WILDLIFE SURVEY

OF

MEBBIN SPRINGS

FOR

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WILDLIFE SURVEY OF MEBBIN SPRINGS - TWEED SHIRE

INTRODUCTION

A survey of the amphibians, reptiles, birds and mammals was carried out on 1,200ha Mebbin Springs, between 4th and 21st March, 1984. The property borders the Tweed River on its south-eastern boundary and lies between 60 and 240m above sea level. It comprises a series of moderately steep slopes and ridges separated by narrow creek flats and is mainly drained to the north into Byrrill Creek by Kunghurloo Creek and its tributaries. Although originally completely forested, the property has had more than half of the forest cover cleared. The central upper Tweed Valley lies in a rain shadow created by the surrounding Nightcap, Mt. Warning and Tweed Ranges. Mebbin Springs experiences a drier climate than most other arms in the catchments of the Tweed and Richmond Rivers.

HISTORY

All the plant communities in the study area have been subjected to human disturbance in the past. While the affects attributable to Aboriginals was minimal, European man has affected the vegetation in more profound ways.

Most of the study area has been totally cleared in the past for the grazing of cattle and the growing of crops. The vegetation in such areas is now a mosaic of regrowth communities with occasional clumps and individual regrowth specimens of the original plants. The area now occupied by forest has been exploited in the past for logs and poles. Consequently, few old original specimens remain; the trees forming the forest have resulted from saplings and seedlings maturing and regeneration from seed subsequent to logging and local clearing. Exotic plants have invaded much of the area which was cleared and some species have been successful in colonising light gaps and disturbed areas in the forest.

Fire has been a naturally occurring factor in most of the area. Fire is most frequent in Eucalyptus forests on the ridges and slopes and the species occupying these areas have evolved in response to frequent firing. This is born out by the high proportion of charred logs in these environments. Fire would have been less frequent in the gullies but would have occurred from time to time. The small areas of closed forest (rainforest) occur on sites which are "fire shadows". Nevertheless, extreme fire events would have affected

the margins of this community has reduced its area. Conversely, the area of rainforest would have increased in times of low fire intensity.

The dynamic relationship between plants and environment factors (such as fire and rainfall) and the consequent fluctuations in species distribution is evident in all the plant communities studied. The occurrence of fires in the area has altered since European settlement.

A number of small dams have been placed throughout the property and recently two large dams have been created on tributaries of the Tweed River and Kunghurloo Creek.

The survey brief required the identification of important wildlife habitats and their special qualities with recommendations for wildlife conservation, taking into account a broad outline provided for development on the property.

METHODS

Habitats

Wildlife habitats were initially grouped into broad categories by a preliminary site inspection and checked and mapped in consultation with an existing aerial photomap and vegetation map. Forest, the most important division in terms of area and potential value to wildlife, was divided into more detailed classes on the basis of associations of dominant tree species. The occurrence and boundaries of these associations were mapped on the ground using the extensive system of vehicular roads and tracks traversing the property. Additional information on the occurrence of associations was provided by records of vegetation floristics and structure made during bird census transects (Map 1).

Amphibians and reptiles

Amphibians and reptiles were actively searched for during the day by turning over logs and rocks in forested areas and pieces of wood and roofing iron in disturbed areas, particularly about places of former settlement. Frogs were sought under logs and rocks in the vicinity of creeks and dams. Diurnally active frogs and reptiles were also encountered during the course of other work. A few reptiles were caught in pit and Elliott traps set for small mammals.

At night, amphibians and reptiles were searched for during spotlight transects (Map 3) and particular attention was paid to creeks and dams for frogs.

Many frogs were located and identified by their calls.

Birds

A series of ten bird census transects were carried out to assess the occurrence and relative abundance of species in all habitats except for the aquatic category (Map 1). One transect was made on each morning of the survey period, a time when birds were most active. Each transect consisted of a number of 10 minute point counts separated by a 100m or greater interval along lines confined to one broad habitat type. At each point all birds present within an observation cylinder of 50m radius were counted during the 10min. period. Species were identified both visually and aurally although every attempt was made to obtain a sighting of all individuals. Birds flying through or over the observation area (and not actively involved with localised foraging such as with raptors, swallows and martins etc.) and those present outside were recorded separately. The vegetation at each point was recorded in terms of floristics and structure using a standard form (Appendix 1).

Outside the transect periods, all significant occurrences such as the presence of new species, concentrations of birds at food sources, the presence of species in habitats where they had not previously been observed etc, were recorded. Additional time was spent searching aquatic habitat, which was not covered by census transects, and subtropical rainforest where cryptic species were likely to be present. Nocturnal birds were searched for during spotlight transects (Map 3).

Mammals

A total of seven transects comprising 25 Elliott traps set approximately 10m apart were laid out to determine the occurrence and relative abundance of small mammals in all forested habitat types (Map 2). A series of 5 x 50cm deep pit traps were dug in conjunction with three trapping transects (Map 2) in an attempt to detect small mammals either too wary to enter Elliott traps or too light to activate the trap's trigger mechanism. Trapping transects were operated for three consecutive nights at each location. A small number of Elliott traps were also set about existing buildings and areas of former settlement to determine the presence of introduced small mammals.

Nine spotlight transects intended primarily to detect medium-sized and large mammals, particularly arboreal species, were run on all but one night of the survey period through all habitats (Map 3). Some transects were carried out from a vehicle but the majority were made on foot.

Diurnally active mammals were encountered during the course of other work and some nocturnal species were disturbed during the day. Searches for small mammals were made in conjunction with those for amphibians and reptiles, under logs and rocks in forested habitats and under wood and sheets of roofing iron about disturbed areas.

RESULTS

Habitats

Four broad habitat divisions were clearly discernible, comprising:-

forest
regenerating forest or scrub
pastoral land or open grassland

and aquatic habitat consisting of reedbeds and swamps, creeks and dams.

Forest was subdivided into five categories made up of three sclerophyll (eucalypt) associations, one rainforest association and another composed of a mixture of sclerophyll and rainforest elements.

Thus, eight distinct wildlife habitats were recognised as follows:-

1. Tallowwood Eucalyptus microcorys - Pink Bloodwood E. intermedia White Mahogany E. acmenioides - Turpentine Syncarpia glomulifera; an association occurring mainly on ridges and upper slopes and dominated by species with the most widespread distribution over the property.

2. An association dominated by the four species in (1) and with either one or both of Small-fruited Grey Gum E. propinqua and Grey Ironbark E. siderophloia as co-dominant; found mainly on the drier ridges but also, with Grey Ironbark only, extending down some slopes.

3. Sydney Blue Gum E. saligna with or without Brush Box Lophostemon conferta and/or Grey Ironbark as co-dominants; occurring mainly on lower slopes and in gullies; some stands of pure Sydney Blue Gum occurred as isolated pockets on lower slopes;

4. Subtropical rainforest; this association was found only in the most sheltered gully on the property; heavily disturbed by recent logging it was difficult to determine dominants although common canopy species were Yellow Carabeen Sloanea woollsii, Maidens Blush S. australis, Hairy Walnut Endiandra pubens, Strangler Fig Ficus watkinsiana and Brush Boxes and Sydney Blue Gums were prominent.

5. Riparian; an assocation occurring along major creeks and dominated by Water Gum Tristania laurina and Lilly Pilly Eugenia smithii with an overstorey of Sydney Blue Gum; in places River Oak Casuarina cunninghamiana, Black Bean Castanospermum australe and Weeping Bottlebrush Callistemon viminalis were co-dominant;

6. Regenerating forest; forest at an early successional stage dominated by one or more of Sydney Blue Gum saplings, Sally Wattle Acacia melanoxylon and Pink-tipped Bottlebrush Callistemon salignus and often with a dense lower layer of introduced Groundsel Baccharis halimifolia Bracken Ptridium esculentum and Lantana Lantana camara; occurring mainly on slopes and creek flats cleared for grazing;

7. Pastoral land; open grassland dominated by the native Blady Grass Imperata cylindrica and introduced Paspalum Paspalum dilatatum, Setaria Setaria sphacelata, Carpet Grass Axonopus affinis and Kikuyu Pennisetum clandesinum; occasional single trees and bushes or small groups were scattered throughout this habitat which was distributed predominantly over creek flats and the more gentle slopes and lower ridges, areas most suited for grazing stock;

8. Aquatic habitat; reedbeds and swamps dominated by Common Reed Phragmites australis, Scirpus sp. Cyperus sp., Cumbungi Typha orientalis and Water Pepper Polygonum hydropiper, creeks and dams.

