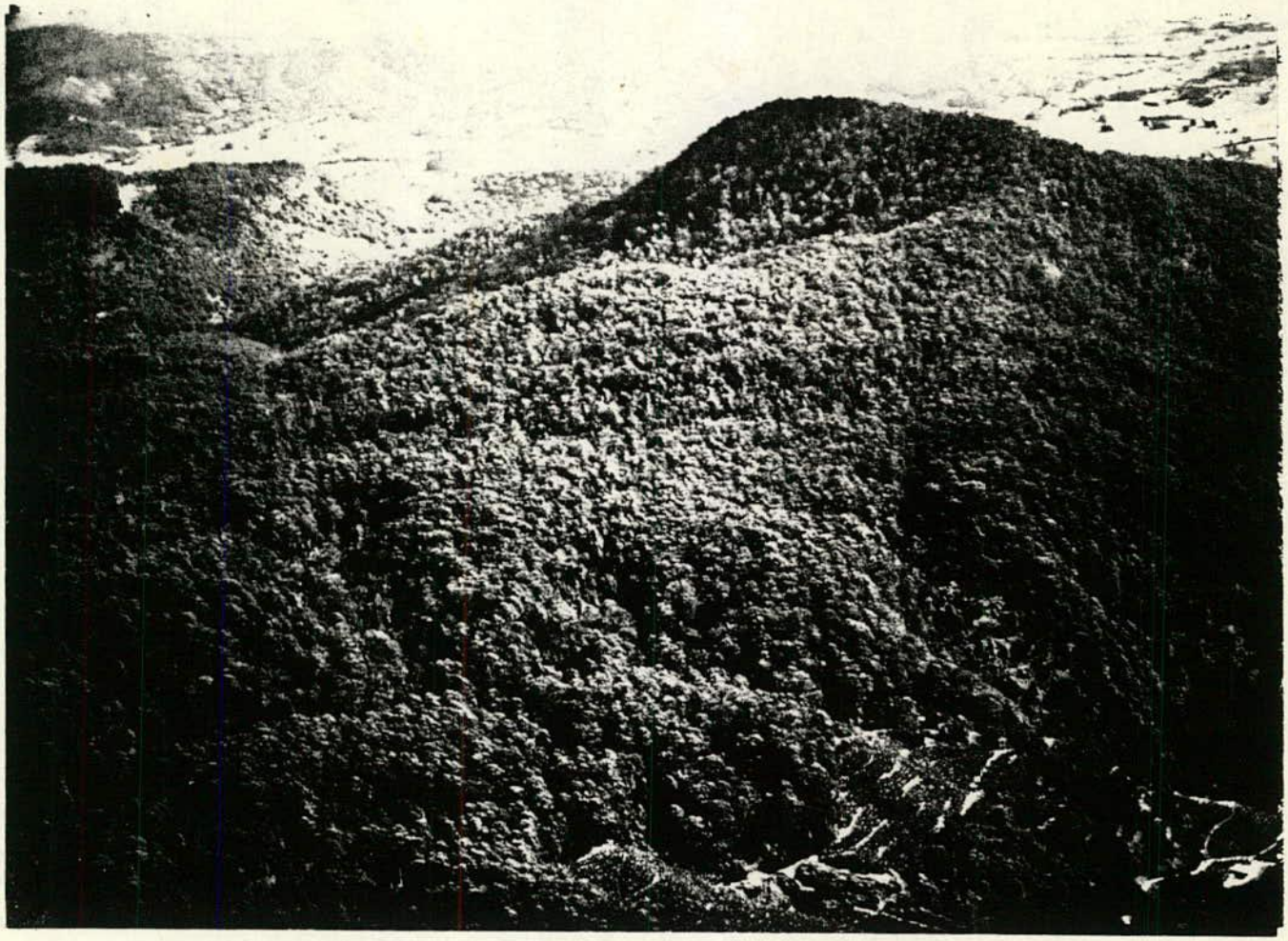


PLATE THIRTEEN
View north across the plateau area to the summit of Mt Nullum. The plateau has a cover which is predominantly Wet Sclerophyll Forest. Rainforest and disturbed rainforest can be seen in gullies. The clifflines of Hatton's Bluff can be seen in the mid-distance in upper left of the photo.

7. FAUNA

7.1 Fauna Survey - Methods and Limitations

A team of four National Parks and Wildlife Service employees conducted a fauna survey on Mount Nullum from 13-16th June 1990. Activities undertaken were trapping of small mammals (including insectivorous bats), spotlighting for arboreal mammals, identification of birds, searching for reptiles and amphibians, and collection of vertebrate scats. Survey materials and methods were:

* Small Mammal Trapping. 250 small Elliot Traps were used to sample 10 trap lines for each of three nights, giving a total of 750 trap nights for the survey. Each trap line was 250 metres in length and 25 traps were set at 10 metre intervals along each. Traps were baited with a mixture of peanut butter, rolled oats and honey. The trap lines were subjectively located to maximise the variety of habitat surveyed in the limited time available. Location of the trap lines is shown on Map Four.

* Insectivorous Bats. One Harp Trap was set in a suitable location on the plateau section of Mount Nullum from dusk to dawn, giving a total of 3 survey nights.

* Arboreal Mammals. Two vehicle-based spotlights were used to sample along the road on the plateau. A total of 8 hours (4 hours each over 3 nights) was spent undertaking this survey.

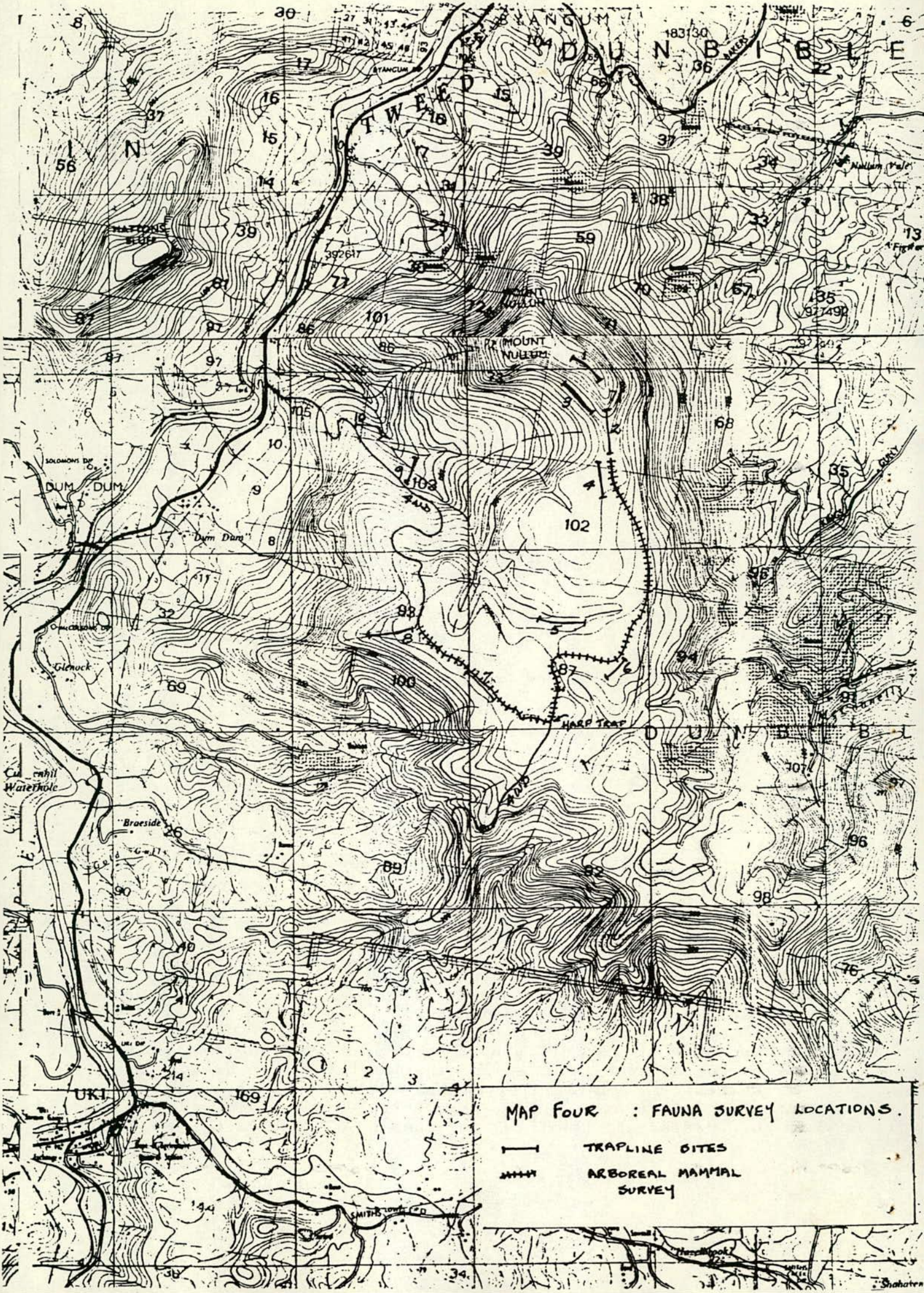
* Avifauna. Birds which were opportunistically sighted or heard were identified.

