INTERIM REPORT ON ECOLOGICAL SURVEY OF BUNGLE BUNGLE NATIONAL PARK WA

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Division of Wildlife & Ecology

To Dept. of Conservation and Land Management , WA

CSIRO
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ECOLOGICAL SURVEY OF PURNULULU (BUNGLE BUNGLE) NATIONAL PARK & CONSERVATION RESERVE.

Interim report by CSIRO Division of Wildlife & Ecology to Department of Conservation & Land Management.

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SUMMARY

This report describes the results of the first of two field surveys of vertebrates and plants of the Bungle Bungle National Park area. Species lists totalling 134 bird, 31 mammal, 58 reptile, 11 amphibian and 12 fish species are given. A collection of about 250 plant taxa is currently being identified at the NT Herbarium. Notable species recorded include Grey Falcon, Red-capped Robin, Nabarlek and new species of Chelodina (turtle), Gehyra (gecko), Lerista (skink) and Ctenotus (skink). The Bilby is probably present.

The fauna is most similar to that recorded for the Argyle area, but its species composition also resembles that of other areas occupying the transition zone between the Wet-Dry tropics and arid Australia.

Management implications discussed include comment on the conservation value of the area, medium-sized mammals, fire regimes, recovery of over-grazed land, tourist access and possible extensions of the Park area. Elimination of a small population of Feral Pigs in the Mt John area is an urgent priority.

1. INTRODUCTION.

1.1. Outline.

This report presents preliminary results from fieldwork in the Purnululu (Bungle Bungle) National Park & Conservation Reserve area ("BBNP") in the mid-Dry season (13 June to 3 August) of 1989. The survey will be completed with field work in the late Dry - early Wet season, planned for mid-November to late December 1989. Results will be analysed fully after this second survey, and a detailed final report presented then.

1.2. Background.

The Bungle Bungle Working Group reported that the area popularly known as Bungle Bungles was a region of great beauty, recreation potential and a significant cultural heritage to the local Aboriginal people (Department of Conservation & Environment 1986). Its recommendation that the area be protected by National Park status was accepted in part by the W.A. government. This evaluation was supported by a floristic inventory of some sites in the Bungle Bungle area (Forbes & Kenneally 1986), which assigned significant conservation value to gorges in the Bungle Bungle massif and parts of the Osmond Valley. Several plant species were recorded for the first time in Western Australia during that survey.

In contrast, the wildlife of BBNP has been subject to no detailed research, and there were virtually no data on the occurrence of mammals, reptiles and amphibians in the area. Records of birds had been documented, based on observations of ranger staff and touring naturalists. The survey we describe here aimed to address this lack of information on wildlife, in order to:

(i) assess the significance of BBNP for wildlife conservation,

(ii) suggest suitable management practices for the

conservation of rare wildlife,

(iii) determine particular sites within the BBNP of special significance for wildlife,

(iv) investigate areas on the periphery of BBNP for possible extension of the park, and areas in the Conservation Reserve for inclusion in the National park,

(v) place the BBNP area fauna in a regional perspective, based on previous research by CALM in the north and west Kimberley,

(vi) provide input into the ongoing monitoring of rehabilitation of previously over-grazed land within BBNP, and

(vii) indicate further research needs for the understanding and management of BBNP.

2. METHODS.

2.1. Outline.

Our survey methodology was consistent with that we have previously used successfully to examine wildlife of Kakadu National Park (Braithwaite 1985; Woinarski et al. 1989), and comparable to that used elsewhere in the Kimberley by CALM (e.g. Miles & Burbidge 1975; Kabay & Burbidge 1977; McKenzie 1981; Burbidge & McKenzie 1983). Representative sites were surveyed intensively for all vertebrates over a period of 6 days. Vertebrate records are related to detailed habitat information, collected synchronously.

2.2. Site selection.

After consultation with Norm McKenzie and Chris Done we selected 11 sites on the basis of (i) geographic spread throughout BBNP and surrounds, (ii) representation of major habitats in BBNP and surrounds, (iii) accessibility, and (iv) avoidance of Aboriginal sacred sites. The location of these survey sites, and the four remaining sites, is given in Figure 1, and further details of sites in Table 1.

2.3. Animal sampling.

At every survey site we established three transects, all of 900m. length (Figure 2). One transect was positioned to sample the major vegetation type at this site ("uniform"). A second transect was positioned to sample the greatest diversity of vegetation types present around the site ("mixed") and a third transect was positioned randomly ("random"). For every transect, we marked 5 equally spaced core quadrats of 80m. x 20m., which were the areas used for trapping of small mammals, reptiles and amphibians and for censuses of reptiles and amphibians. The core quadrats were nested inside larger (100m. x 100m.) quadrats marked for bird censuses and observations of larger mammals (Figure 3). In every

core quadrat we placed 20 mammal traps (16 small Elliott, three large Elliott and one cage (20cm. x 20cm. x 56cm.)) and three pitfall traps. These were all set for a period of four successive days and nights. Every pitfall trap had 8m. of 25cm. high driftline fence.

We searched quadrats systematically for reptiles and amphibians (three censuses per quadrat during daylight and two censuses per quadrat at night, every census for 5 minutes) and birds (eight instantaneous censuses per quadrat during daylight and two at night). Larger mammals were recorded incidentally during these censuses, or their presence inferred from tracks, faeces or other signs.

At every survey site, we set a harp trap (Tidemann & Woodside 1978) on every transect over four nights to sample bats. Additionally, we used mist nets for variable periods on at least two nights per site.

Abundance measures were assigned for every species in every quadrat (total of 105 quadrats), by tallying the number of individuals caught and the total number recorded in all censuses for that quadrat. We assigned an abundance value of 0.1 to animal species known to be present in quadrats by tracks or other signs or recorded in incidental observations but neither trapped nor recorded in that quadrat during censuses.

For every survey site, we also recorded incidental observations, of animals seen or heard in the general area encompassed by the end points of all transects, or within about 2km. of the campsite.

Fishes and other aquatic vertebrates were not surveyed systematically by this study, but incidental observations were noted, and sampling was undertaken where possible.

Voucher specimens of mammal, reptile, fish and

amphibian species were retained for deposit at the Western Australian Museum.

2.4. Flora and Habitat Description.

We completed a pro-forma of habitat variables for every quadrat. Methodology is described in detail in Woinarski et al. (1989). We measured basal area of woody plant species present, number of termitaria, litter depth and presence of feral animals and their signs. We estimated rock cover, rock size, canopy height, canopy cover, distance to permanent water and cover of life-forms in the categories trees >8m, trees 2-8m, regenerating trees, mallees, palms, shrubs >2m, shrubs <2m, chenopods, cycads, tussock grasses, hummock grasses, sedges, forbs, ferns and vines. We recorded topographic position, whether the site had been burnt recently, rock type and plant species flowering and fruiting. Soil was assessed for gravel content and texture. Vegetation structure was described using Specht's (1970) classification, and habitat type categorised according to the description of Forbes & Kenneally (1986).

Within every quadrat, the canopy cover of woody plant species (1 to 8m) were recorded in 5 regularly located plots (5m x 5m). Ground layer (<1m) was assessed similarly, but with five plots of 2m x 2m All species with canopy cover of >10% in this layer were identified. The number of species occurring in every plot was recorded by categories (woody plants, tussock grasses, hummock grasses, sedges, forbs and ferns). The total cover, grass cover, grass height and cover of logs was also estimated for every square. Duplicate voucher specimens of most taxa were collected and lodged with the N.T. and W.A. Herbaria.