The areas occupied by each habitat division and percentage area of the property, obtained by mapping habitats (Map 4), are given in Table 1.

A list of all plant species recorded on the property is given in Appendix 2.

Overall vertebrate results

A total of 141 vertebrates were recorded during the course of the survey, comprising 8 frogs, 12 reptiles, 102 birds and 19 mammals. These are listed in Appendix 3 together with an assessment of their status in habitats. Only birds of terrestrial habitats and small mammals of forest habitats were sampled quantitatively, thus estimates of relative abundance for other groups are less accurate. Two additional reptiles, one bird and one mammal not encountered during the survey have previously been recorded from the property (Appendix 3).

Forest habitats contained 102 species (4 frogs, 11 reptiles, 73 birds and 14 mammals), regenerating forest 47 species, pastoral land 49 species and aquatic habitat 19 species. A breakdown of the numbers of species of vertebrate groups recorded in all habitats is given in Table 2.

Amphibians and reptiles

Most frogs were located by their calls at small dams and along creeks at night. Lesueur's Frog Litoria lesueurii and the Broad-palmed Frog L. latopalmata were the most widespread species, occurring in forest habitats and pastoral land well away from permanent or semi-permanent water as well as in aquatic habitat. The Broad-palmed Frog was the only species found active during the day. One individual of the uncommon Fletcher's Frog Lechriodus fletcheri, classed as protected under Schedule 12A of the National Parks and Wildlife Act, was captured in leaf litter in Sydney Blue Gum forest near the Western boundary of the property (Map 2).

The majority of reptiles were observed or captured in forest habitats. Exceptions were the Eastern Snake-necked Tortoise Chelodina longicollis a number of individuals of which were observed in Kunghurloo Creek, the Eastern Water Dragon Physignathus lesueurii which was abundant in aquatic habitat and the widely distributed Lace Monitor Varanus varius which also was common in regenerating forest and pastoral land. Two individuals of the Major Skink Egernia frerei, regarded as rare in New South Wales and designated vulnerable and rare under Schedule 12 of the National Parks and Wildlife Act, were captured. One was obtained under a pile of fence posts adjacent to a track through a Tallowwood - Pink Bloodwood - White Mahogany - Turpentine - Grey Ironbark association near the western boundary of the property and the other was captured near the eastern boundary in a pit trap set in conjunction with small mammal trapping transect 5, in a predominantly Small-fruited Grey Gum - Grey Ironbark association (Map 2). Two juvenile Land Mullets Egernia major captured in Elliott traps on transect 6 (Map 2) were taken on small mammal trapping transects.

Birds

Totals of 55 bird species (Appendix 3) and 568 individuals (Table 3) were recorded at 54 points during the census transects (Appendix 3). The number of points sampled in each habitat, mean species at each point in each habitat, total species in each habitat, total individuals in each habitat and mean individuals at each point in each habitat (density) are given in Table 3.

TABLE 1. AREA OF HABITATS

Habitat	Area ha	% area of grazing
1. Tallowwood - Pink Bloodwood - White Mahogany - Turpentine	58.5	4.7
2. (1) ± Small-fruited Grey Gum ± Grey Ironbark	117	9.4
3. Sydney Blue Gum ± Brush Box ± Grey Ironbark	322	26.0
4. Subtropical rainforest	13.5	1.1
5. Riparian	15	1.2
6. Regenerating forest	375	30.3
7. Pastoral land	290	23.4
8. Aquatic habitat	48	3.9
Total forest habitats	526	42.5
Total	1239	

TABLE 2. NUMBERS OF FROG, REPTILE, BIRD & MAMMAL SPECIES RECORDED IN HABITATS

Habitat	frogs	reptiles	birds	mammals	total vertebrates
1. Tallowwood - Pink Bloodwood - White Mahogany - Turpentine	2	1	37	5	45
2. (1) ± Small-fruited Grey Gum ± Grey Ironbark	3	6	37	10	56
3. Sydney Blue Gum ± Brush Box ± Grey Ironbark	3	6	42	7	58
4. Subtropical rainforest	1	4	25	5	35
5. Riparian	2	3	23	1	29
6. Regenerating forest	1	2	44	-	47
7. Pastoral land	2	2	39	6	49
8. Aquatic habitat	6	2	11	-	19
* Total forest habitats (1)-(5)	4	11	73	14	102

* Due to overlaps in faunal composition between most forest associations the total is less than the sum of the sub-totals of the five forest associations.

TABLE 3 BIRDS SPECIES RICHNESS & DENSITIES RECORDED IN HABITATS

Habitat	No. points censused	mean species per point	total species	total indiv- iduals	mean density per point
1. Tallowwood - Pink Bloodwood - White Mahogany - Turpentine	9	5.8	26	84	9.3
2. (1) ± Small-fruited Grey Gum ± Grey Ironbark	13	6.5	28	151	11.6
3. Sydney Blue Gum ± Brush Box ± Grey Ironbark	15	7.5	37	193	12.9
4. Subtropical rainforest	3	5.7	10	42	14
5. Riparian	2	6	10	16	8
6. Regenerating forest	7.5	4.7	20	73	9.7
7. Pastoral land	4.5	1.1	4	9	2
8. Aquatic habitat	-	-	-	-	-
total for all habitats	54	-	55	568	-
total forest habitats (1)-(5)	42	-	50	486	-

TABLE 4 SMALL MAMMAL SPECIES & NUMBERS TRAPPED IN HABITATS

Habitat	No. Antechinus flavipes	No. A.stuartii	No. Rattus fuscipes
1. Tallowwood - Pink Bloodwood - White Mahogany - Turpentine	0	0	2
2. (1) ± Small-fruited Grey Gum ± Grey Ironbark	3	0	3
3. Sydney Blue Gum ± Brush Box ± Grey Ironbark	0	2	12
4. Subtropical rainforest	0	4	21
5. Riparian	0	0	0
6. Regenerating forest	-	-	-
7. Pastoral land	-	-	-
8. Aquatic habitat	-	-	-
totals	3	6	38

The most abundant birds, in order of decreasing abundance were:- Lewin's Honeyeater Meliphaga lewinii, Striated Thornbill Acanthiza lineata, Brown Thornbill A. pusilla, Red-browed Firetail Emblema temporalis, Variegated Fairy-wren Malurus lamberti, Grey Fantail Rhipidura fuliginosa, Silvereye Zosterops lateralis, White-browed Scrubwren Sericornis frontalis and Eastern Whipbird Psophodes olivaceus. The most widespread species (recorded in 5 habitats) were Leaden Flycatcher Myiagra rubecula, White-browed Scrubwren, Brown Thornbill and Lewin's Honeyeater.

Birds confined to the dry forest habitats of ridges and upper slopes were:- Scaly-breasted Lorikeet Trichoglossus chlorolepidotus, Black-faced Cuckoo-shrike Coracina noraehollandiae, White throated Warbler Gerygone olivacea, Sittella Neositta chrysoptera and Yellow-faced Honeyeater Lichenostomus chrysops. Confined to the moist forest habits including subtropical rainforest were:- Australian King-parrot Alisterus scapularis, Shrike tit Falcunculus frontatus, Little Shrike-thrush Colluricincla megarhyncha, Black-faced Monarch Monarcha melanopsis, White-eared Monarch M. leucotis, Logrunner Orthonyx temminckii, Large-billed Scrubwren Sericornis magnirostris, Bell Miner Manorina melanophrys, Satin Bowerbird Ptilonorhynchus violaceus, Green Catbird Ailuroedus crassirostris and Paradise Riflebird Ptiloris paradiseus.