* Herpetofauna. Systematic substrate searching was carried out at favourable locations and favourable times for reptiles and amphibians. Species opportunistically sighted were also identified.

* Vertebrate Scats. Scats were collected for later identification.

The fauna survey had several limitations. Perhaps the most severe constraint was the season of the year during which it was undertaken. This is expected to have limited the results for all vertebrate groups. Winter surveys are particularly unfavourable for the sampling of insectivorous bats, birds, reptiles and amphibians.

The surveys for all groups were also limited by the small number of sites sampled and the length of the survey. Small terrestrial mammal trapping was limited to ten trap lines and, although the lines were selected to maximise sampling of different habitats, a number of habitats were not


MAP FOUR : FAUNA SURVEY LOCATIONS.
TRAPLINE SITES
ARBOREAL MAMMAL SURVEY
MOUNT NULLUM
DUM DUM
Glenock
Broadside
HARP TRAP
HARP
BYANGUM
DUNBIBLE
TWEED
LYN

sampled. Trapping of insectivorous bats was limited to one site. Spotlighting for arboreal mammals was restricted to the road on the plateau and only two of the three nights available were suitable for surveying.

Invertebrates of Mount Nullum have not been surveyed.

7.2 Fauna Habitat

Three broad fauna habitats occur on Mount Nullum - rainforest, wet sclerophyll forest and dry sclerophyll forest. Species associations of these forest types are outlined in Section 5.

7.2.1 Rainforest

Three subformations of rainforest - subtropical, warm temperate and dry - are present on Mount Nullum. This habitat type occurs on the more moist and more sheltered sites with relatively high soil fertility. Ecotones between and mixtures of all three subforms are extensive on Mount Nullum. Ecotones with the sclerophyll forests are also extensive, with rainforest forming a conspicuous component of the understorey of the wet sclerophyll forest.

Rainforest in the area varies structurally from tall closed forest in subtropical rainforest to low closed forest with emergents in dry rainforest. The understorey varies from complex in subtropical and mixed subtropical/warm temperate types to relatively open in some dry rainforests. Floristically the rainforests are also varied, with few canopy and understorey species in some areas of warm temperate and dry rainforest types, and a diverse suite of species in subtropical and mixed subtropical/warm temperate types.

All of the rainforest sites surveyed provide diverse ground habitats with abundant leaf litter, fallen and decaying logs and, in areas such as watercourses, exposed bedrock and boulders of granite. Parts of the following trap lines are in rainforest: 3 (subtropical rainforest). 5 (subtropical rainforest), 9 (warm temperate rainforest) and 10 (warm temperate rainforest).

7.2.2 Wet Sclerophyll Forest

This is the most extensive habitat type on Mount Nullum. It generally occupies less sheltered and less fertile sites than the rainforest and is subject to infrequent fires. The four species associations present are described in Section 5.2 Ecotones are common between these associations, as are ecotones between the wet sclerophyll forest and the rainforests and dry sclerophyll forest.

In addition to the variations in species composition, the upper canopy of eucalypts, Brush Box and Turpentine is structurally very varied. Structural types present include

"old growth" stands (unlogged or lightly logged areas), remnant "old growth" emergents above an even age regrowth midstorey, and regrowth areas. In short, most successional stages and mixtures from formerly clear-felled areas to virtually intact mature forest are present on Mount Nullum.

The understorey of the wet sclerophyll forest is also variable. Rainforest species are common and range from subtropical rainforest species to warm temperate rainforest species with decreasing soil fertility or to dry rainforest species with decreasing soil moisture. Sclerophyllous species are present in the understorey in drier, less fertile and/or more exposed sites, and particularly in ecotones with dry sclerophyll forest. The structure of the understorey also varies and includes all stages from very young to older well-developed rainforest and from relatively clear to dense. The ground cover generally includes a litter layer, and fallen and decaying logs are common.

Parts of trap lines 3, 5 and 9 and all line 6 are in wet sclerophyll forest.

7.2.3 Dry Scleropyll Forest

This habitat type is restricted to the drier exposed aspects and steep slopes with poor or shallow soils. One species association has been recognised in this forest type; it is described in Section 5.3.1 Ecotones between this forest and wet sclerophyll forest are common.

This forest type has been little affected by human activities. Old canopy trees are common and trees dead from old age or lightening strike are scattered throughout the forest, providing an abundance of hollows. Fallen trees and decaying logs are also common.

The understorey shrub layer is generally sparse but, in a few areas, dense stands of Grass Tree and other shrubs provide good shelter for ground dwelling animals. Grasses, including Kangaroo Grass and Bladey Grass, are the most common ground cover; Bracken Fern occurs in a few areas.

The dry sclerophyll habitat is sampled by trap lines 1, 2, 4, 7 and 8 and parts of 9 and 10.

7.2.4 Ecotones

Ecotones (overlaps of vegetation types that incorporate habitats of each) are common on Mount Nullum. Their breadth on the plateau, attributable to the gentle topography, is especially marked. These ecotones, and particularly the ecotones between scleropyll forest and rainforest, are important to fauna.

While rainforest provides habitat for a rich and diverse fauna, the most diverse species assemblages for many faunal groups are found not in rainforest but in the ecotones

between rainforest and sclerophyll forest and in wet-sclerophyll forests with a closed understorey of rainforest species. The greater faunal diversity found in these ecotones and forest types can largely be related to their structural diversity (Adam, 1987). The overstorey of eucalypts and related species provides niches for species characteristic of sclerophyll communities, while the rainforest understorey supports a rainforest fauna. Holes and hollow trunks are a feature of the tall emergent eucalypts and these are important for birds and arboreal mammals. The interspersion of rainforest and sclerophyll forest is most common in northern New South Wales. It is much less common in the rainforest areas of northern Queensland, where abrupt rainforest/dry eucalypt woodland boundaries are common (Tracey, 1982), and southern New South Wales where rainforest is much less common.

7.3 Results of Service Fauna Survey

The results of the Service fauna survey are shown in Tables One, Two and Three.

7.3.1 Small Terrestrial Mammals

163 animals were trapped in the 750 trap nights of the survey. 41 of these animals were re-captures. Therefore, 122 different animals were captured in 750 trap nights.