Complete plant species lists were recorded for every quadrat.

2.5. Personnel.

The field team was based on a core of three persons.

Primary responsibilities were:

Nick Gambold: reptiles, amphibians.

Karina Menkhorst: vegetation and habitat description, bats.

John Woinarski: birds, small mammals (excluding bats).

Field work was assisted at various times by Dick Braithwaite, Ian Cowie, Kay Dyson, Bert Herold, Lynn Lowe, Therese Patterson, Glenn & Robyn Colledge, and the very obliging CALM staff of the area: Paul Butters, Gordon Carrington, Chris Done, Dave Milne, Neil McGinty, Mark Pittavino, Alex Rogers, Bob Taylor, and Jim Woolfenden.

3. RESULTS AND INTERPRETATION.

3.1. Vegetation.

The plant material collected has not yet been processed. About 500 specimens of about 250 species were collected. The number of new species added to the BBNP plant list is not yet known, but probably of the order of 30% of that list (=90 to 120 species).

3.2. Birds.

The number of species recorded at our survey sites was 122 (Table **2**), of which 18 were not hitherto known from BBNP. The additional species are: Little Black Cormorant, Brolga, Pacific Baza, Square-tailed Kite, Peregrine Falcon, White-bellied Sea-eagle, Barn Owl, Australian Owlet-Nightjar, Little Button-quail, Pallid Cuckoo, Horsfield Bronze-cuckoo, Azure Kingfisher, Jacky Winter, Red-capped Robin, Red-browed Pardalote, Grey-headed Honeyeater, Bar-breasted Honeyeater and Little Crow. The total number of bird species now known from the BBNP area is 134 (this survey + CALM list + one species, Black-shouldered Kite, reported by J. Paton in July 1989). Notable species are: Grey Falcon, a rare species included on the RAOU's "Annotated List of Rare, Endangered and Extinct Birds of Australia and its Territories", and Red-capped Robin, a mainly southern species whose occurrence in the Kimberley area is infrequent and restricted.

3.3. Mammals

About 30 mammal species were recorded during this survey (Table **2**), the exact number depending upon taxonomic opinion about some retained specimens. We are aware of definite records of one other species, the Camel Camelus dromedarius, from BBNP (Bob Taylor pers. comm.). Raymond Wallaby implied that several other species were, and perhaps still are, present in the BBNP: a Quoll, Bilby, Spectacled Hare-Wallaby, Golden Bandicoot, a Possum. Descriptions of a macropod seen

by Bob Taylor are also probably not referrable to any macropod on our list. The detection of these mammal species will be a principal aim of the forthcoming Wet season survey.

Notable mammal species recorded are: Nabarlek Peradorcas concinna, one seen at our survey site 6 is an unusually southern record for this small rock wallaby; Pigs Sus scrofa were recorded from droppings in riparian vegetation near Mt John (our site 7), and have not before been recorded in the BBNP area; Bilby Macrotis lagotis, an abandoned burrow system was located at our site 3, and was almost certainly made by this species. It appeared not to have been used for 2-3 years.

3.4. Reptiles.

Fifty-six reptile species were recorded during this survey (Table **2**). Four taxa collected are of undescribed species: a gecko Gehyra sp. nov., a turtle Chelodina sp. nov., and two skinks Lerista sp. nov., and Ctenotus sp. nov.; a further gecko Oedura cf. rhombifer may also be new. These await further taxonomic appraisal. The survey period was marked by cool weather, which probably led to reduced reptile activity and detection. This was so particularly for snakes. One additional species (Varanus glauerti) was recorded by N. Gambold & K. Menkhorst in an earlier visit (November 1986). Two snakes, Death Adder Acanthophis praelongus and Black-headed Python Aspidites melanocephalus, have been reliably reported in the BBNP area by rangers.

3.5. Amphibians.

Seven frog species were recorded during this survey (Table **2**). Additional to these species, N. Gambold & K. Menkhorst recorded Litoria caerulea, L. splendida, Cyclorana australis and C. longipes in November 1986. No rainfall occurred during this survey period, which reduced the activity and detection of frog species.

3.6. Fish.

Twelve fish species were recorded during this survey: ?Ambassis macleayi, Amniateba peroides, Arius cf. australis, Hephaestus jenkinsi, Leiopotherapon unicolor, Melanotaenia splendida, Nematolosa erebi, Neosilurus hyrtlii, Oxyeleotris herwerdenii, O. lineolatus, Parambassis gulliveri and Toxotes chatareus.

3.7. Collections.

Vertebrate specimens were collected for the W.A. Museum (permit no. 188) as part of this survey. Total collections were: birds (1 specimen), mammals (73 specimens of 15 species), reptiles (181 specimens of 49 species), amphibians (34 specimens of 6 species) and fish (15 specimens of 12 species). These will all be housed in the W.A. Museum, Perth.

3.8. Biogeographic affinities

There has been little previous biological research in the south-east Kimberley. In contrast, the north and south-west Kimberley has been studied in depth in a series of CALM and WA Museum surveys, and biogeographical patterns described (e.g. McKenzie 1981). In Figure 4 we place the fauna of the Bungle Bungles in a regional perspective. To compare the fauna recorded in this survey with that recorded in other surveys in northern Australia we use the similarity index 200w/(a+b), where w = the number of species occurring both in the Bungle Bungles and survey area b, a = the number of species recorded in the Bungle Bungles and b = the number of species recorded in survey area b. This index ranges from 0, if the two regions compared share no species, to 100, if the two regions possess exactly the same species composition.

The BBNP vertebrate fauna is most similar to that reported for the Argyle area (Dames & Moore 1982), reflecting geographic proximity and similar habitat

range. The BBNP fauna is also closely related to those of Drysdale (Kabay & Burbidge 1977) and Stage III of Kakadu National Park (Woinarski et al. 1989). It shares fewest species with the Great Sandy Desert, although the BBNP fauna is as similar to that of the Tanami Desert (Gibson 1986) as it is to most of the north and west Kimberley (Mitchell Plateau, Dampier Peninsula, Prince Regent River area). Like Stage III of Kakadu, the BBNP area occupies a transition zone between tropical coastal and arid inland environments, and its fauna combines elements of both.

This pattern is demonstrated in the bird species composition of the BBNP area, which is similar to that of other regions in this environmental transition zone, even though the longitudinal spread of these regions is vast (Drysdale, Argyle, Keep River, Katherine, Kakadu Stage III). The avifauna of coastal areas and regions with substantial waterbodies (e.g. Stages I & II of Kakadu, Dampier Peninsula) is substantially different. So too is the avifauna of the more arid Tanami and Great Sandy Deserts. Characteristic inland species which do reach the BBNP include Little Crow, Spinifex-bird, Red-capped Robin, Grey-headed Honeyeater, Red-browed Pardalote, Ground Cuckoo-shrike and Painted Firetail. Conversely, BBNP is about the southern fringe of the range of several characteristic tropical species, such as Pacific Baza, Black Bittern, Radjah Shelduck, Azure Kingfisher, White-gaped Honeyeater and Bar-breasted Honeyeater.