Species recorded in pastoral land; Australian Pipit Anthus novaeseelandiae Golden-headed Cisticola Cisticola exilis, Red-backed Fairy-wren Malarus melanocephalus and Australian Magpie Gymnorhina tibicen, were all confined to this habitat except for the Australian Magpie which was also recorded in regenerating forest. The only bird confined to riparian forest was the Willie-wagtail Rhipidura leucophrys.

A number of birds were recorded in additional habitats (Appendix 3) outside the period of census transects and another 47 species not observed at all during transects (Appendix 3) were added at these times. Apart from birds restricted to aquatic habitat, which was not sampled systematically, most of the 47 additional species were predominantly from forest habitats and pastoral land (Appendix 3).

Four birds were confined to aquatic habitat; Australian Little Grebe Podiceps novacholandiae, Pacific Black Duck Anas superciliosa, Maned Duck Chenonetta jubata and a crake Porzana sp. (not identified) and most records of the Pheasant Coucal Centropus phasianinus and Tawny Grassbird Megalurus timoriensis were from this habitat.

Four nocturnal species were observed during spotlight transects; the Tawny Frogmouth Podargus strigoides and White-throated Nightjar Caprimulgus mystacalis were common and widespread over the property and the Southern Boobook Ninox novaeseelandiae and Australian Owlet-nightjar Aegotheles cristatus were recorded in regenerating forest and pastoral land.

During the survey a number of concentrations of birds were observed at localised food sources. Patches of flowering Pink Bloodwoods which were widespread on ridges and upper slopes were visited by small flocks of Scaly-breasted Lorikeets, Noisy Friarbirds Philemon corniculatus, Lewin's Honeyeaters, Yellow-faced Honeyeaters and Scarlet Honeyeaters Myzomela sanguinolenta. A few patches of flowering Long-leafed Mistletoe Amyema pendulum on mature Tallowwoods, Pink Bloodwoods and Grey Ironbarks, again mainly on ridges and upper slopes, attracted relatively dense concentrations of Lewin's Honeyeaters, Yellow-faced Honeyeaters, Brown Honeyeaters Lichmera indistincta, White-cheeked Honeyeaters Phylidonyris nigra, Eastern Spinebills Acanthorhynchus tenuirostris and Scarlet Honeyeaters.

In the subtropical rainforest gully (Map 4) fruiting Maidens Blush attracted small flocks of Lewin's Honeyeaters, Figbirds Sphecotheres viridis and Green Catbirds accompanied by pairs of Australian King-parrots and individual Paradise Riflebirds. Small flocks of Satin Bowerbirds and Pied Currawongs Strepera graculina were also observed in the rainforest gully feeding on the ripe fruits of Strangler Figs.

Several mixed foraging flocks were noted moving through and around the edges of heavily disturbed and regenerating forest. These flocks were composed mainly of Black-faced Cuckoo-shrikes, Rufous Whistlers Pachycephala rufiventris, Rufous Fantails Rhipidura rufifrons, Grey Fantails, Variegated Fairy wrens, Brown Thornbills and Silvereyes accompanied by individual Jacky-winters Microeca leucophaea, Golden Whistlers Pachycephala pectoralis, Leaden Flycatchers White-throated Warblers, Spotted Pardalotes Pardalotus punctatus, Striated Pardalotes P. striatus and Spangled Drongos Dicrurus hottentottus and occasionally small flocks of Rainbow Bee-eaters Merops ornatus.

Only one bird classed as vulnerable and rare under Schedule 12 of the National Parks and Wildlife Act was recorded during the survey. This was the White-eared Monarch, of which at least three pairs were present in the subtropical rainforest gully (Map 2). However three other species worthy of note were; a pair of Brush Bronzewings Phaps elegans observed on the edge of the subtropical rainforest gully, a juvenile Oriental Cuckoo Cuculus saturatus

present in dry ridge forest near the southern boundary of the property and a colony of Bell Miners located in a Sydney Blue Gum - Grey Ironbark association in the north-western corner of the property (Map 2). The Oriental Cuckoo is considered rare in New South Wales (Morris et al, 1981) and both the Brush Bronzewing and Bell Miner are regionally rare in north-eastern New South Wales (pers. obs.)

Mammals

47 individuals of three species of small mammals were captured for a total of 525 trap-nights on 7 Elliott transects (Table 4). Pit traps, which did not yield any small mammals, are not included in this total. The Bush Rat Rattus fuscipes was the only species at all widespread and was most abundant in moist forest associations.

The Brown Antechinus Antechinus stuartii was confined to moist forest habitats and the Yellow-footed Antechinus A. flavipes was captured only on transect 5 (Map 2) in a predominantly Small-fruited Grey Gum - Grey Ironbark dry ridge forest association. The presence of the Yellow-footed Antechinus can be considered regionally significant as this species appears to be rare and patchily distributed in north-eastern New South Wales (pers. obs.) The only other noteworthy mammal recorded on the property was the Common Planigale Planigale maculata, classed as vulnerable and rare in New South Wales under Schedule 12 of the National Parks and Wildlife Act. One adult male Common Planigale and an adult female with five half-grown young in a nest were found under sheets of roofing iron in pastoral land about an area of former settlement in the centre of the property (Map 2).

No introduced small mammals were recorded despite several nights of trapping about areas of former settlement.

Of the other mammals, most were observed principally in forest habitats (Appendix 3), although densities of the majority of species, particularly arboreal mammals, obtained on spotlight transects were very low. Only one record each of the Greater Glider Petauroides volans, Mountain Brushtail Possum Trichosurus caninus and Feathertail Glider Acrobates pygmaeus were made and only three Koalas Phascolarctos cinereus were observed. The Greater Glider was seen in dry ridge forest habitat near the north-western corner of the property, the Koalas and Feathertail Glider in dry ridge forest near the south-eastern corner of the property and the Mountain Brushtail Possum in the subtropical rainforest gully (Map 2).

The Grey-headed Flying-fox Pteropus poliocephalus was the most common mammal with small flocks attracted to the patches of flowering Pink Bloodwoods. Numbers were also seen feeding on the fruits of Strangler Figs in the subtropical rainforest gully. A number of small insectivorous bats were observed over all habitats during spotlight transects but were not identified.

CONSERVATION SIGNIFICANCE

A total of 8 frogs, 12 reptiles, 102 birds and 19 mammals were recorded during the survey. A similar recent survey at nearby Doon Doon (Parker and Parker, 1979) recorded 3 additional frogs, 7 reptiles, 23 birds and 5 mammals and a further 16 frogs, 20 reptiles, 47 birds and 24 mammals are known from or could be expected in the Tweed Valley (pers.obs.) This represents a relatively rich vertebrate fauna in terms of species richness for coastal south-eastern Australia.

The fact that certain species were not recorded in particular locations within Mebbin Springs reflects:-

(a) The probability of detecting many species is low

(b) The condition and history of the vegetation, area of patch, isolation from similar vegetation, age structure of trees, fire history and whether grazed.

These have an important influence on the suitability of different areas, containing both the same and other vegetation types, providing habitat for various species.

Most conservation interest is attached to the closed and open forests where 8 vulnerable and rare vertebrates were recorded (Appendix 3). All but the Common Planigale are forest dependent. The eucalypt forest has significance at a local level for all the species inhabiting this area and in the case of a few species such as the intracontinental migrants, Yellow-faced Honeyeater and Silvereye, it provides an area of overwintering habitat. As such any reduction in the area of habitat will have consequences over widespread areas as far south as Tasmania. The rainforest is important in that it occurs at low elevations compared with that in the nearby Border Ranges National Park and Nightcap National Park. Along with other remnants in the Tweed and Richmond Valleys provide important overwintering habitat for many birds from the higher altitude rainforests.