These animals consisted of 5 species:

- Bush Rat (*Rattus fuscipes*) - 71 individuals
- Brown Antechinus (*Antechinus stuartii*) - 42 individuals
- Fawn-footed Melomys (*Melomys cervinipes*) - 7 individuals
- Dusky Antechinus (*A. swainsonii*) - 1 individual
- House Mouse (*Mus musculus*) - 1 individual

With the exception of the House Mouse, all species captured are native species.

In addition, the Northern Brown Bandicoot (*Isoodon macrourus*) was seen while spotlighting for arboreal mammals. Bandicoot diggings were very common throughout the wet sclerophyll forest areas and particularly common in ecotones of dry sclerophyll forest and rainforest near trap lines 1 and 2.

TABLE ONE

Mammal Fauna of Mount Nullum.
Results of N.P.W.S. Survey conducted 13-16 June 1990.

\+ - Confirmed capture/identification
0 - Unconfirmed Occurrence
x - Number of individuals/habitat area
* - Introduced Species
\# - Scat Identification

Scientific Name	Common Name	Habitat - Vegetation DSF	WSF	RF
<u>Dasyuridae</u>				
Antechinus stuartii	Brown Antechinus	+ 10	+ 8	+ 24
A. swainsonii	Dusky Antechinus			+ 1
<u>Muridae</u>				
Rattus fuscipes	Bush Rat	+ 23	+ 8	+ 41
Melomys cervinipes	Fawn-footed Melomys	+ 2		+ 5
Mus musculus *	House Mouse	+ 1		
<u>Petauridae</u>				
Petauras breviceps	Sugar Glider	+ 1	+ 2	
P. australis	Yellow-bellied Glider		0	
P. norfolcensis	Squirrel Glider		0	
Petauriodes volans	Greater Glider	+ 3	+ 6	
Psuedocheirus peregrinus	Common Ringtail Possum	+ 2		
<u>Phalangeridae</u>				
Trichosurus caninus	Mountain Brushtail Possum	+ 1	+ 2	
<u>Macropodidae</u>				
Wallabia bicolour	Swamp Wallaby	+# 1		
<u>Bovidae</u>				
Capra hircus *	Goat	+# ?		
<u>Peramelidae</u>				
Isoodon macrourus	Northern Brown Bandicoot		+ 1	

TABLE TWO

Avifauna of Mount Nullum
Results of N.P.W.S. Survey conducted 13-16 June 1990.

\+ - Confirmed Identification - Sighting/Call
0 - Evidence of Activity - Previously unrecorded
\+ - Confirmed Sighting, Previously Unrecorded

		Habitat		
Scientific Name	Common Name	DSF	WSF	RF
Megapodiiae				
Alectura lathami	Australian Brush Turkey			+
Columbidae				
Columba leucomela	White-headed Pigeon		+	
Macropygia amboinensis	Brown Cuckoo Dove		+	
Chalcophaps indica	Emerald Dove		+	+
Cacatuidae				
Calyptorhynchus lathami	Glossy Black Cockatoo	0		
Polytelidae				
Alisterus scapularis	Australian King Parrot		+	
Platycercidae				
Platycerccus elegans	Crimson Rosella	+		
Aegothelidae				
Aegotheles cristutus	Australian Owlet Nightjar		+	
Alcedinidae				
Dacelo novaeguineae	Laughing Kookaburra	+		
Menuridae				
Menura alberti	Albert's Lyrebird		+	+
Campephagidae				
Coracina novaehollandiae	Black-faced Cuckoo Shrike	+		
Muscicapidae				
Eopsaltria australis	Eastern Yellow Robin		+	+
Tregellasia capito	Pale Yellow Robin			+
Pachycephala pectoralis	Golden Whistler	+		
Colluricincla megarhyncha	Grey Shrike Thrush	+	+	+
Rhipidara rufifrons	Rufous Fantail			+
R. faliginosa	Grey Faintail	+		
Maluridae				
Malurus lamberti	Variegated Fairy Wren	+		
Acanthizidae				
Sericornis magnirostric	Large Billed Scrub Wren		+	+
S. frontalis	White-browed Scrub Wren			+
Acanthiza lineata	Striated Thornbill	+		
Climacteridae				
Climacteris leucophaea	White-throated Tree Creeper	+		

Avifauna cont.

		Habitat		
Scientific Name	Common Name	DSF	WSF	RF
Meliphagidae				
Meliphagidae lewinii	Lewins Honeyeater	+	+	+
Myzomela sanguinolenta	Scarlet Honeyeater	+		
Dicaeidae				
Dicaeum hirundinaceum	Mistletobird	+		
Pardalotidae				
Pardalotus striatus	Striated Pardalote	+		
Zosteropidae				
Zosterops lateralis	Silvereye	+		
Ploceidae				
Emblema temporalis	Red-browed Finch	+		
Oriolidae				
Oriolus sagittatus	Olive-backed Oriole		+	
Dicruridae				
Dicrurus hottentottus	Spangled Drongo		+	
Cracticidae				
Strepera granculina	Pied Currawong	+	+	
Pittidae				
Pitta versicolour	Noisy Pitta			+
Meropidae				
Merops ornatus	Rainbow Bee-eater	+		

TABLE THREE

Herpetofauna of Mount Nullum

Results of N.P.W.S. Survey conducted 13-16 June 1990.

\+ - Confirmed Sighting/Identification
0 - Granite Outcrops

Scientific Name	Common Name	Habitat DSF	WSF	RF
<u>Elapidae</u>				
Cryptophis nigrescens	Eastern Small-eyed Snake	+		
Demansia psammophis	Yellow-faced Whip Snake	+		
<u>Hylidae</u>				
Litoria lesuerii	Lesueur's Frog	+0		
<u>Myobatrachidae</u>				
Pseudophryne bibroni	Brown Toadlet	+0		
<u>Scincidae</u>				
Eulampris tenuis	Skink	+0		

7.3.2 Insectivorous Bats

No insectivorous bats were captured in the Harp Trap. A few were observed while spotlighting but not identified.

7.3.3 Arboreal Mammals

Four species were identified and 17 animals were sighted:

- Greater Glider (*Petauroides volans*) - 9 individuals
- Sugar Glider (*Petaurus breviceps*) - 3 individuals
- Mountain Brushtail Possum (*Trichosurus caninus*) - 3 individuals
- Common Ringtail Possum (*Pseudocheirus peregrinus*) - 2 individuals

7.3.4 Birds

Thirty-three species of birds were identified during the survey period. Three of these species had not been recorded by Holmes (Mitchell McCotter, 1987) from Mount Nullum:

- Rainbow Bee-eater (*Merops ornatus*)
- Rufous Fantail (*Rhipidara rufifrons*)
- Noisy Pitta (*Pitta versicolor*)

7.3.5 Reptiles and Amphibians

Five species were recorded during the survey:

- Eastern Small-eyed Snake (*Cryptophis nigrescens*)
- Yellow-faced Whipsnake (*Demansia psammorphis*)
- A Skink (*Eulampris tenuis*)
- Brown Toadlet (*Psuedophryne bibroni*)
- Lesueur's Frog (*Litoria lesuerii*)

7.3.6 Vertebrate Scats

Vertebrate scats were not common, probably due to the extended wet weather preceding the survey period. The presence of two species was shown by their scats:

- Swamp Wallaby (*Wallabia bicolor*)
- Goat (*Capra hircus*)

7.4 Discussion and Fauna Conservation Values

Any discussion of the fauna of Mount Nullum must take into account the limitations of all faunal surveys undertaken. The Service survey and the earlier survey of avifauna by Holmes (Mitchell McCotter and Associates 1988a) were both limited in duration - 3 days and 2 days respectively. That of Holmes was confined to the Council-owned land on the plateau and the Service survey, while encompassing more of the area, sampled only a limited number of habitats. The

Service survey was particularly limited by being carried out in Winter when a number of animal groups can be expected to be inactive or absent.