The relationships of the mammal fauna are less clear, partly because survey methods for mammals have been especially variable between studies. BBNP includes both arid (e.g. Sminthopsis youngsoni) and tropical (Peradorcas concinna) elements.

The BBNP reptile fauna is a rich mixture of arid and tropical with, except for Argyle, no close affinities

with other areas surveyed. Typical inland species include Egernia striata, Eremiascincus richardsonii, Lerista bipes, Pseudonaja modesta, Ctenotus piankai and Ctenophorus isolepis. Northern species include Carlia amax, C. munda, Demansia atra and Ctenotus inornatus. The BBNP may also have a distinctive component of unique reptiles: Gehyra sp. nov., Lerista sp. nov. and Ctenotus sp. nov.

The frogs of BBNP are a restricted set of those characteristic of the north Kimberley and tropical Australia in general. No frogs typical of arid areas have been found in the BBNP area yet.

3.9. Management implications.

Our data are incomplete and not yet analysed, so our comments here are preliminary notes only.

(a) The BBNP area is now shown to have a rich vertebrate fauna, including several species which may be restricted to this area. Accordingly, the conservation value of the area is demonstrably increased.

(b) Rare species present include the Grey Falcon, and probably Bilby. The presence of Bilbies and several other species of medium-sized mammals (e.g. possibly Western Quoll, Golden Bandicoot) would demand special management guidelines. It is important that the next stage of this survey examines the status, habitat preferences and management requirements of such species.

(c) The development of a considered fire management plan would be critical to the conservation of such species, the maintenance of environmental patchiness and the preservation of biological diversity in this area. This is probably so especially for habitats where the understory is dominated by spinifex species. Total exclusion of fire is unlikely to be the regime which would be most ecologically desirable (see Burbidge 1985; Bolton & Latz 1978).

(d) Previously over-grazed lowland areas are in the process of rehabilitation following the removal of stock. Our data should show the extent to which the wildlife of such areas has been affected and whether this wildlife, and native vegetation, is returning. Our impression is that the wildlife of such previously over-grazed areas is still very incomplete, and that recovery may be slow. The erradication of feral livestock is a critical management aim for this conservation area. We recommend that urgent priority be given to the elimination of the small population of feral pigs in the Mt John creek area (a tributary of Osmond Creek). Much of the conservation value of the riverside vegetation in the Osmond Valley would be destroyed if this population increased and spread.

(e) We support the current limitations on tourist access, prior to further investigation and identification of possible sites of significance for wildlife conservation. The erosion of existing access roads and the proliferation of tracks has become a significant land management problem, and can be expected to lead to spread of weeds and environmental degradation on a major scale unless road surfaces are improved.

(f) Our results are not sufficient yet to consider possible extensions of BBNP or to recommend any change in status for the Conservation Reserve. Our single site in the Conservation Reserve yielded seven vertebrate species not recorded at any other site in this survey, including Nabarlek, the goanna Varanus kingorum, Square-tailed Kite and Red-capped Robin. Our single site outside the National Park/Conservation Reserve area, on Texas Downs station near Mt. John, yielded 16 vertebrate species not otherwise recorded during the survey, including Pacific Baza, Bar-breasted Honeyeater, Brolga, and the turtle Chelodina sp. nov.. A proper assessment of the conservation value of this area will

not be possible until our plant collections have been examined.

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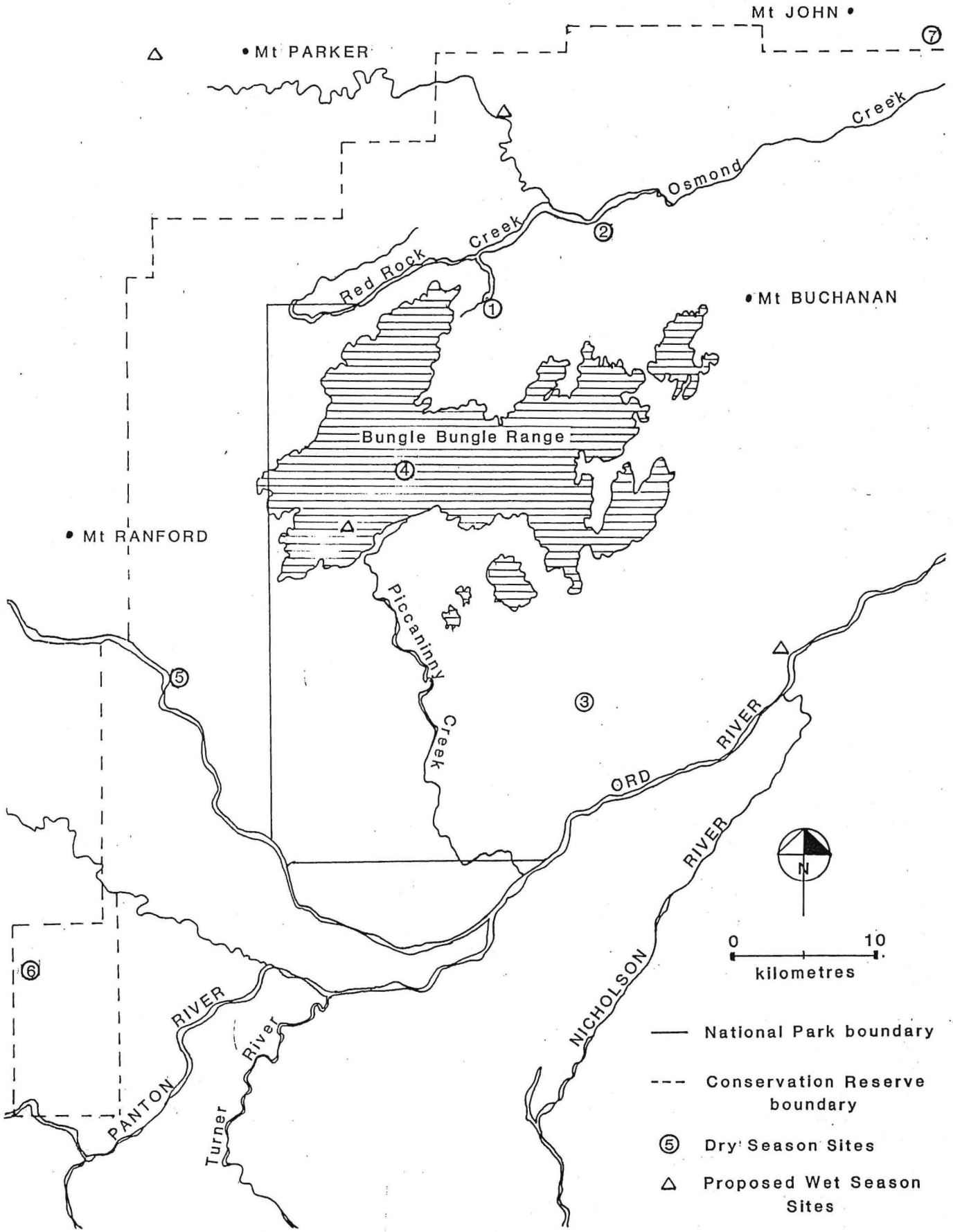
Figure 1 : Location of Survey Sites.