With respect to conserving wildlife populations, Mebbin Springs is not an

isolated entity but is part of a larger area of forest encompassing Mebbin State Forest and surrounding portions. Animals move readily between these and the land use on any part of this area has repercussions for the long term viability of any fauna population. Mebbin Springs by itself would not be considered of a size adequate to conserve the majority of its wildlife species. It is thus dependent on adjacent property owners managing their area with equivalent sensitivity. This is particularly true of the larger and rarer species which range over comparatively large areas.

Under natural conditions the intrinsic variation in size classes of these forest types is induced by the growth, death and decomposition of individual trees or relatively small stands subject to windthrow or cyclone damage.

From the survey results (Table 5), the richest and hence most important broad habitat type on the property is forest. The moist associations of the lower slopes and gullies, Sydney Blue Gum ± Brush Box ± Grey Ironbark and subtropical rainforest, and the dry ridge association of Tallowwood - Pink Bloodwood - White Mahogany - Turpentine ± Small-fruited Grey Gum ± Grey Ironbark were the richest of the forest habitat subdivisions.

HABITAT MANAGEMENT

Faunal habitat is conventionally described by the vegetation types present. In the case of fruit or nectar eating animals the particular plant species present, in so far as they do or do not provide food can determine their presence or absence. Whereas many others, especially insectivores appear to respond to the foliage cover and stratification of that foliage between the ground and canopy. Habitat is a dynamic system subject to both outside influences such as fire, flood, cyclone etc, and its intrinsic processes of growth, death, species replacement etc and seasonal cycles of flowering and fruiting. Fauna habitat can be destroyed and created as exemplified by many of Mebbin Springs forest dwellers who have recolonized or increased in numbers, since the abandonment of dairy farming. Other species are dependent on habitat maintained by slashing or grazing.

The manager of any area of faunal habitat is faced with several options including:-

(a) managing solely for the benefit of rarer species

(b) managing to maximise the number of species

(c) managing to maintain the status quo

TABLE 5 RELATIVE SPECIES RICHNESS AND DENSITIES IN HABITATS

Habitat	Relative species richness expressed as % species in habitat: % area of habitat					Birds (data from census transects) Relative densities expressed as no. individuals/ha: % area of habitat	
	Total vertebrates	Frogs	Reptiles	Birds	Mammals	Species richness	Density
1. Tallowwood - Pink Bloodwood - White Mahogany - Turpentine	6.8	5.3	1.8	7.7	5.6	10.1	2.5
2. (1) ± Small-fruited Grey Gum ± Grey Ironbark	4.2	8.0	5.3	3.9	5.6	8.5	1.6
3. Sydney Blue Gum ± Brush Box ± Grey Ironbark	1.6	1.4	1.9	1.6	1.4	2.6	0.6
4. Subtropical rainforest	22.5	11.4	30.3	22.3	23.9	16.5	16.2
5. Riparian	17.1	20.4	20.8	18.8	4.4	15.2	8.5
6. Regenerating forest	1.1	0.4	0.6	1.4	0	1.2	0.4
7. Pastoral land	1.5	1.1	0.7	1.6	1.3	0.03	0.1
8. Aquatic habitat	3.5	19.2	4.3	2.8	0	-	-
Total forest habitats	1.7	1.2	2.2	1.7	1.7	2.1	0.4

Management in an active and passive sense will be required to maintain and continue to enhance the present diverse fauna.

The development of the estate has provided mowed grassland which suits birds such as Pipits, Magpies and Willie Wagtails. Artificial dams in the drainage lines provide aquatic habitat for ducks, grebes and amphibians where none previously existed.

Due to the importance of forested habitat in a regional and national scale as well as its regional significance as part of a link between the Tweed and Nightcap Ranges, it is important that forest regeneration is actively promoted. Partial clearing increases the amount of forest edge favouring certain species, but to maintain the habitat of forest dependent species, it is important that wide cleared verges are not made along the roads.

In a national, regional and local context, changes in land use on Mebbin Springs in common with other freehold land in the Tweed Valley, has involved a reduction in tree and shrub density and a corresponding increase in grass cover. This has favoured many grassland and woodland inhabiting species, but has been correspondingly detrimental to forest dependent fauna.

As well as these gross changes (involving forest clearing and ringbarking) on a regional scale, there are other changes such as roading, logging, burning and grazing. These factors do not obliterate the original structure (height, cover and density of vegetation strata) or the component species, but alter the habitat to favour species restricted to ridges and at the expense of gully (closed forest) inhabiting species.

The high proportion of trees with fire scars on the butt and the predominance of Bladey Grass attest to the past use of fire for the management of grazing land. It can be predicted that a reduction in fire frequency, due to changed pasture management associated with intensification of land use, will favour rainforest plants which will spread up the slopes from gully bottoms and areas of fire shadow, and as a consequence rainforest dependent fauna.

There are a large number of trackways present throughout the property, a legacy of its history of amalgamation of many portions and access for transport of logs to the Kunghurloo sawmill. Depending to some extent on the height of the adjacent trees, gliding marsupials can readily "fly" across a road pavement but additional clearing of verges can preclude this

possibility and isolate them in relatively small patches. Predators such as the Dingo and Cane Toad favour tracks and roads, Harden (1981) Tyler(1976) and reptiles frequently use them as basking sites, but the consequences of this has not been investigated.

The lack of fences in the proposed development is important to prevent isolation of individuals and follows the principle of allowing free flow throughout continuous habitat, should some area become locally unsuitable it can be recolonized later.

An important aspect of habitat management, apart from the favouring of particular faunal communities is to make an area unsuitable for the existence of or colonization by feral and or abundant species, that compete with those rarer species which may be threatened by competition with or predation from them. Two important local examples are the Noisy Miner (Manorina melanocephala) and Cane Toad (Bufo marinus). Dow (1977) has pointed out how the aggressive colonial honeyeater, the Noisy Miner can effectively exclude other bird species from the area of their colonies, especially if the area is grassy woodland. They occur in lower densities in woodlands with a shrub layer and in these habitats are unable to exclude other bird species. Dow says, "Man's activities in modifying natural vegetation doubtless have played a part in promoting the success of Miners over a wide range. The destruction of low vegetation has been zealously pursued in much of eastern Australia, possibly since prehistoric times. Fire is the main agent but other means of clearing have been employed. Subsequent grazing by livestock ensures that open woodland and savanna will persist. Not only will such activities by man provide habitats in which M. Melanocephala can more easily be socially dominant but by then man has already begun to eliminate other species indirectly through destruction of parts of their habitats. Abundant anecdotal evidence shows that, when homesites are created in natural woodland, Miners move in and other species later disappear."

Where clearings occur for subsequent houses it is important that the owners be made aware of the necessity to plant a dense collection of shrubs and small trees, as even a subtle change to the understorey without influencing the majority of trees can have unforeseen consequences.

The current age/size structure of the forest trees is such that most trees

are less than 30 centimetres (d.b.h) contrasting with stumps greater than 100 centimetres (d.b.h.). Forests at this stage of development have a high carrying capacity for foliage feeders, which do not require tree hollows and nectar feeding honeyeaters and flying foxes, but are not suitable for those species requiring nest hollows. The relatively low density of arboreal gliders and possums compared with forests of similar tree species, reflects the lack of large mature and overmature trees with consequent low densities of tree hollows.

As well as minimising disturbance to mature trees, it is equally important that saplings and shrubs be retained i.e. the forest should ideally have a mixture of age classes from saplings to mature trees. Where clearings for buildings are being made nearer than 80 metres to the adjacent clearing, it is important to have a dense planting of shrubs and small trees. Recher et.al. (1980) found principally open country and woodland birds colonizing narrower strips of forest.

The estate has been designed to avoid cleared corridors, which would have provided a barrier to tree dependent or cover dependent species. Many of these areas are currently being reforested with tree species appropriate to the site conditions.