7.4.1 Small Terrestrial Mammals

The results of the small mammal trapping in winter indicate a good biomass of small mammals on Mount Nullum.

The two species most commonly captured, the Bush Rat and the Brown Antechinus, occur in large numbers across all habitats sampled. This probably reflects the flexibility of these species habitat requirements but may also be influenced by the breadth and frequency of ecotones on Mount Nullum.

While the Bush Rat and Brown Antechinus are relatively common species statewide, the other two native species captured - Fawn-footed Melomys and Dusky Antechinus - are not. The Fawn-footed Melomys is common in Queensland, but is regarded as rare in New South Wales (Strahan, 1983). It is particularly sensitive to the destruction or isolation of the rainforest habitat which it prefers.

The Dusky Antechinus is also sensitive to habitat disturbance and associated invasions by exotic plants and animals. The one animal (a sub-adult male) was captured in a well-developed rainforest in the western drainage basin (Trap Line 9). The species is close to its northern limit on Mount Nullum and is not common in the Tweed Shield region - Smith et. al. (1989) captured the species at only three of the 159 sites they surveyed in the region.

Both Fawn-footed Melomys and Dusky Antechinus are significant species for Mount Nullum. The Service survey indicates that these species prefer the well-developed rainforest habitats in the western drainage basin of the area.

7.4.2 Insectivorous Bats

While no insectivorous bats were captured during the Service survey, several specimens were seen while spotlighting. It is expected that better results would be obtained if surveys were carried out in warmer months.

7.4.3 Arboreal Mammals

While none of the four species located in the Service survey are regarded as rare or endangered, population density, particularly of the Greater Glider, appears high.

Nine individuals of Greater Glider were observed in the 15 hectares of wet and dry sclerophyll forest on the plateau which were surveyed. This appears to be a particularly high population density for this species which studies indicate has an average home range for an individual of 2-6 hectares (Kehl et. al. 1977).

Harry Hines of University of New England carried out a short survey for arboreal mammals on the plateau in March 1990. In addition to the four species recorded by the Service team, he also recorded the Yellow-bellied Glider (*Petaurus australis*) and Squirrel Glider (*P. norfolcensis*). Both of these species warrant listing as rare and endangered fauna on Schedule 12 of the National Parks and Wildlife Act (1974) and their presence on Mount Nullum would make this an area of high significance for arboreal mammals.

The Koala (*Phascolarctos cinereus*) has not been recorded from Mount Nullum to date but is locally common nearby (Mount Warning Road) and has been recorded from contiguous forest.

The forests of Mount Nullum appear to provide ideal habitat for arboreal mammals. Important features include the presence of a significant number of large dead and living hollow-bearing trees, the mix of ecotones and seral stages, and a high plant species diversity. These features are best developed on the plateau and in the western drainage basin. Further surveys of these areas may prove rewarding.

7.4.4 Macropods

Only one species of macropod - the Swamp Wallaby - has been recorded from Mount Nullum. The occurrence of several other species can be expected and further survey is necessary.

7.4.5 Birds

The Service survey only located 33 birds species, a result attributable to the undertaking of the survey in Winter. Better results could be expected in Spring or Summer when native foods are more abundant.

A survey by Glen Holmes (Mitchell McCotter and Associates, 1988a) of the Council-owned land on the plateau revealed the presence of 57 bird species. The Service survey found three species not recorded by Holmes; 60 species are therefore now known from the area. These are listed at Appendix Two.

Four species of birds regarded as vulnerable and rare (National Parks and Wildlife Act (1974), Part 2) are recorded from Mount Nullum. These are:

Aviceda subcristata (Pacific Baza)
Coracina lineata (Yellow-eyed Cuckoo-shrike)
Menura alberti (Albert's Lyrebird)
Monarcha leucotis (White-eared Monarch)

Seven species of birds regarded as Fauna of Special Concern (National Parks and Wildlife Act (1974) Part 1) are recorded. These are:

Calyptorhynchus lathami (Glossy Black Cockatoo)
Chaleophaps indica (Emerald Dove)
Coracina tenuirostris (Cicadabird)
Hirundapus caudacutus (White-throated Needletail)
Merops ornatus (Rainbow Bee-eater)
Ptilinopus regina (Rose-crowned Fruit Dove)
Rhipidara rufifrons (Rufous Fantail)

Some of these species are relatively common on Mount Nullum. The Albert's Lyrebird, for example, was often heard calling and scratchings were very common. One indication of the density of the species were four males heard calling from one valley.

The presence of many large mature and dead trees with hollows on Mount Nullum suggests that raptors such as the Powerful Owl (*Ninox strenua*) are likely to occur. Further survey work with an emphasis on such species could reap positive results.

7.4.6 Reptiles and Amphibians

The Service fauna survey, could hardly have been conducted at a worse time for reptiles and amphibians which are torpid in winter. Indeed, the recording of five species indicates a potentially interesting herpetofauna community on Mount Nullum. The regionally unusual geology of the area strengthens this prediction and field inspection of the granite outcrops on the mountain confirmed that they provide ideal habitat for these groups.

Additionally, Andrew Murray (1990) has recorded the Dwarf Crowned Snake (*Cacophis krefftii*) from Dry Sclerophyll Forest on the mountain. This species is listed as Vulnerable and Rare (National Parks and Wildlife Act, Schedule 12).

The reptiles and amphibian component of the fauna of Mount Nullum is still very poorly known. Indications are that it is potentially very interesting and further study at a more suitable time of the year is warranted.

7.4.7 Exotic Species

Two exotic species - the House Mouse and the Goat - have been recorded from Mount Nullum. It appears the House Mouse is in very low numbers in the area - with only one specimen being captured - and is presumably having very limited impact on the biota of the area.

The presence of the Goat was indicated by old scats, and no animals were sighted. The scats were found in rocky outcrops on the northern and western sides of the mountain. It is unlikely that the species is presently in the area as there have been no sightings even though the area has been the subject of considerable attention recently. It is most likely that the scats are from animals which wandered onto

the mountain some time ago from a property across the Tweed River under Hattons Bluff. Goats from that property have wandered some distance in the past onto other lands. The damage this species is capable of doing to native plant and animal communities cannot be over-emphasised and, if it is seen on the mountain in the future, immediate steps should be taken to remove it.

7.5 Further Work

Further survey work at an appropriate time of the year (Spring-Summer) is necessary to determine what animals are present on Mount Nullum. Surveys to date have been limited in time and the area covered.

8. CULTURAL HERITAGE

Unfortunately, there is a total lack of information on Aboriginal use or significance of Mount Nullum. However, it and Hatton's Bluff to the north occur on either side of the narrowing of the Tweed River prior to its entry to the Tweed floodplain. This, plus the unimpeded views of the floodplain, suggests that the mountain may have played a strategic role in defence or movements of Aboriginal people. The diverse habitats for plants and animals on the mountain suggest that the area may also have provided a source of foods and materials. Mitchell McCotter and Associates (1988a) mapped areas within the Council-owned land which might have been utilised for camps and ceremonial grounds. Unfortunately all must remain speculation in the absence of material or authentic anecdotal evidence.

Possible evidence is a mature Turpentine with a large oval scar one side. This scar may be the result of Aboriginal activities and the careful removal of live bark from the edges of the scar may provide clues (such as stone axe scars) as to its origin. Until this and other survey work is undertaken, the Aboriginal significance of Mount Nullum remains unclear.

European activities on Mount Nullum have included practices such as logging, sawmilling and plantation farming, and associated works such as roading. Evidence of most of these activities remains in the area but all are typical of European activities in this part of the State and cannot be regarded as significant.