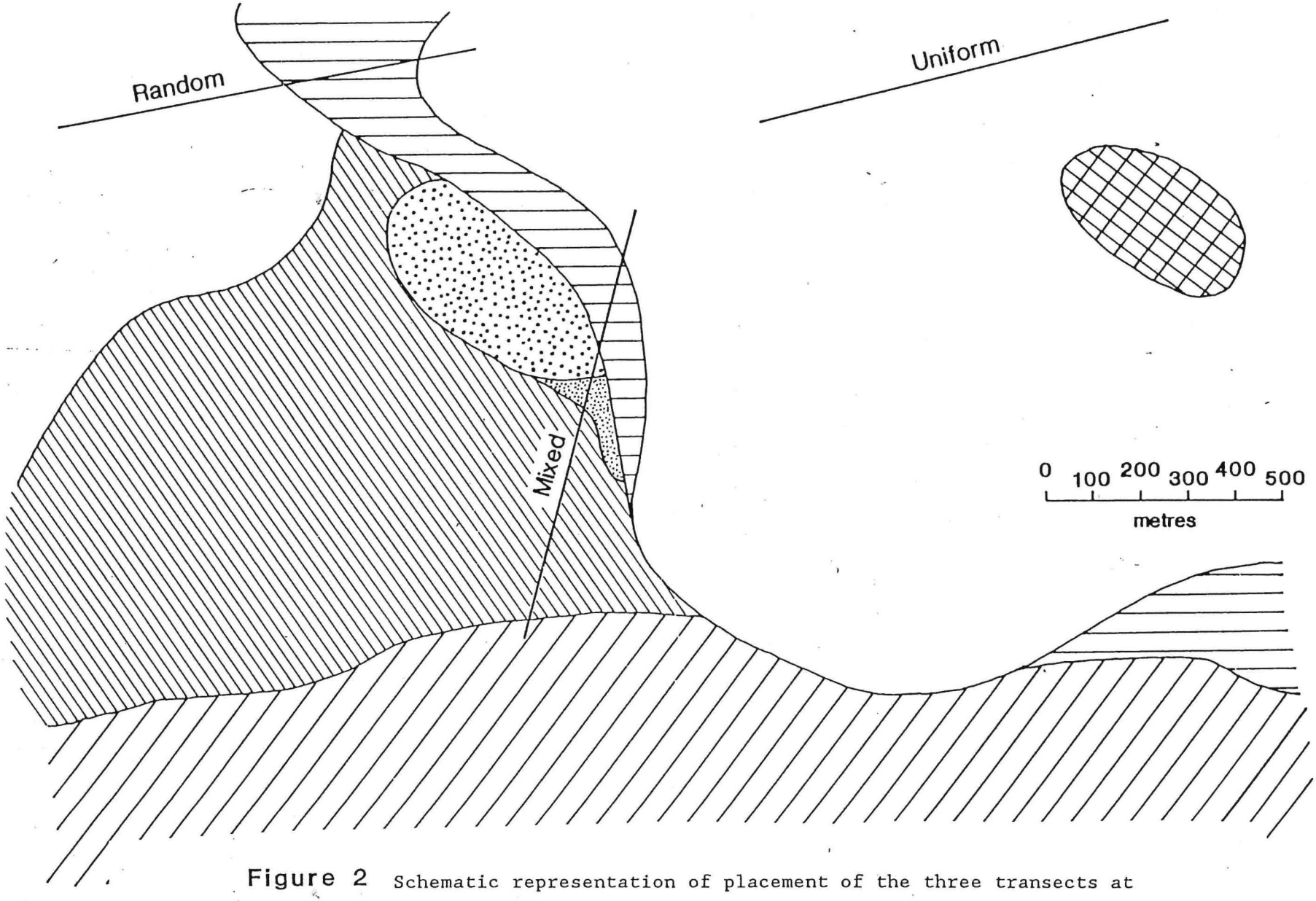


Figure 2 Schematic representation of placement of the three transects at one study site. Vegetation types present are illustrated by different symbols.

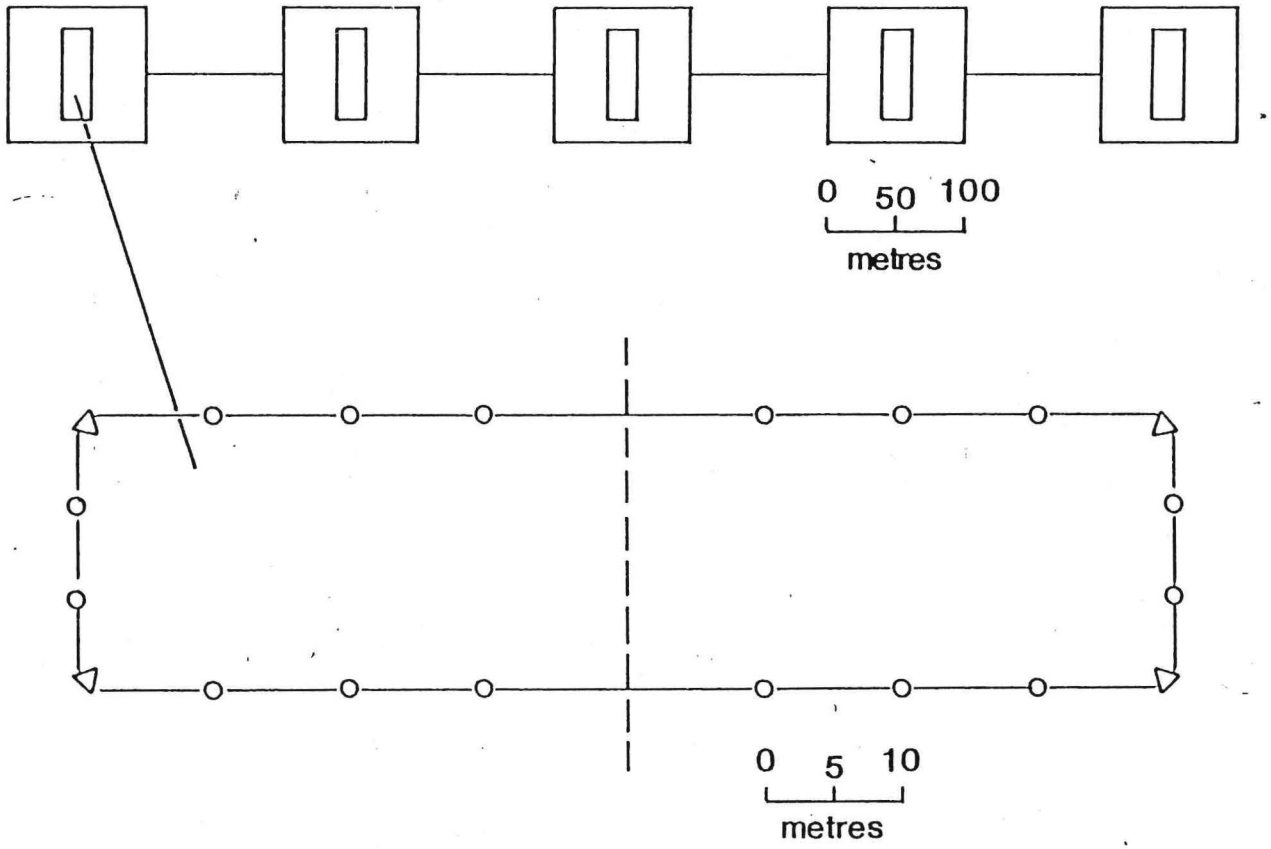


Figure 3 Layout of quadrats along one transect. This design was followed for all transects at all ten sites.