DEVELOPMENT CONTROLS

Because forest has been identified as the most important wildlife habitat on Mebbin Springs, in terms of species richness, densities and the presence of significant vertebrates, it is suggested that development be excluded from forested areas as much as possible. Moist forest of the gullies and lower slopes, among the richest associations and those most sensitive to disturbance, should be entirely reserved from development. Some areas of regeneration bordering these associations should also be reserved and assisted to proceed by supression of competing weeds, both to act as a buffer and to increase the area of moist forest. The drier associations of ridges and upper slopes, which are less sensitive to disturbance, could tolerate the construction of low density dwellings and limited selective logging, such as extraction of pole timber without becoming too severely degraded. However, it is suggested that any form of development be restricted to the periphery of these areas. Developments such as high density housing construction, intensive logging, the formation of large internal clearings and regular hazard reduction burning should be avoided as they are incompatible with the maintenance of forest for wildlife conservation. It is also

suggested that domestic pets such as dogs or cats be excluded from any settlement in or adjacent to forest.

Dry forest associations should be maintained in blocks with moist forest, since they act as corridors to movement between areas of the latter, and a system of corridors should be created to facilitate the movement of all forest wildlife across the property. It has been well established that such corridors are important in maintaining biotic diversity and ecol-ogical viability between "islands" of natural habitats (MacClintock et.al. 1977, Diamond 1975, MacArthur and Wilson 1967).

The creation of corridors should involve the planting of suitable tree species along creeks and around dams as this would also incorporate a number of existing riparian remnants and enhance other envirnmental values. To provide maximum effectiveness, such corridors should be at least 80m wide, as this has been found to be the minimum requirement for management of forest wildlife in a study of logging effects on the south coast of New South Wales (Recher et.al. 1980), where bird communities of narrower strips were found to be dominated by open country and edge species.

Grazing should be excluded from any forested areas by suitable fencing and any single or groups of mature trees in open country, should be retained and protected. During the survey it was found that such trees or patches were important food sources for birds as many supported high numbers of flowering mistletoe or in the case of figs, provided fruit.

GUIDELINES FOR DEVELOPMENT

1. In view of the shortage of tree hollows, logging activities should avoid mature and overmature trees (i.e. greater than 70 centimetres diameter at breast height).

2. Tree planting should occur initially in areas that are bounded by forest stands to link up isolated patches of forested habitat, in strips at least 80 metres wide.

3. Domestic dogs and cats should be discouraged or prevented from entering forest habitats. Consideration should be given to promoting this as part of the development concept.

4. Where clearings for buildings are being made that are nearer than 80metres to the next adjacent clearing, dense plantings of shrubs and trees should be established to prevent the ingress of woodland and open country birds.

5. Tree clearance along road verges through forested areas should be minimized.

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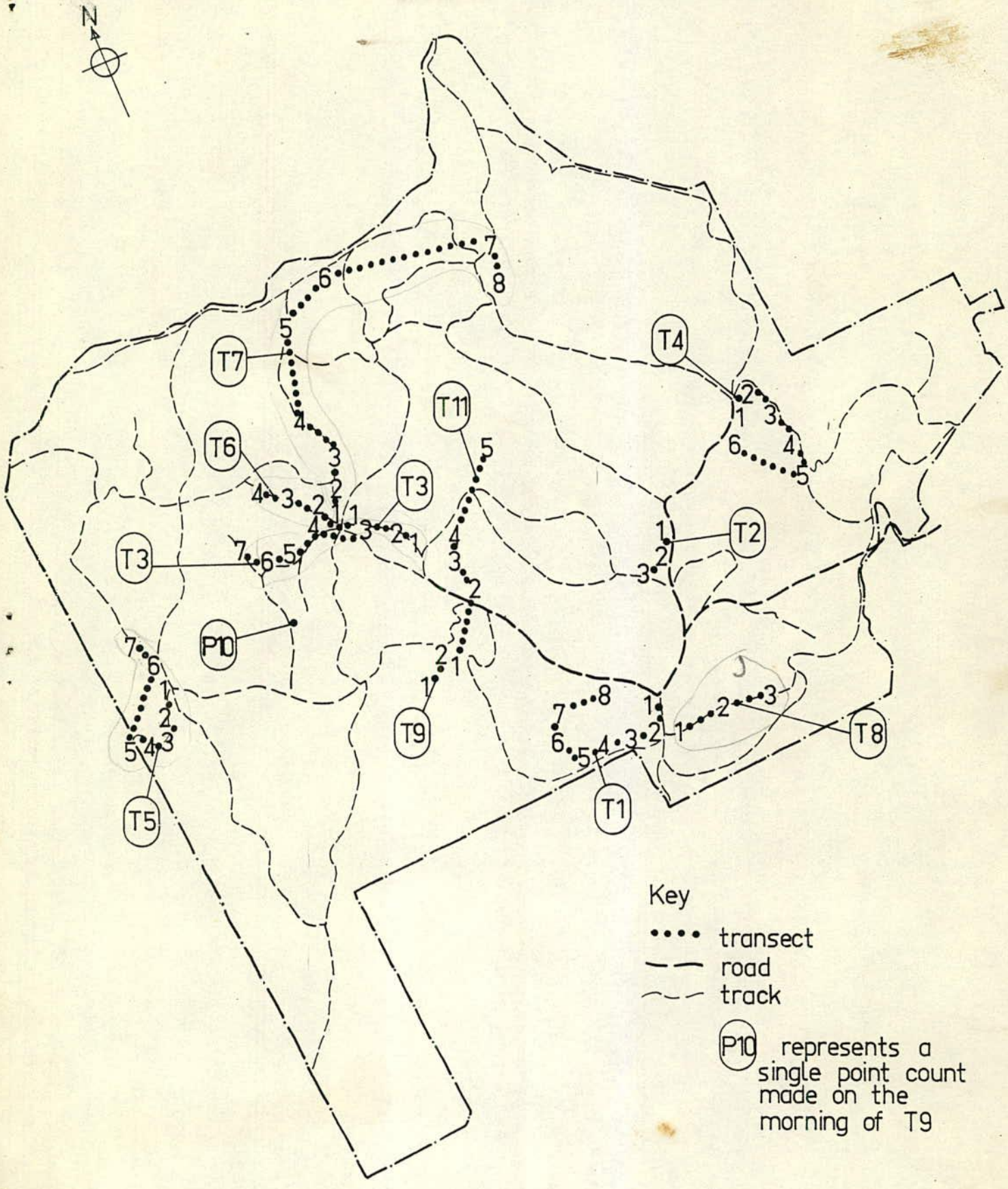
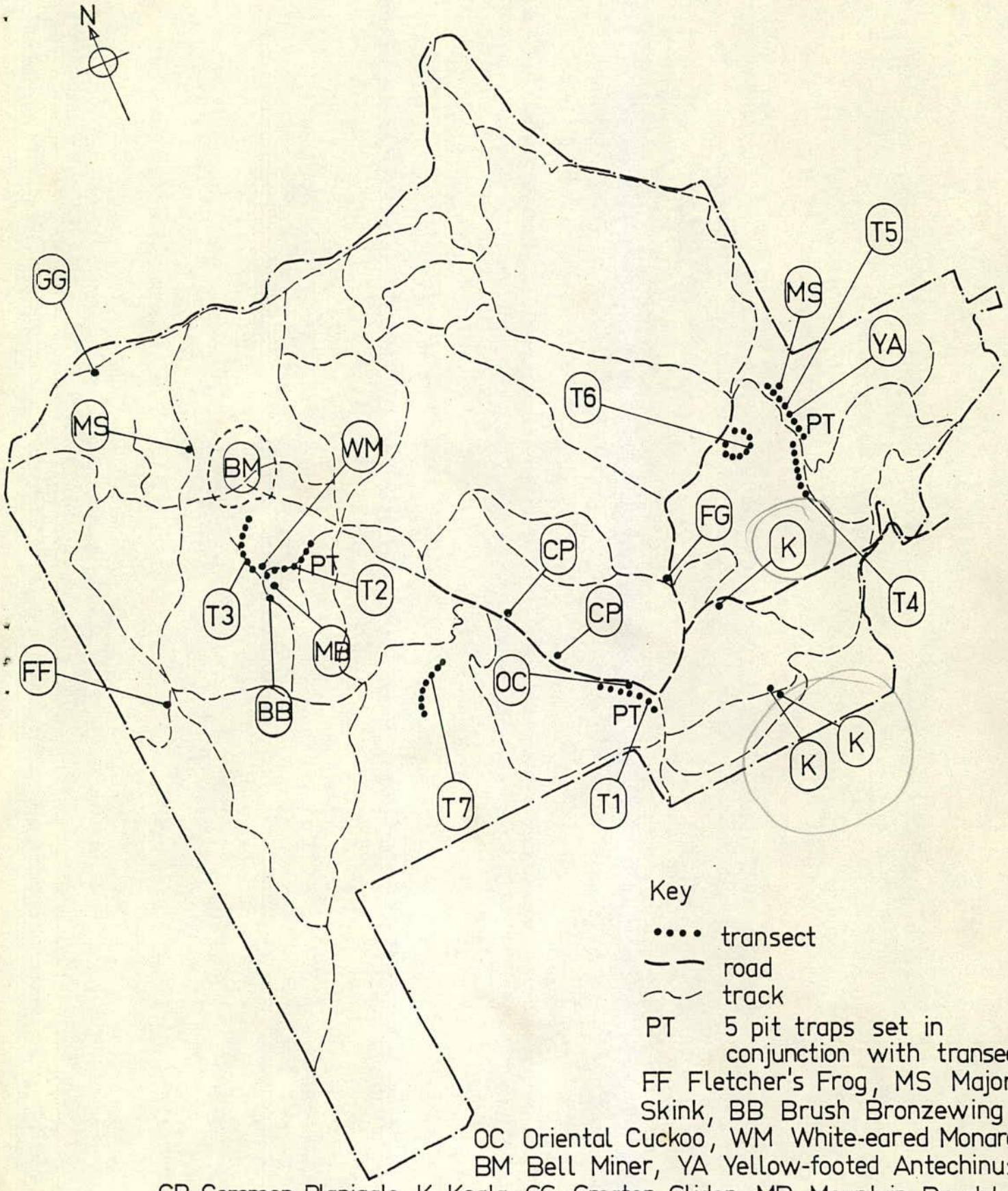