9. RECREATIONAL OPPORTUNITIES

Mount Nullum has a number of features which make it attractive for recreation. These include:

* Proximity to Murwillumbah and the Gold and Tweed Coasts.

* Lookout points which provide good views of Murwillumbah and the lower Tweed and Mount Warning.

* Two attractive large waterfalls on a pleasant creek.

* Extensive areas of often very attractive forest with some very large specimens of trees such as Turpentine, Tallowwood and Forest She-oak.

* Opportunities for nature-based activities such as birdwatching, bushwalking and plant identification.

While limited recreational use has taken place on Mount Nullum for some decades, promotion of increased recreational use must take into account the heritage values of the area and the fact that increased visitation is likely to cause damage to the recreational features or areas associated with them. Access to the waterfalls and the summit area, for example, is by way of steep slopes which are prone to slip and erosion.

Activities such as pilfering of epiphytic orchids will also increase with increased visitation. These species are currently conspicuous and easily reached. A case in point is a *Cymbidium* orchid which had survived for several decades, albeit with some depletion, almost at ground level behind one of the lookouts; this orchid has been completely removed in the past two months, perhaps taken by the people who broke bottles on the lookout rock.

It might be possible with great care to provide recreational facilities in Mount Nullum which would not degrade the heritage values. The intensity and location of such facilities would be of paramount importance and, obviously, factors such as nature and location of access and provision of services such as water and toilets would need to be addressed at an early stage of planning. It is possible that very carefully planned, low-key recreational facilities on Mount Nullum may provide an attraction which would relieve some of the pressure on Mount Warning National Park.

10. CONCLUSIONS AND RECOMMENDATIONS

The information available on Mount Nullum shows that the area has significant heritage values. Further surveys of fauna and aboriginal sites may show that these values are even more significant. Obviously, management of the area must seek to protect these heritage values.

Mount Nullum has an unique geological substrate in coastal north-eastern New South Wales which is reflected in a number of the species and species assemblages present. A number of the rare or threatened and significant plant species present either normally occur in much drier or less fertile habitats such as the Northern Tablelands and on ryholite. Others, if present elsewhere in the Tweed area, occur on Mount Nullum in very high numbers or densities. Several of the communities are inadequately conserved. In the case of two dry rainforest sub-alliances, one is not conserved and the

other is reported for the first time from far-northern New South Wales.

It is evident that Mount Nullum provides significant habitat for native species. This is additional to the role the area plays as a wildlife corridor linking other significance habitat areas on the Tweed Shield. It is obvious that habitat protection on Mount Nullum should include not only that area previously identified by the Service to the Draft Local Environment Plan for Tweed Shire but <u>all</u> of the mountain.

It is recommended that:

a) all of the Mount Nullum area be zoned Habitat Protection - this would include all areas presently zoned Habitat Protection plus areas zoned Scenic Escarpment Protection.

b) further surveys for fauna and Aboriginal sites be carried out as a matter of priority, and

c) consideration be given to providing more permanent protection to the heritage values of Mount Nullum. The Mount Nullum area has special scientific interest pertaining to:

* <u>wildlife</u>
  - 5 inadequately conserved plant associations
  - 14 rare or threatened plant species
  - high biomass of small mammals
  - high population density of arboreal marsupials
  - 4 vulnerable and rare birds
  - 2 uncommon mammals

* <u>natural environments</u>
  - important wildlife corridor linking other forested habitats
  - scenic and aesthetic values

* <u>natural phenomena</u>
  - granite outcrop

and therefore warrants declaration as a nature reserve for the purposes stated in Section 49(3) of the National Parks and Wildlife Act, 1974.

11. ACKNOWLEDGEMENTS

Thanks are extended to other members of the fauna survey team, and particularly Senior Ranger David Charley, for useful comments on the fauna section.

Special thanks are due to Ms. Stephanie Horton who contributed her time editing the draft text and provided useful comments and information for all sections of the report.

Photo Credits: Plates Two and Twelve are by John Hunter, Plate Three by Steve Phillips and Plates Six, Eight and Eleven by Brian McLachlan. All other photos were taken by Geoff Biddle.

12. BIBLIOGRAPHY

Adam, P. (1987) New South Wales Rainforests. The Nomination for the World Heritage List. National Parks and Wildlife Service, Sydney.

Beadle, N.C.W. (1981). The Vegetation of Australia. Cambridge University Press, Cambridge.

(1982). Students Flora of North Eastern New South Wales. Part III. Angiosperms: Families 84-107. University of New England, Armidale.

(1984). Students Flora of North Eastern New South Wales. Part V. Angiosperms: Families 137-170. Univeristy of New England, Armidale.

Benson, J. (1989). Establishing priorities for the conservation of rare of threatened plants and plant associations in New South Wales. Proceedings of a National Conference on The Conservation of Threatened Species and their Habitats, IUCN, Sydney.

Briggs, J.D. and Leigh, J.H. (1988). Rare or Threatened Australian Plants. Special Publication 14. Aust. National Parks & Wildlife Service, Canberra.

Brooker, M.I.H. and Kleinig, D.A. (1983). A Field Guide to Eucalypts. Volume 1. South-eastern Australia. Inkata Press, Melbourne.

Floyd, A.G. (19). The Vegetation of the Border Ranges. Unpublished report to NSW National Parks & Wildlife Service.

(1981). Vegetation of the Western Nightcap Range. Unpublished report to NSW National Parks & Wildlife Service.

(1984). Vegetation - by communities/habitat. Rainforest Paper No. 22. Review of policies, priorities and programmes for nature conservation in New South Wales. Unpublished report to NSW National Parks & Wildlife Service.

(1989). Rainforest Trees of Mainland South-eastern Australia. Inkata Press, Melbourne.

(1990). Australian Rainforests in New South Wales. NSW National Parks and Wildlife Service. Surrey Beatty & Sons, Sydney.

Gould, W. (1970). The petrology of the Mount Nullum igneous complex, east of Mount Warning, N.E. N.S.W. Unpublished thesis, Department of Geology, University of Queensland.

Kooyman, R. (1987). Vegetation survey. Cedar Creek area adjacent to Mount Warning National Park. Unpublished report to Soil Conservation Service of NSW.

(1988) Species list Mount Nullum access road. Unpublished report.

Leigh, J., Briggs, J. and Hartley, W. (1981). Rare and Threatened Australian Plants. Special Publication 7. Australian National Parks & Wildlife Service, Canberra.

Mitchell McCotter & Associates. (1988a). Mount Nullum Environmental Study. Unpublished report to Tweed Shire Council.

(1988b) Mount Nullum Supplementary Environmental Study. Unpublished report to Tweed Shire Council.

Murray, A.S. (1990). Submission to Commission of Inquiry: Proposed rezoning of Mount Nullum (Tweed LEP 1987, Draft Amendment No. 16) to permit a sanitorium, Residential Units, Tourist Accommodation, Tourist Facilities and other uses. Unpublished submission.

Smith, A.P., Hines, H.B. & Webber, P. (1989). Mammals, reptiles and amphibians of the rainforests of the Mount Warning Caldera Region. Unpublished report NSW N.P.W.S.

Stanley, T.D. & Ross, E.M. (1983). Flora of South-eastern Queensland. Volume 1. Qld. Dept. Primary Industries, Brisbane.

(1986) Flora of South-eastern Queensland. Volume 2 Qld. Dept. Primary Industries, Brisbane.

Strahan, R. (ed.) (1983). The Australian Museum Complete Book of Australian Mammals. Angus & Robertson, Sydney.

Thomas, M.B. & McDonald, W. (1987). Rare and Threatened Plants of Queensland. Qld. Dept. Primary Industries, Brisbane.