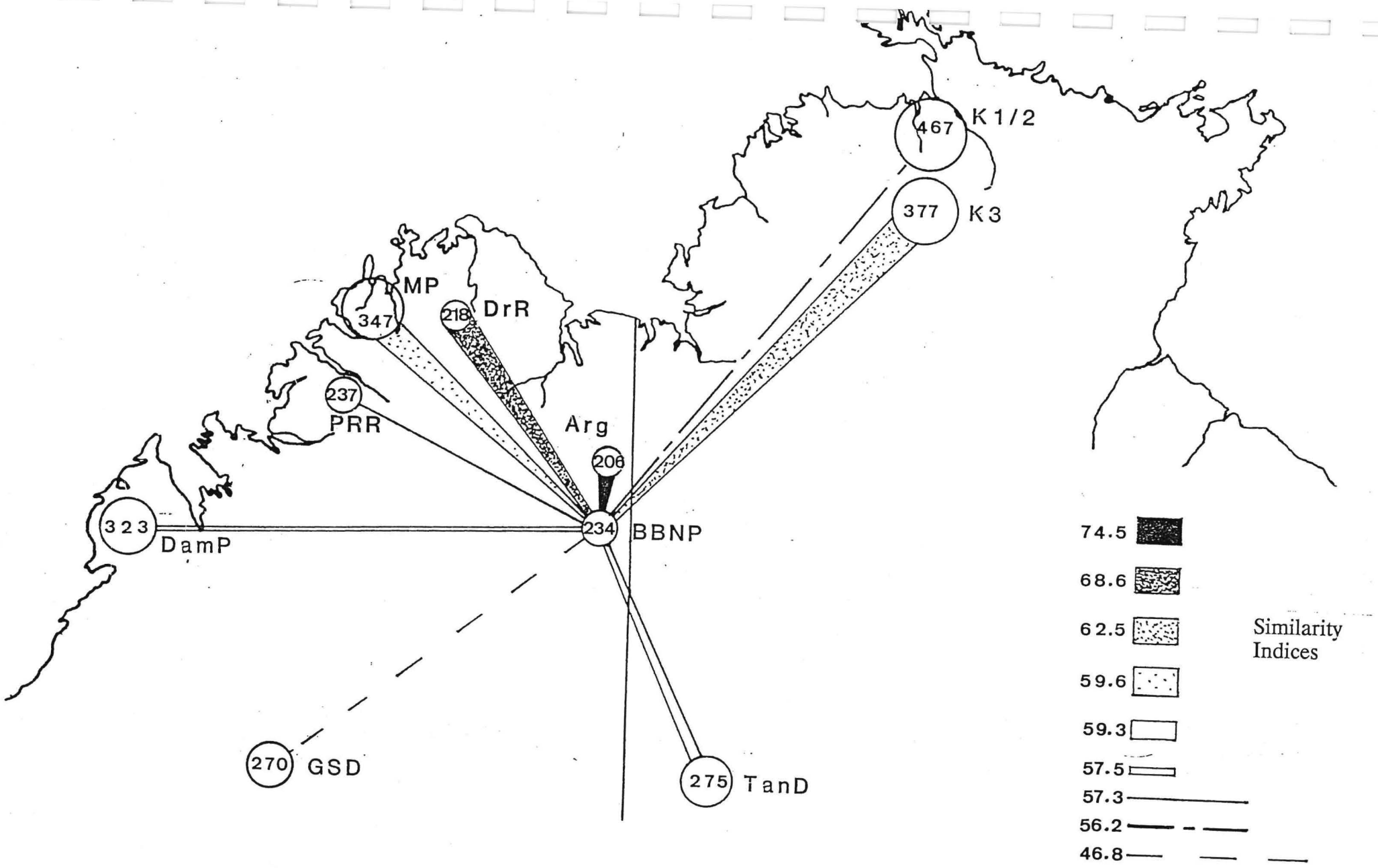


Figure 4a Similarity of species composition : Total species

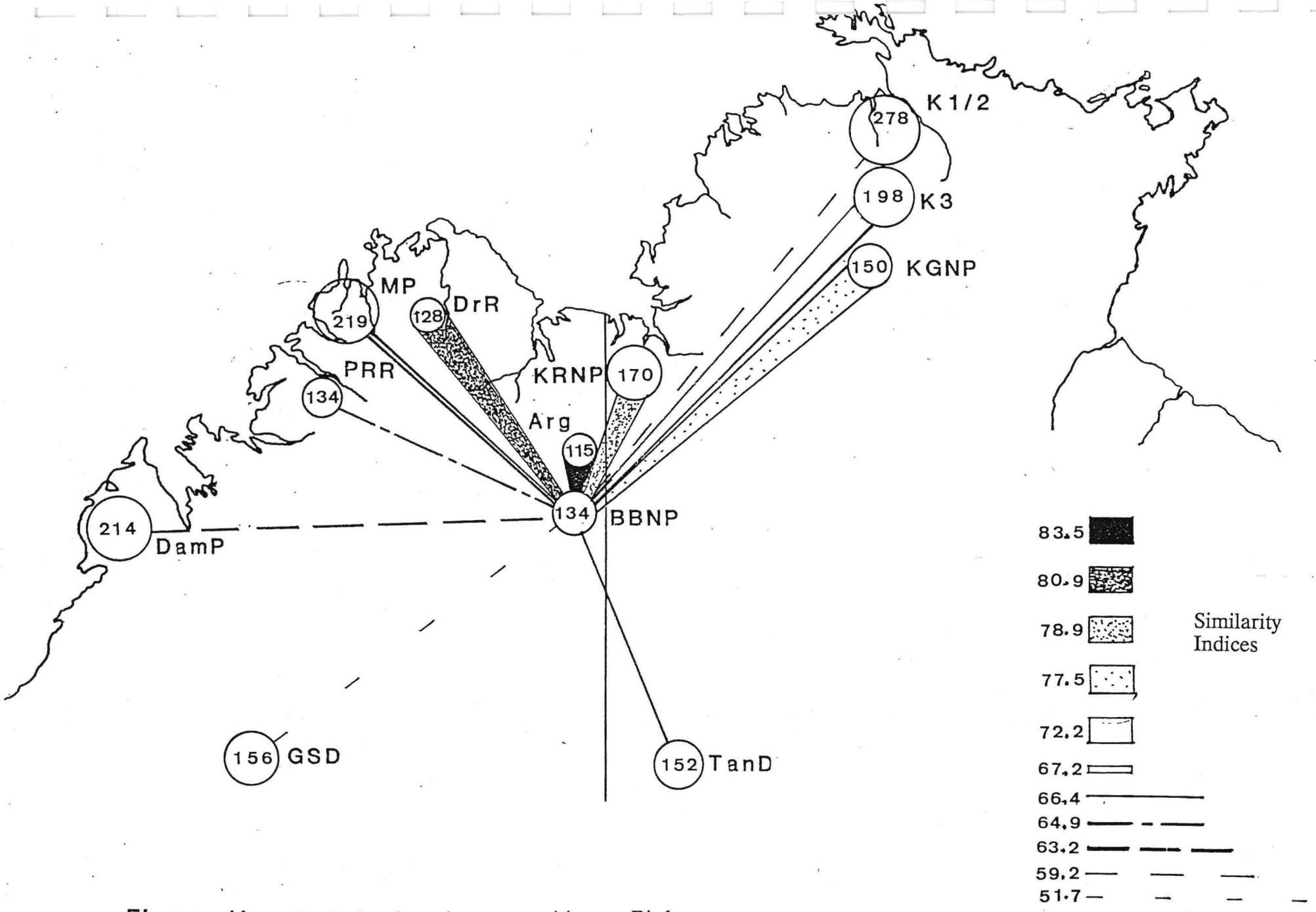


Figure 4b Similarity of species composition : Birds

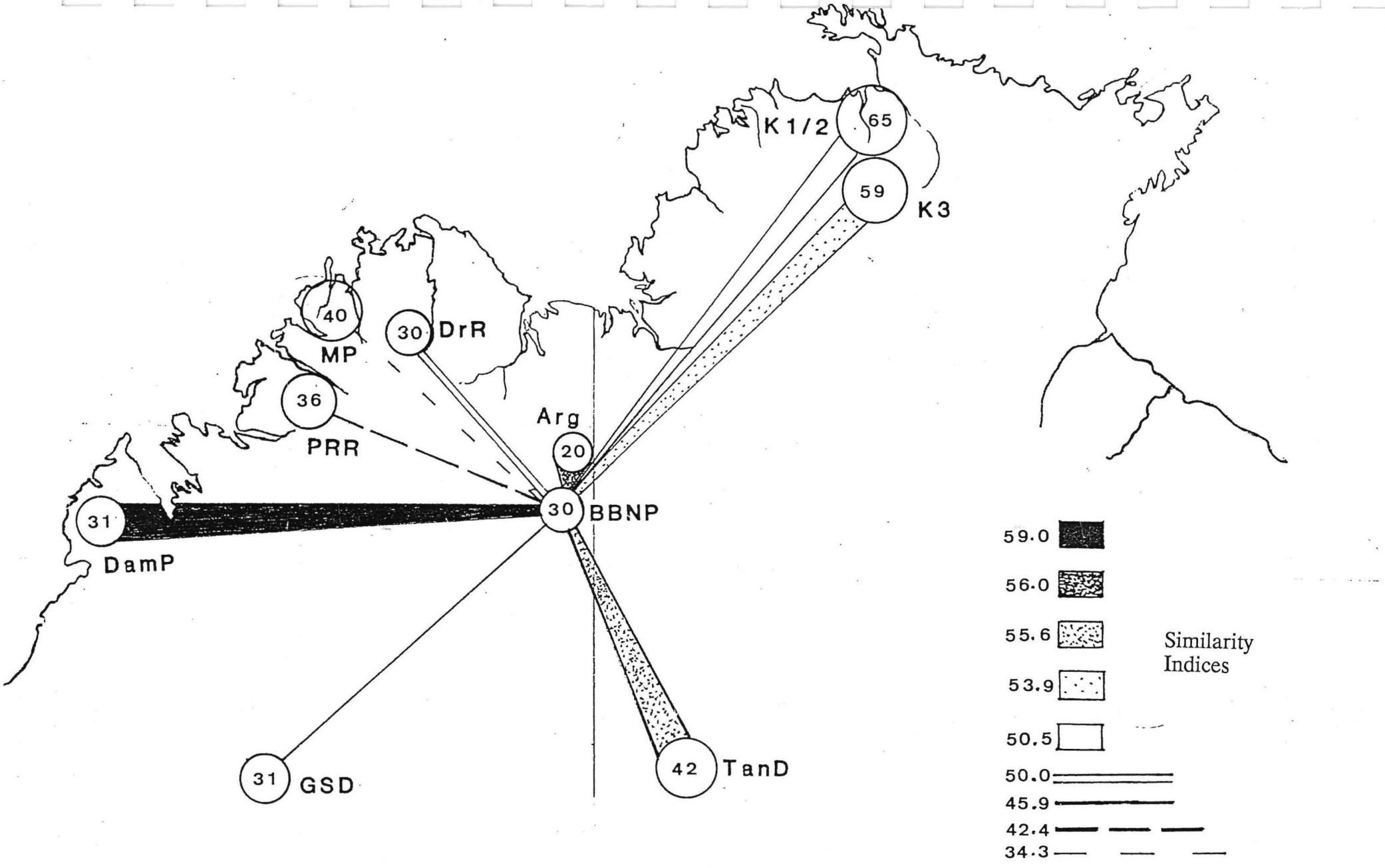


Figure 4c Similarity of species composition : Mammals

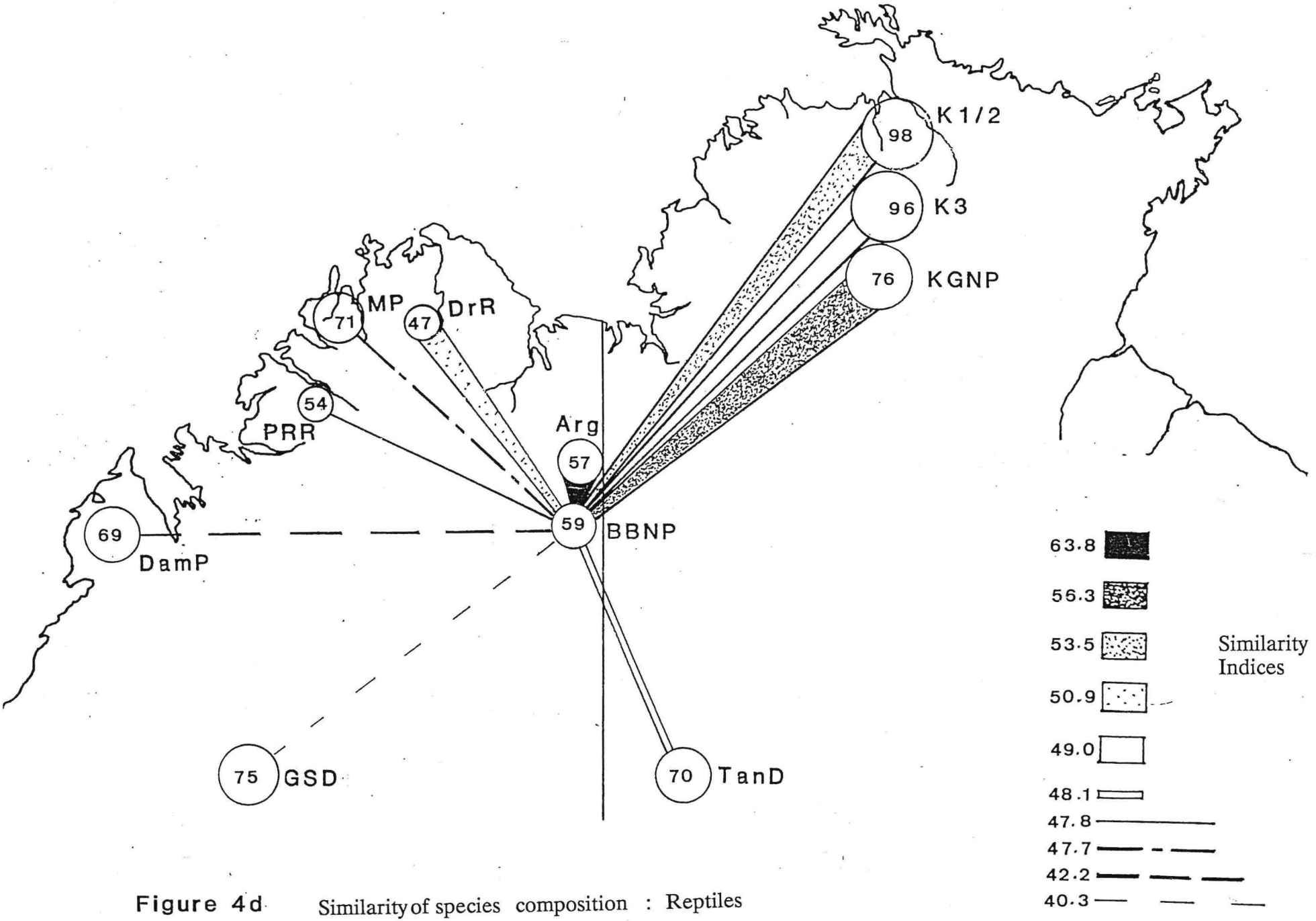


Figure 4d Similarity of species composition : Reptiles

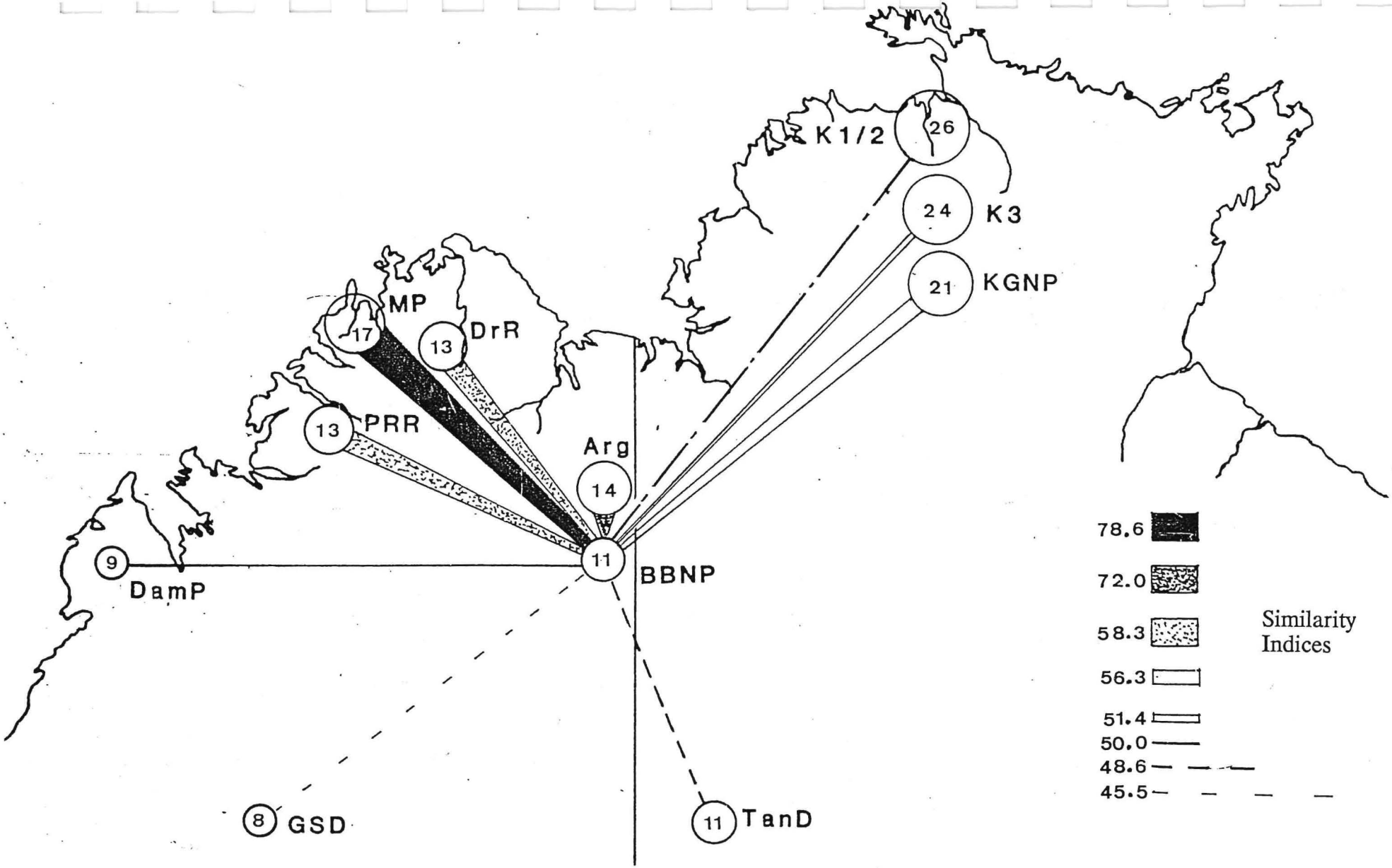


Figure 4e Similarity of species composition : Frogs

TABLE 1: Location of Bungle Bungle Survey Sites

Site No.	Site Name	Dates	Lat.	Long.	Grid Ref.
1	Bull Creek	14-18 June 89	17°19'	128°27'	4563-424845
2	Osmond Spring	19-24 June 89	17°16'	128°31'	4663-495893