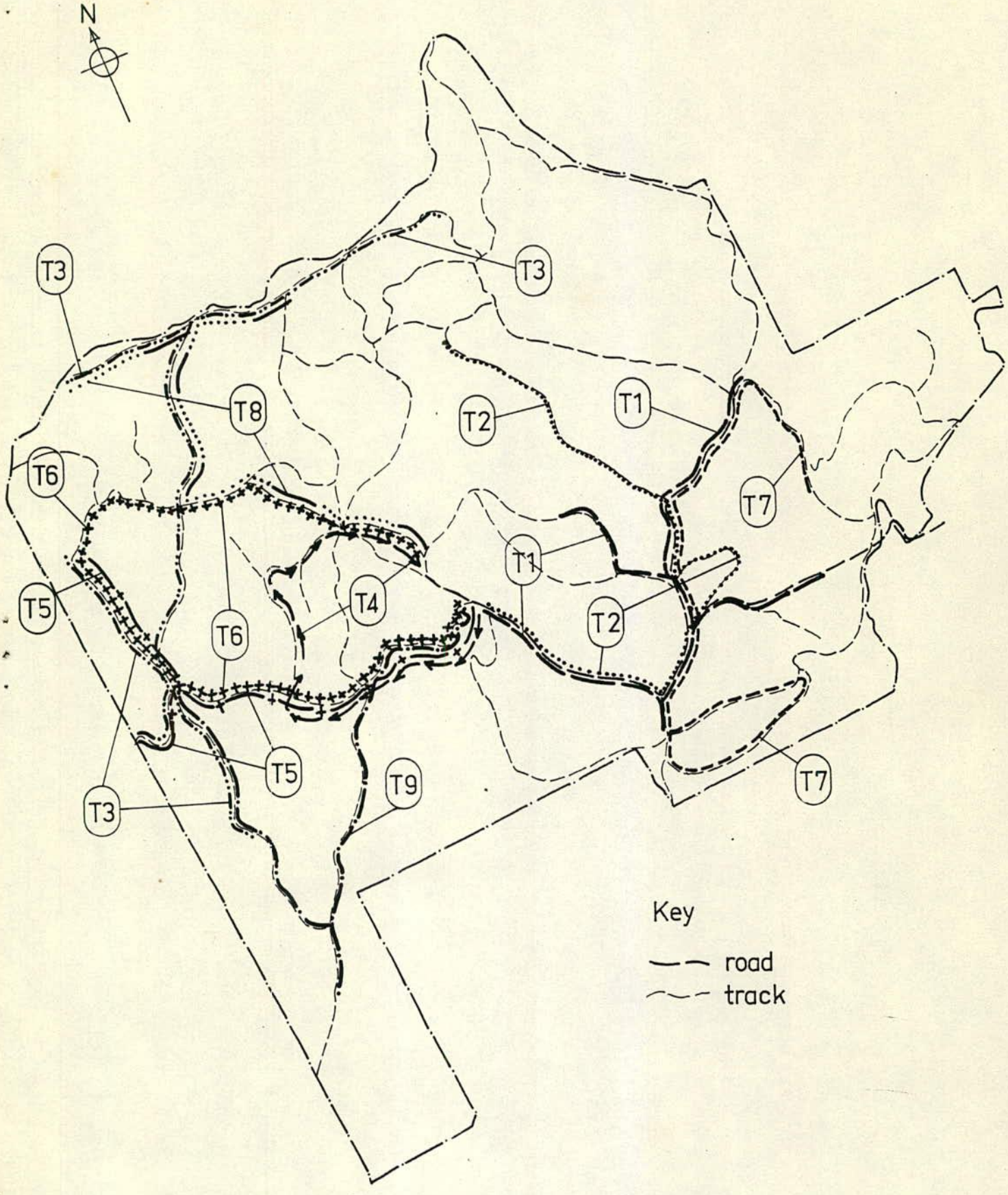
MAP 1 Location of bird census transects.

A 10 min. bird count and record of vegetation floristics and structure were made at each numbered point on the transect.



MAP 2 Location of small mammal trapping transects and records of significant vertebrates.

25 Elliott traps were set for 3 consecutive nights on each transect.



MAP 3 Location of spotlight transects.

Appendix 1. Standard form used to record vegetation attributes at each point on bird census transects.

VEGETATION/HABITAT ATTRIBUTES

OBSERVER	DATE	TRANSECT NO.	PAGE NO.

Dominant Species, Genus or Life Forms	Height	Av. Crown Diameter	Crown Ratio	Profile
Upper				
Middle				
Lower				
Ground				
Site				