Tracey, J.G. (1982). The Vegetation of the Humid Tropical Region of North Queensland. CSIRO, Melbourne.

APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
PTERIDOPHYTES				
ADIANTACEAE				
Adiantum formosum	1	+		
A. hispidulum		+		
A. sylvaticum	2			
ASPIDIACEAE				
Lastreopsis decomposita	1,2	+		
L. marginans	1	+		
L. microsora	1,2	+		
ASPLENIACEAE				
Asplenium australasicum	1,2	+		
A. polyodon	1			2
ATHYRIACEAE				
Diplazium australe				
BLECHNACEAE				
Blechnum cartilagineum	1,2	+		
B. nudum	2			
B. patersonii	1,2	+		
Doodia aspera	1	+		
D. caudata			+	1
CYATHEACEAE				
Cyathea australis	1,2	+		
C. cooperi	1	+		
C. leichhardtiana	1,2	+		
DAVALLIACEAE				
Davallia pyxidata	1		+	
DENNSTAEDTIACEAE				
Hypolepis punctata		+		
Pteridium esculentum		+	+	
DICKSONIACEAE				
Culcita dubia		+	+	1
GLEICHENIACEAE				
Sticherus flabellatus		+		
S. lobatus		+		
LINSAEACEAE				
Lindsaea microphylla				
NEPHROLEPIDAEAE				
Arthropteris tenella	2			
Nephrolepis cordifolia	1	+		
OSMUNDACEAE				
Todea barbara	2			
POLYPODIACEAE				
Dictymia brownii			+	
Microsorium scandens	1	+		
Platycerium bifurcatum	2	+		
P. superbum	1			
Pyrossia rupestris			+	

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
PTERIDACEAE				
Pteris tremula	2			
P. umbrosa	2			
SINOPTERIDACEAE				
Pellaea paradoxa	2			
P. falcata		+		
THELYPTERIDACEAE				
Christella dentata	2	+		
SCHIZAEACEAE				
Schizaea bifida		+		
CYCADS				
ZAMIACEAE				
Lepidozamia peroffskyana		+		
GYMNOSPERMS				
ARAUCARIACEAE				
Araucaria cunninghamii	3			
PODOCARPACEAE				
Podocarpus elatus	1,3			
ANGIOSPERMS - MONOCOTYLEDONS				
AGAVACEAE				
Cordyline petiolaris	1,2	+		
C. rubra	1,2	+		
C. stricta	2			
ARACEAE				
Alocasia macrorrhizos	1	+		
Gymnostachys anceps	1	+	+	
Pothos longipes	1,2			
ARECACEAE				
Archontophoenix cunninghamiana	1,2	+		
Calamus muelleri	1,2	+		
Linospadix monostachyus	1,2	+		
COMMELINACEAE				
Aneilema acuminatum	1			
Aneilema biflorum	1			2
Commelina cyanea			2	
Pollia crispata				
CYPERACEAE				
? Cyperus sp. (A.M.)				
Exocarya scleroides	2	+		
Gahnia aspera	2	+		
Lepidosperma curophorum		+		
Scleria sp.	2	+		
DIOSCOREACEAE				
Dioscorea transversa	1,2	+		
FLAGELLARIACEAE				
Flagellaria indica	1,2	+		
JUNCACEAE				
Juncus sp.		+		

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
LILIACEAE				
Dianella caerulea		+	+	
Kreysigia multiflora	1,2	+	+	
Patersonia sericea (A.M.)				
Thysanotus tuberosus			+	1
ORCHIDACEAE				
Bulbophyllum exiguum				2
Caladenia catenata				
Calanthe tripicata	1	+		
Corybas sp.			+	
Cymbidium madidum			+	
C. suave		+	+	
Dendrobium aemulum	1	+		
D. beckleri				
D. gracilicaule				
D. kingianum			+	2
D. linguiforme				2
D. monophyllum				2
D. speciosum			+	2
D. teretifolium	1			
D. tetragonum	3			
Liparis reflexa			+	2
Oberonia palmicola	3			
Plectorrhiza tridentata	1,3			
Pterostylis (?) acuminata			+	
Sarcochilus hillii			+	2
Thelmytria aristata				
Rhinerrhiza divitiflora	1			
PHILESIACEAE				
Eustrephus latifolius		+		
Geitonoplesium cymosum	1,2	+		
POACEAE				
* Andropogan virginicus		+		
Bothriochloa sp.		+		
Entolasia stricta		+		
Imperata cylindrica			+	1
* Melinus minutiflorus		+		
Oplismenus sp.		+		
* Paspalum dilatatum		+		
Poa sp.			+	
* Setaria ? geniculata		+		
Themeda australis			+	1
SMILACACEAE				
Ripogonum album	1	+		
R. discolor	2			
R. elseyanum	1	+		
Smilax australis	1	+		
S. glyciphylla	1,2	+		

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
XANTHORRHOEACEAE				
L. laxa	2		+	
Lomandra leucocephala ssp. leucocephala				
L. multiflora		+		
L. spicata		+	+	
Xanthorrhoea australis			+	1
X. macronema			+	
ZINGIBERACEAE				
Alpinia al	1	+		
A. caerulea	1,2	+	+	
ANGIOSPERMS - DICOTYLEDONS				
ACANTHACEAE				
Pseuderanthemum variabile	3	+	+	
AKANIACEAE				
Akania lucens				
ANACARDIACEAE	1			
Euroschinus falcata	1	+		
Rhodasphaera rhodanthema	3			
ANNONACEAE				
Ancana stenopetala	1			
Rauwenhoffia leichhardtii	1			
APIACEAE				
Hydrocotyle pedicellosa				
Platysace lanceolata			+	1
ALANGIACEAE				
Alangium villosum				
APOCYNACEAE				
Alyxia ruscifolia	3			
Ervatamia angustisepala	2	+		
Carissa ovata	3			
Melodinus acutiflorus		+		
M. australis	1	+		
Parsonsia fulva			+	
P. straminea		+		
ARALIACEAE				
Astrotricha floccosa		+		
Cephalaralia cephalobotrys	1,2	+		
Polyscias elegans	1,2	+		
P. murrayi		+		
P. sambucifolia		+	+	
ARISTOLOCHIACEAE				
Aristolochia praevenosa	1			
ASCLEPIADACEAE				
* Asclepius curassavica			+	1
* Gomphocarpus fruticosus		+		
Hoya australis			+	2
Tylophora paniculata			+	

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
ASTERACEAE				
Acomis acoma		+		
* Ageratina adenophora	1	+	+	3
* A. riparia	1,2	+		3
* Ageratum houstonianum		+		
* Baccharis halimifolia		+		3
* Bidens pilosa		+	+	
Cassinia ? compacta		+		
Centratherum muticum		+	+	
* Cirsium vulgare		+	+	
Helichrysum elatum		+		
H. rufescens (A.M.)				
H. diosmifolium		+		3
* Hypochoeris radicata			+	
Olearia heterocarpa		+	+	
O. nernstii		+		
Senecio amygdalifolius		+		
S. lautus			+	
* Sonchus oleraceus			+	
BIGNONIACEAE				
Pandorea pandorana	1	+	+	
BURSERACEAE				
Canarium australasicum	2			
CAPPARIDACEAE				
Capparis arborea	1			
CASUARINACEAE				
Allocasuarina littoralis				1
A. torulosa		+	+	1
CELASTRACEAE				
Cassine australis	3			
Celastrus subspicatus		+		
Denhamia celastroides		+		
Hedrianthera porphyropetala	1,2	+		
Maytenus silvestris		+		
CHENOPODIACEAE				
Rhagodia hastata				2
CONVOLVULACEAE				
Convolvulus erubescens		+		
CUCURBITACEAE				
Diplocyclos palmatus	1	+		
Trichosanthes subvelutina		+		
Zehneria cunninghamii	1			
CUNONIACEAE				
Caldcluvia paniculosa	1,2	+		
Geissois benthamiana	1,2	+		
Pseudoweinmannia lachnocarpa	1	1		
Schizomeria ovata	2	+		