3	Goosehole Breakaway	28 June - 2 July 89	17°34'	128°31'	4662-490568
4	Piccaninny Massif	3 - 7 July 89	17°26'	128°24'	4563-365725
5	Blue Holes	11 - 15 July 89	17°33'	128°15'	4562-208587
6	Turner	16 - 21 July 89	17°44'	128°09'	4562-118394
7	Mt John	25 - 30 July 89	17°10'	128°44'	4663-723013

TABLE 2. List of species recorded at sites during survey. Values in body of table are the number of quadrats in which the species was recorded.

BIRDS:

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Emu	3							1	3
Little Black Cormorant					1		*	2	1
Little Pied Cormorant							1	1	1
Darter					1		2	2	3
Pacific Heron					1	*	1	3	2
White Faced Heron		*						1	0
Great Egret					1			1	1
Rufous Night-heron					1	*	4	3	5
Black Bittern					*		1	2	1
Jabiru		*						1	0
Brolga							*	1	0
Radjah Shelduck					*			1	0
Pacific Baza							1	1	1
Square-tailed Kite						*		1	0
Black-breasted Kite		*	*	*				3	0
Whistling Kite	*	2			2	*		4	4
Black Kite		4	1					2	5
Brown Goshawk		3					*	2	3
Collared Sparrowhawk		1			1	1		3	3
Grey Goshawk		1						1	1
Little Eagle			*					1	0
Wedge-tailed Eagle			*		*	*	*	4	0
White-bellied Sea-eagle		1			*		1	3	2
Peregrine Falcon	2			*				2	2
Australian Hobby		1	1		*			3	2
Grey Falcon	*					1	*	3	1
Brown Falcon	*	1	2		1	*	2	6	6
Kestrel		*		1	*			3	1
Brown Quail	5		2					2	7
Little Button-quail			1			*		2	1
Bustard			*			*		2	0
Black-fronted Dotterel	*	*	*		2	*		5	2