Appendix 2. Vascular Plants recorded at Mebbin Springs

TREES & SHRUBS

Common Name	Scientific Name	Vegn. Type
Lace Flower Tree	Abarema grandiflora	C, Om, Ol
Snowwood	Abarema sapindoides	Ol
Twin Vein Wattle	Acacia binervata	Om, Ou
	Acacia falcata	Om, Ou
	Acacia leucoclada	Om, Ou
Blackwood	Acacia melanoxylon	S
Red Apple	Acmena brachyandra	C
Lilly Pilly	Acmena smithii	C, Om
Common Acronychia	Acronychia oblongifolia	C, Om
Hairy Acronychia	Acronychia pubescens	Om
Turnipwood	Akania lucens	C
Red Ash	Alphitonia excelsa	C, Ou
Hoop Pine	Araucaria cunninghamii	C, Om
Rose Myrtle	Archirhodomyrtus beckleri	Om, S
Bangalow Palm	Archontophoenix cunninghamiana	C, Om
White Booyong	Argyrodendron trifoliolatum	C
Coogera	Arytera distylis	C
Actephila	Actephila lindleyi	C
Macleay Laurel	Anopterus macleayanus	C
Groundsel	Baccharis halimifolia	Om, S
Brush Bloodwood	Baloghia lucida	C
Flame Tree	Brachychiton acerifolium	Ol
Breynia	Breynia oblongifolia	C, Om, S
Soft Corkwood	Caldcluvia paniculosa	C, Om
Willow Bottlebrush	Callistemon salignus	Ol
Weeping Bottlebrush	Callistemon viminalis	R
Smooth Cassia	Cassia floribunda	S, Om
River Oak	Casuarina cunninghamiana	R
Forest Oak	Casuarina torulosa	O, Ou, Om
Brown Myrtle	Choricarpia leptopetala	C, Om
Camphor Laurel	Cinnamonum camphora	Or, Ou, Om
Brown Currajong	Commersonia bartramii	C, Ol
Broad leaved Palm Lily	Cordyline fruticosa	C, Ol
Native Cascarilla	Croton verreauxii	C, Ol
Pigeonberry Ash	Cryptocarya erythroxylon	C
Jackwood	Cryptocarya glaucescens	C, Om
Murrogun	Cryptocarya microneura	Ol

Common Name	Scientific Name	Vegn. Type
Pepperberry	Cryptocarya obovata	C
Forest Maple	Cryptocarya rigida	Ol
Small-leaved Tuckeroo	Cupaniopsis parvifolia	C
Rusty Tuckeroo	Cupaniopsis serrata	C, Ol
Prickly Treefern	Cyathea leichhardtiana	C, Om
Smooth Treefern	Cyathea cooperi	C
Shiny leaf Stinging Tree	Dendrocnide photinophylla	C
Denhamia	Denhamia pittosporoides	C, Ol
Hairy Rosewood	Didymocheton rufum	C
Myrtle Ebony	Diospyros pentamera	C
Native Tamarind	Diploglottis australis	C, Ol
Hop Bush	Dodonea triquetra	Ou, Om
Corkwood	Duboisia myoporoides	C, Om, S
Rosewood	Dysoxylum fraseranum	C
Blue Fig	Elaeocarpus grandis	C
Hard Quandong	Elaeocarpus obovatus	C, Ol
Blueberry Ash	Elaeocarpus reticulatus	Ol
Green Tamarind	Ellatostachys nervosa	C
Yellow Ash	Emmenosperma alphitonioides	C
Black Walnut	Endiandra globosa	C
Green-leaved Rose Walnut	Endiandra muelleri	C
Hairy Walnut	Endiandra pubens	C
Banana Bush	Ervatamia angustisepala	C, Om
Batswing Coral Tree	Erythrina vespertilio	Ou
White Mahogany	Eucalyptus acmenioides	Ou, Om
Flooded Gum	Eucalyptus grandis	Ol
Pink Bloodwood	Eucalyptus intermedia	Ou, Om, Ol
Tallowwood	Eucalyptus microcorys	Ou, Om
Small fruited Grey Gum	Eucalyptus propinqua	Ou, Om
Sydney Blue Gum	Eucalyptus saligna	Ol, Om
Grey Ironbark	Eucalyptus siderophloia	Ou
White Euodia	Euodia micrococca	C
Bolwarra	Eupomatia laurina	C, Ol
Ribbonwood	Euroschinus falcatus	C
Creek Sandpaper Fig	Ficus coronata	C, Ol
Moreton Bay Fig	Ficus macrophylla	C
Small-leaf Fig	Ficus obliqua	C
Strangler Fig	Ficus watkinsiana	C
Fissistigma	Fissistigma stenophylla	C

Common Name	Scientific Name	Vegn.Type
Teak	Flindersia australis	C, Om
Cudgeri	Flindersia schottiana	C
Red Carabeen	Geissois benthami	C
Cheesewood	Glochidion ferdinandi	C, Om, Ol, S
White Beech	Gmelina leichhardtii	C, Ol
Guioa	Guioa semiglauca	C, Ol
Rusty helicia	Helicia ferruginea	C
Native Rosella	Hibiscus heterophyllus	Om, S
	Hibiscus splendens	Om
	Hovea acutifolia	Ou, Om, S
Native Frangipani	Hymenosporum flavum	C
Australian Indigo	Indigofera australis	Ou, Om
Foambark	Jagera pseudorhus	C, Om
Walking Stick Palm	Linospadix monostachya	C
Cabbage Palm	Livistona australis	Om
Brush Box	Lophostemon conferta	Om, Ol
Macaranga	Macaranga tanarius	S
Red Kamala	Mallotus philippensis	C, Om
White Cedar	Melia azedarach	C, Ol
Finger Lime	Microcitrus australasicus	Ol
Yellow Pear Fruit	Mischocarpus pyriformis	C, Om
Mulberry	Morus alba	C
White Bolly Gum	Neolitsea dealbata	C, Om
Smooth Mock-olive	Notelaea venosa	C, Om, S
Bleeding Heart	Omalanthus populifolius	Om, S
Geebung	Persoonia attenuata	Ou, Om, S
Plum Myrtle	Pilidiostigma glabrum	C, Om, S
Riceflower	Pimelia ligustrina	Om
Mock Orange	Pittosporum undulatum	C, Ol
Thin-leaved Coondoo	Planehonella chartacea	C
Blush Coondoo	Planehonella laurifolia	C
Brown Pine	Podocarpus elatus	Ol
Silver Basswood	Polyscias elegans	C, Om
Pencil Cedar	Polyscias murrayi	C, Ol
Rose Marara	Pseudoweinmannia lachnocarpa	C
Guava	Psidium guajava	S
Hairy Psychotria	Psychotria loniceroides	Om
Native Gardenia	Randia benthamiana	Ol
Red Muttonwood	Rapanea subsessilis	C
Muttonwood	Rapanea variabilis	C, Om

Common Name	Scientific Name	Vegn.Type
Couch	Cynodon dactylon	G
	OTHER HERBS	
Blue Goat Weed	Ageratum houstonianum	S, G
Native Ginger	Alpinea caerulea	C, Om
Ragweed	Ambrosia artemisifolia	S, G
	Baumea	Aq
Farmers Friends	Bidens pilosa	S, G
Cunjevoi	Alocasia macrorrhizos	C
Spear Thistle	Circium vulgare	S, G
Flaxleaved Fleabane	Conyza bonariensis	S, G
Thickhead	Crassocephalum crepidioides	S, G
	Cyperus spp.	Aq
	Dianella caerulea	C, Om
Crofton Weed	Eupatorium adenophorum	S, G
Mist Flower	Eupatorium riparium	Ou,Om,Ol,S,G
	Gnaphalium sp.	Ou
	Gomphocarpus fruticosus	S, G
Cotton Bush	Gomphocarpus physocarpus	S, G
	Hybanthus enneaspermum	Ol
	Kyllinga brevifolia	G
Sedge	Lepironia articulata	Aq
	Lomandra spp.	Ou, Om,S
Blue Water Lily	Nymphaea capensis	Aq
Yellow Wood Sorrel	Oxalis corniculata	Om, S, G
Frogmouth	Philydrum lanuginosum	Aq
Common Reed	Phragmites australis	Aq
Inkweed	Phytolacca octandra	S, G
Water Pepper	Polygonum hydropiper	G, Aq
	Poranthera microphylla	Om
	Scirpus	Aq
Sow Thistle	Sonchus oleraceus	S, G
Stinking Roger	Tagetes minuta	S, G
Cumbungi	Typha orientalis	Aq
Ivy-leaved Violet	Viola hederaceae	Om, Ol, G
	EPIPHYTES	
	Amyema pendulum	Ou, Om
Bird's Nest Fern	Asplenium nidus	C, Om
Rock Lily	Dendrobium speciosum	C