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
CLUSIACEAE				
Hypericum granineum		+		
CRASSULACEAE				
Crassula sieberana				2
DILLENIACEAE				
Hibbertia aspera			+	
H. dentata	2	+		
H. scandens		+	+	3
EBENACEAE				
Diospyros pentamera	1,3			
EHRETIACEAE				
Ehretia acuminata	1,3	+		
ELAEOCARPACEAE				
Elaeocarpus grandis	1			
E. kirtonii	1			
E. obovatus		+		
E. reticulatus		+		
Sloanea australis	1	+		
S. woollsii	1,2	+		
EPACRIDACEAE				
Leucopogon juniperinus			+	1
Trochocarpa laurina	1,2	+		
ESCALLONIACEAE				
Abrophyllum ornans	2			
Anopterus macleayanus	2			
Argophyllum nullumense	1,2	+		
Cuttsia viburnea	2	+		
Polyosma cunninghamii	1,2			
Quintinia verdonii	1,2	+		
EUPHORBIACEAE				
Actephila lindleyi	1			
Austrobuxus swainii	2	+		
Baloghia inophloia	1			
Breynia oblongifolia		+	+	
Claoxylon australe	1	+		
Cleistanthus cunninghamii	3			
Coelebogyne ilifolia	3			
Croton acronychoides	3			
C. stigmatosus	3			
C. verreaxii	1	+		
Drypetes australasica	1,2	+		
Glochidion ferdinandi		+		3
Macaranga tanarius	1			3
Mallotus philippensis	1	+		3
Omalanthus populifolius	1,2	+		
Phyllanthus gasstroemii	3	+	+	
Tragia novae - hollandiae	1			

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
EPOMATIACEAE				
Eupomatia bennettii	1	+		
E. laurina	1,2	+		
FABACEAE				
Caesalpinioidae				
* Caesalpinia decapetala	2	+		
C. subtropica				
* Cassia floribunda			+	3
C. marksiana	1	+		
Faboideae				
Austrosteenisia blackii	1	+		
Castanospermum australe	1			
* Crotolaria incana			+	
Daviesia arborea		+	+	
D. ulicifolia			+	
Derris involuta	1	+		
Desmodium nemorosum			+	
Glycine clandestina		+		
Hardenbergia violacea			+	1
Hovea acutifolia		+		3
Indigofera australis		+	+	
Kennedia rubicunda			+	1
Pultenaea retusa			+	
Milletia megasperma	1	+		
Mimosoideae				
Acacia binervata		+	+	
A. melanoxylon		+		3
A. myrtifolia		+		
A. orites	2	+		
Archidendron grandiflorum	1	+		3
A. muellerianum	2	+		
Pararchidendron pruinosum	1	+		
FLACOURTIACEAE				
Berberidopsis beckleri (A.M.)				
Scolopia braunii	1	+		
Streptothamnus moorei	2			
GERANIACEAE				
Geranium (?) homeanum		+		
GENTIANACEAE				
* Centaurium erythrae		+		
GOODENIACEAE				
Goodenia rotundifolia			+	
ICACINACEAE				
Citronella moorei	1	+		
Pennantia cunninghamii	1			

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
LAMIACEAE				
Ajuga australe		+		
Plectranthus argentatus				2
P. graveolens			+	2
Prostanthera nivea			+	1
P. phylicifolia (R.K.)			?	
LAURACEAE				
Beilschmiedia elliptica	1,2	+		
B. obtusifolia	1	+		
* Cinnamomum camphora		+		
C. oliveri	2			
Cryptocarya erythroxylon	1			
C. glaucescens	2	+		
C. laevigata	1	+		
C. microneura	1,2	+		
C. obvoata				
C. rigida	2	+	+	
C. triplinervis	3			
Endiandra discolor		+		
E. globosa	1,2	+		
E. muelleri		+		
E. sp. aff. muelleri (G.H.)		+		
E. pubens	1,2	+		
E. sieberi				
Litsea australis	2	+		
L. reticulata				
Neolitsea dealbata	1,2	+		
LOBELIACEAE				
Lobelia gibbosa			+	
L. trigonocaulis		+		
Pratia purpurascens		+	+	
LOGANIACEAE				
Logania albiflora		+		
LORANTHACEAE				
Amyema sp.		+		
Amylotheca dictyphleba	1,2			
Benthamina alyxifolia	2			
Muellerina celastroides		+		
MALVACEAE				
Hibiscus heterophyllus	2	+		3
H. splendens		+		
Sida rhombifolia		+		
MELIACEAE				
Anthocarapa sp.	1			
Dysoxylum fraseranum	1			
D. muelleri	1			
D. rufum	1,2	+		

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
Melia azedarach				3
Synoum glandulosum	1,2	+		
Toona australis		+		
MENISPERMACEAE				
Carronia multisepala	1	+		
Legnephora moorei	1			
Stephania aculeata	2	+		
S. japonica	1	+		
MONIMIACEAE				
Daphnandra sp.	2			
Doryphora sassafras	2			
Palmeria scandens	2	+		
Wilkiea austroqueenslandica	1	+		
W. huegeliana	1,2	+		
W. macrophylla	1			
MORACEAE				
Ficus coronata	1	+		3
F. fraseri	2	+		
F. macrophylla	1			
F. obliqua	1			
F. virens	1			
F. watkinsiana	1			
Maclura cochinchinensis	1,2	+		
Malaisia scandens		+		
Streblus brunonianus	3			
MYOPORACEAE				
Myoporum montanum			+	
MYRSINACEAE				
Embelia australasica	1			
Rapanea howittiana		+	+	
R. subsessilis	1,2	+		
R. variabilis		+		
MYRTACEAE				
Acmena hemilampra	1			
A. ingens	1			
A. smithii	1	+		
Archirhodomyrtus beckleri		+		
Austromyrtus acmenioides	3			
A. sp. aff. acmenioides (1)	3			
A. sp. aff. acmenioides (2)	3			
A. bidwillii	1	+		
A. hillii	3			
Backhousia myrtifolia	3			
Baeckea virgata		+		1
Callistemon salignus		+		
Decaspermum parviflorum	2			
Eucalyptus acmenioides		+	+	

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
E. fibrosa (R.K.)			?	
E. grandis	1	+		
E. gummifera (R.K.)			?	
E. intermedia		+	+	
E. microcorys		+	+	
E. nigra (R.K.)			?	
E. propinqua		+	+	
E. punctata (R.K.)			?	
E. resinifera			+	
E. saligna		+		
E. siderophloia		+	+	
E. tereticornis			+	
E. umbra			+	
Leptospermum flavescens		+		
L. petersonii			+	1
Lophostemon confertus	1,3		+	+
Pilidiostigma glabrum	1,2	+		
Rhodamnia maideniana	1,2	+		
R. rubescens	1	+		
Rhodomyrtus psidioides		+		
Syncarpia glomulifera		+	+	
Syzygium australe	1	+		
S. corynanthum	1			
S. crebrinerve	1			
S. francisii	1			
S. hodgkinsoniae	1			
S. moorei	1			
S. oleosum	1	+		
Tristaniopsis laurina	1,3			
OLEACEAE				
Jasminum volubile		+	+	2
* Ligustrum lucidum		+		
Notelaea johnsonii	1			
N. longifloia	2	+		
Olea paniculata		+		
OXALIDACEAE				
Oxalis corniculata			+	
PASSIFLORACEAE				
Passiflora aurantia	1			
* P. edulis		+		
P. suberosa		+		
* P. subpeltata	1	+	+	
PEPEROMIACEAE				
Peperomia leptostachya	1,3			
P. tetraphylla	1,3			