	Common Name	Scientific Name	Vegn.Type Om 1	Ou 2	Ol 3	C 4	R 5	S 6	G 7	Aq 8
	Eastern Small-eyed Snake	Cryptophis nigrescens		+	+					
	Yellow-faced Whip Snake	Demansia psammophis		U						
	(Red-bellied Black Snake	Pseudechis porphyriacus)		+						
	BIRDS									
	Australian Little Grebe	Podiceps novaehollandiae								U
	White-faced Heron	Ardea novaehollandiae							R	
	Pacific Black Duck	Anas superciliosa								C
	Maned Duck	Chenonetta jubata								C
	Brown Goshawk	Accipiter fasciatus	R	R						
	Wedge-tailed Eagle	Aquila audax			U				U	
	Brown Falcon	Falco berigora							R	
	Australian Brush-turkey	Alectura lathami	+							
	Brown Quail	Coturnix australis							U	
	Crake	Porzana sp.								+
	Masked Lapwing	Vanellus miles							U	U
	Rose-crowned Fruit-dove	Ptilinopus regina				U				
	Topknot Pigeon	Lopholaimus antarcticus				U			over	
	White-headed Pigeon	Columba leucomela				U				
P	Brown Cuckoo-dove	Macropygia amboinensis	U			C				
P	Bar-shouldered Dove	Geopelia humeralis					U	U	U	
*N	Brush Bronzewing	Phaps elegans				R				
	Crested Pigeon	Ocyphaps lophotes							U	
	Funereal Cockatoo	Calyptorhynchus funereus				R	R			

	Common Name	Scientific Name	Vegn.Type							
			Om	Ou	Ol	C	R	S	G	Aq
			1	2	3	4	5	6	7	8
	Rainbow Lorikeet	Trichoglossus haematodus			over + over					
P	Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	U	U		U				
P	Australian King-parrot	Alisterus scapularis		U	U	U				
P	Crimson Rosella	Platycercus elegans	U		U			U	U	
	Eastern Rosella	Platycercus eximius							U	
*	Oriental Cuckoo	Cuculus saturatus		R						
P	Shining Bronzecuckoo	Chrysococcyx lucidus	U	C	U					
	Pheasant Coucal	Centropus phasianinus							U	U
	Southern Boobook	Ninox novaeseelandiae						U	U	
	Tawny Frogmouth	Podargus strigoides	C	C	U		U	C	A	
	Australian Owlet-nightjar	Aegotheles cristatus						U	U	
	White-throated Nightjar	Caprimulgus mystacalis	C	C	C	over + over C		C	C	
	Spine-tailed Swift	Hirundapus caudacutus								
P	Laughing Kookaburra	Dacelo novaequineae		U			U	U	U	
	Rainbow Bee-eater	Merops ornatus						C	C	U
	Dollarbird	Eurystomus orientalis	R	R	R					
	Noisy Pitta	Pitta versicolor			R					
	Welcome Swallow	Hirundo neoxena						C	C	C
	Tree Martin	Cecropis nigricans							U	
P	Australian Pipit	Anthus novaeseelandiae							R	
P	Black-faced Cuckoo shrike	Coracina novaehollandiae		U			U	C	C	
	Little Cuckooshrike	Coracina robusta						R		
P	Cicadabird	Coracina tenuirostris	U		C			U		
	Varied Triller	Lalage leucomela		R						
	(Rose Robin	Petroica rosea)				+				

	Common Name	Scientific Name	Vegn. Type							
			Om	Ou	Ol	C	R	S	G	Aq
			1	2	3	4	5	6	7	8
P	Eastern Yellow Robin	Eopsaltria australis	C	U	C	U		U		
	Jacky-winter	Microeca leucophaea						U	U	
P	Pale-yellow Robin	Tregellasia capito	U		U	U				
P	Shrike-tit	Falcunculus frontatus			U	U		U		
P	Golden Whistler	Pachycephala pectoralis	U	U	C			U		
P	Rufous Whistler	Pachycephala rufiventris	U	C	U		U	C	U	
P	Little Shrike-thrush	Colluricincla megarhyncha			U	U				
P	Grey Shrike-thrush	Colluricincla harmonica		C	U				U	
P	Black-faced Monarch	Monarcha melanopsis			U	U				
P	Spectacled Monarch	Monarcha trivirgatus	U	U	U	U				
*+P	White-eared Monarch	Monarcha leucotis				U				
P	Leaden Flycatcher	Myiagra rubecula	U	U	U		U	U		
	Restless Flycatcher	Myiagra inquieta					R			
P	Rufous Fantail	Rhipidura rufifrons	U	U	C	U		U		
P	Grey Fantail	Rhipidura fuliginosa	C	A	A		U	U		
P	Willie-wagtail	Rhipidura leucophrys					U	U	U	
P	Logrunner	Orthonyx temminckii			U					
P	Eastern Whipbird	Psophodes olivaceus		C	A	U	C	U		
	Tawny Grassbird	Megalurus timoriensis							U	U
P	Golden-headed Cisticola	Cisticola exilis						U	U	
P	Superb Fairy-wren	Malurus cyaneus	U				U	C	C	
P	Variegated Fairy-wren	Malurus lamberti		A	U			A		
P	Red-backed Fairy-wren	Malurus melanocephalus							U	U
P	Large-billed Scrubwren	Sericornis magnirostris			C					

Common Name	Scientific Name	Vegn. Type							
		Om 1	Ou 2	Ol 3	C 4	R 5	S 6	G 7	Aq 8
Red-necked Wallaby	Macropus rufogriseus							U	
Grey-headed Flying-fox	Pteropus poliocephalus	A	A	A	C	U			
Bush Rat	Rattus fuscipes	U	U	C	A				
(Dingo	Canis familiaris)								
Fox	Vulpes vulpes							U	
Feral Cat	Felis cattus							R	
Rabbit	Oryctolages cuniculus							R.	

status in habitats

A - abundant

C - common

U - uncommon

R - rare

\+ - present, status not established

0 status of Bell Miner refers to vicinity of colony (see Map 5)

* Regarded as rare in N.S.W.

*N Regarded as rare in northern N.S.W.

\+ Listed in Schedules 12 & 12A of the National Parks & Wildlife Act as vulnerable, rare and threatened fauna or in imminent danger of extinction or possibly extinct.

P Recorded during point census transects

( ) Recorded outside the survey period

	Common Name	Scientific Name	Vegn. Type Om 1	Ou 2	Ol 3	C 4	R 5	S 6	G 7	Aq 8
	Spangled Drongo	Dicrurus hottentottus	U	U			U	U	U	
P	Satin Bowerbird	Ptilonorhynchus violaceus			U	C				
P	Green Catbird	Ailuroedus crassirostris			U	U				
P	Paradise Riflebird	Ptiloris paradiseus			U	U				
	Magpie-lark	Grallina cyanoleuca							U	U
P	Grey Butcherbird	Cracticus torquatus	U	U			U	C	C	
	Pied Butcherbird	Cracticus nigrogularis					U		C	
P	Australian Magpie	Gymnorhina tibicen					U	U	C	
P	Pied Currawong	Strepera graculina	U	U	U		U	U	U	
	Torresian Crow	Corvus orru					U	U	U	
	MAMMALS									
	Short-beaked Echidna	Tachyglossus aculeatus		U					U	
	Yellow-footed Antechinus	Antechinus flavipes		U						
	Brown Antechinus	Antechinus stuartii				C				
*+	Common Planigale	Planigale maculata							U	
	Northern Brown Bandicoot	Isoodon macrourus	U	U						
	Long-nosed Bandicoot	Perameles nasuta		U	U					
	[illegible]ala	Phascolarctos cinereus	U		U					
	[illegible]mmon Ringtail Possum	Pseudocheirus peregrinus			U					
	[illegible]ater Glider	Petauroides volans		R						
	[illegible]ugar Glider	Petaurus breviceps		U	U					
	Mountain Brushtail Possum	Trichosurus caninus				R				
	Feathertail Glider	Acrobates pygmaeus		+						
	Red-legged Pademelon	Thylogale stigmatica	U	U	C	U				