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
PITTOSPORACEAE				
Billardiera scandens		+		
Bursaria spinosa		+	+	
Citriobatus pauciflorus	2			
Hymenosporum flavum	1	+		
Pittosporum revolutum	1,2	+		
P. undulatum		+		
PIPERACEAE				
Piper novae-hollandiae				
PROTEACEAE				
Helicia ferruginea	2			
H. glabriflora	2			
Lomatia silaifolia		+	+	
Macadamia tetraphylla	1			
Persoonia attentuata		+	+	
P. laevis		+	+	
Stenocarpus sinuatus	1			
RANUNCULACEAE				
Clematis glycinoides			+	
C. aristata		+		
RHAMNACEAE				
Alphitonia excelsa		+		3
A. petrei	2			
Pomaderris ferruginea			+	
ROSACEAE				
Rubus hillii	1,2	+		
R. moorei	1			
R. parvifolius		+		
R. rosifolius	2	+		
R. sp. aff. moorei	1,2	+		
RUBIACEAE				
Borreria brachystema		+		
Canthium coprosmoides	1,2	+		
C. odoratum	3			
Hodgkinsonia ovatiflora	1	+		
Morinda jasminoides	1,2	+		
Pomax umbellata			+	2
Psychotria daphnoides	1,2	+		
P. loniceroides		+		
P. simmondsiana	2			
Randia benthamiana	1,2	+		
R. chartacea	1			
RUTACEAE				
Acronychia baeuerlenii	2			
A. laevis	1	+		
A. pubescens	1	+		
Bosistoa pentacocca	1,3			
Bouchardatia neurococca	1,3			

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
* Citrus limon		+		
Euodia micrococca				3
E. sp. nov.	1,2	+		
Flindersia australis	1			
F. bennettiana		+		
F. schottiana	1			3
Microcitrus australasica	1	+		
Pentaceras australe	3			
Phebalium squameum		+		
Sarcomelicope simplicifolia	1			
Zieria arborescens		+		
Z. smithii		+	+	
SAPINDACEAE				
Arytera divaricata	1			
A. distylis	1,2,3			
Castanospora alphandii	1			
Cupaniopsis newmannii	1	+		
Diploglottis australis	1	+		
Dodonaea triquetra		+		
Ellatostachys nervosa	1			
Guioa semiglauca	1	+		3
Harpullia alata	1,2	+		
H. hillii	1			
H. pendula	3			
Jagera pseudorhus	1,2	+		
Mischocarpus anodontus	1			
M. australis	1			
M. pyriformis	1			
Sarcopteryx stipitata	1,2	+		
SAPOTACEAE				
Planchonella australis	1			
P. myrsinoides	3			
SCROPHULARIACEAE				
Artanema fimbriatum		+		
SIMAROUBACEAE				
Guilfoylia monostylis	1			
SOLANACEAE				
Duboisia myoporoides	2	+		3
Solanum corifolium	2	+		
S. densevestitum	1	+		
S. inaequilaterum	2	+		
* S. mauritianum		+		3
S. stelligerum	2	+		
STERCULIACEAE				
Brachychiton acerifolius	1			
B. populneus			+	
Commersonia bartramia	2	+		3
Seringia arborescens		+		
Sterculia quadrifida	3			

cont. APPENDIX ONE - FLORA OF MOUNT NULLUM

	RF	WSF	DSF	OTHER
SYMPLOCACEAE				
Symplocos stawellii (R.K.)				
S. thwaitesii	2	+		
THYMELAEACEAE				
Pimelia altior		+		
P. hirsuta		+		
P. latifolia		+		
P. ligustrina		+		
Wikstroemia indica		+		
ULMACEAE				
Aphananthe philippinensis	1,3			
Celtis paniculata	1			
Trema aspera		+		3
URTICACEAE				
Boehmeria platyphylla	1	+		
Dendrocnide moroides		+		
Elatostema reticulatum	1			
E. stipitatum	1			
Pipturus argenteus		+		
Urtica incisa				3
VERBENACEAE				
Callicarpa pedunculata				3
Clerodendrum floribundum		+		
C. tomentosum		+		
Gmelina leichhardtii	1,2	+		
* Lantana camara	1,2	+	+	3
* Verbena rigida			+	
VIOLACEAE				
Hybanthus enneaspermus			+	
Viola hederacea		+	+	
VITACEAE				
Cayratia clematidea			+	
Cissus antarctica	1	+		
C. hypoglauca	1,2	+	+	3
C. opaca			+	
C. sterculifolia	2			
Tetrastigma nitens	1			
WINTERACEAE				
Tasmania insipida	2	+		

KEY Rf = Rainforest. 1 = Subtropical
2 = Warm Temperate
3 = Dry

WSF = Wet Sclerophyll Forest

DSF = Dry Sclerophyll Forest

Other = Other Plant Communities.
1 = Grassy shrubland on steep rock areas;
2 = Communities on rocks;
3 = Previously cleared or heavily disturbed areas.

A.M. = Species recorded only by Andrew Murray
G.H. = Species recorded only by Glen Holmes
R.K. = Species recorded only by Robert Kooyman.

APPENDIX TWO - AVIFAUNA OF MOUNT NULLUM

Based on Holmes (in Mitchell McCotter, 1987) with additions from N.P.W.S. Survey (see Table 2).

		Ds	Ws	Wt	St
ACCIPITRIDAE					
Aviceda subcristata	Pacific Baza		+	+	+
Accipiter fasciatus	Brown Goshawk		+		
A. novaehollandiae	Grey Goshawk		+		
MEGAPODIIDAE					
Alectura lathami	Australian Brush-turkey		+		+
COLUMBIDAE					
Ptilinopus regina	Rose-crowned Fruit Dove		+	+	+
Columba leucomela	White-headed Pigeon		+		
Macropygia amboinensis	Brown Cuckoo-Dove		+	+	+
Chalcophaps indica	Emerald Dove	+	+		+
Leucosarcia melanoleuca	Wonga Pigeon		+		+
CACATUIDAE					
Calyptorhynchus lathami	Glossy Black-Cockatoo		+		
C. funereus	Yellow-tailed Black Cockatoo		+		
POLYTELIDAE					
Alisterus scapularis	Australian King Parrot		+		
PLATYCERCIDAE					
Platycercus elegans	Crimson Rosella		+		
CUCULIDAE					
Cuculus variolosus	Brush Cuckoo	+	+	+	
C. pyrrhophanus	Fan-tailed Cuckoo		+	+	+
Chrysococcyx lucidus	Shining Bronze Cuckoo		+	+	
AEGOTHELIDAE					
Aegotheles cristatus	Australian Owlet-nightjar	+			
APODIDAE					
Hirundapus caudacutus	White-throated Needletail	+	+		
ALCEDINIDAE					
Dacelo novaeguineae	Laughing Kookaburra		+		
MEROPIDAE					
Merops ornatus	Rainbow Bee-eater				
CORACIIDAE					
Eurystomus orientalis	Dollarbird				
PITTIDAE					
Pitta versicolor	Noisy Pitta				
MENURIDAE					
Menura alberti	Alberts Lyrebird	+	+	+	+
Hirundinidae					
Cecropis nigricans	Tree Martin	+	+		
CAMPEPHAGIDAE					
Coracina novaehollandiae	Black-faced Cuckoo-shrike	+	+		
C. lineata	Yellow-eyed Cuckoo-shrike		+		
C. tenuirostris	Cicadabird	+	+		
Lalage leucomela	Varied Triller		+		