Birds cont'd

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Bar-shouldered dove		8	*		3		7	4	18
Peaceful Dove	5	15	4		8	5	8	6	45
Diamond Dove			12		5	3		3	20
White-quilled Rock-Pigeon	1			2			5	3	8
Common Bronzewing	4	1	*			1		4	6
Spinifex Pigeon	4		4		5	4	2	5	19
Crested Pigeon	6	5	3		3			4	17
Red-collared Lorikeet	2	2						2	4
Varied Lorikeet			1		3			2	4
Red-winged Parrot	2	3	*		2	3	3	6	13
Northern Rosella	12	5	5		2	3		5	27
Budgerigar	6	2	8		7			4	23
Cockatiel	6	*	4		4	*		5	14
Red-tailed Black-cockatoo		*					*	2	0
Little Corella		*	1		2		*	4	3
Sulphur-crested Cockatoo	*	7	*		3	*	5	6	15
Pallid Cuckoo			4			1	*	3	5
Horsfield Bronze-cuckoo			1		1	1		3	3
Channel-billed Cuckoo		*						1	0
Pheasant Coucal		1					1	2	2
Barn Owl			2					1	2
Barking Owl		*					4	2	4
Southern Boobook			1	1	*		3	4	5
Tawny Frogmouth	*		1		*	3		4	4
Australian Owlet-Nightjar	*					3		2	3
Spotted Nightjar	*		*		*	7	*	5	7
Azure Kingfisher		1			2		*	3	3
Blue-winged Kookaburra	*	4				1	2	4	7
Red-backed Kingfisher		*	3		3	*	*	5	6
Rainbow Bee-eater	3	5	5	6	8	2	4	7	33
Tree Martin					1			1	1
Fairy Martin			*					1	0
Richard's Pipit					1			1	1
Ground Cuckoo-shrike			*					1	0
Black-faced Cuckoo-shrike	1	5	1	1	6	3	6	7	23
White-bellied Cuckoo-shrike	1	2	2		2	1	4	6	12
White-winged Triller	1	4	6		9	2	2	6	24

Birds cont'd

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Jacky Winter		4						1	4
Red-capped Robin						*		1	0
Rufous Whistler		15	6		6	7	7	5	41
Sandstone Shrike-thrush	*		1	3		*	*	5	4
Grey Shrike-thrush	1	7	1		4	5	6	6	24
Northern Fantail		2			2		6	3	10
Willie Wagtail	1	13	8		10	6	6	6	44
Leaden Flycatcher							4	1	4
Restless Flycatcher		11			9	1	3	4	24
Grey-crowned Babbler		5	9		3	4		4	21
Weebill		4	2		9	9	8	5	32
Variegated Fairy-wren				2		3	2	3	7
Red-backed Fairy-wren	3		6		4	1		4	14
Spinifex-bird			3			1		2	4
Rufous Songlark		*						1	0
Varied Sittella	1	2				2		3	5
Black-tailed Treecreeper	3	*	5		3	1		5	12
Mistletoebird	4	13	2	11	5	2	11	7	48
Red-browed Pardalote	3		7		1	4		4	15
Striated Pardalote	8	14	2	5	6	4	5	7	44
Brown Honeyeater	11	12		15	15	9	14	6	76
Singing Honeyeater			2	*	1		1	4	4
Grey-headed Honeyeater	*							1	0
Grey-fronted Honeyeater	5		11	6		13	*	5	35
Yellow-tinted Honeyeater		10			5	3	3	4	21
White-gaped Honeyeater		3			1		5	3	9
White-throated Honeyeater		8					4	2	12
Black-chinned Honeyeater	3		6		4	3	1	5	17
Little Friarbird	14	10	5	7	11	8	9	7	64
Silver-crowned Friarbird	4	2		*		2	8	5	16
Bar-breasted Honeyeater							6	1	6
Rufous-throated Honeyeater				3	1		5	3	9
Yellow-throated Miner	15		9	*	5		*	5	29
Painted Firetail			5		2	2		3	9
Crimson Finch							4	1	4
Zebra Finch			9		5	1		3	15

Birds cont'd

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Double-barred Finch		10			3	3	7	4	23
Masked Finch					1	*		2	1
Long-tailed Finch	2	6	*		5	*		5	13
Pictorella Mannikin	*		*					2	0
Olive-backed Oriole		6					7	2	13
Australian Magpie-lark	5	7	9		9		*	5	30
White-breasted Wood-swallow		3			1			2	4
Black-faced Wood-swallow	*	3	12		10	6	*	6	31
Little Wood-swallow	1	2	2	3	7		2	6	17
Masked Wood-swallow				14	3			2	17
White-browed Wood-swallow				2				1	2
Grey Butcherbird							*	1	0
Pied Butcherbird	12	10	8	8	6	*	6	7	50
Australian Magpie	1		*		*			3	1
Great Bowerbird	1	2		4	1	5	7	6	20
Torresian Crow	2	7		1	5		5	5	20
Little Crow	*		3			*	*	4	3

ADDITIONAL BIRD SPECIES KNOWN FROM BBNP (FROM CALM LIST) : Hoary-headed Grebe, Australian Pelican, Bush Thick-knee, Spotted Harrier, Galah, Dollarbird, Sacred Kingfisher, Singing Bushlark, Tawny Grassbird, Grey Fantail, Banded Honeyeater.

MAMMALS:

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Tachyglossus aculeatus			1			1	4	3	6
Sminthopsis macroura	1				1			2	2
S. youngsoni			2		1			2	3
Planigale ingrami	5					3		2	8
Planigale sp.				3		2	2	3	7
Onychogalea unguifera			5		3			2	8
Peradorcas concinna						1		1	1
Macropus robustus			9	5	6	13	14	5	47
Pteropus scapulatus							*	1	-
Hipposideros ater						*		1	-
Taphozous georgianus				*		*		2	-
Nyctophilus geoffroyi							*	1	-
N. arnhemensis		*			*	*		3	-
Miniopterus schreibersii	*			*	*	*		4	-
Chalinolobus gouldii	*	*			*	*	*	5	-
Scotorepens greyi	*				*	*		3	-
Eptesicus sp. A	*			*	*	*		4	-
Eptesicus sp. B	*				*			2	-
Zyzomys argurus				8		8	11	3	27
Pseudomys delicatulus	7	3	2		1	2		5	15
P. nanus	6	1		3				4	12
Pseudomys sp.						1		1	1
Hydromys chrysogaster							1	1	1
Canis familiaris	*	1	4		3	4		5	12
Felis catus	*	1	5					3	6
Equus caballus						*		1	-
E. asinus	1	2	5		11	8	6	6	35
Sus scrofa							4	1	4
Bos taurus	*	2	2		5	9	8	6	26

HERPETOFAUNA:

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Ranidella bilingua		1		2	1	2	6	5	12
Limnodynastes ornatus	1	1		1				3	3
Uperoleia sp.				2				1	2
Litoria coplandi	2			2	3	1	2	5	10
Litoria rubella	1				*			2	1
Litoria wotjulumensis						1	1	2	2
Litoria meiriana				2				1	2
Crocodylus johstoni		2			1		3	3	6
Chelodina sp.							3	1	3
Emydura sp.							3	1	3
Diplodactylus stenodactylus	3				1			2	4
Gehra australis	2	4	2		1	1	2	6	12
Gehra nana	1		4	7	1	4	2	6	19
Gehyra pilbara			2					1	2
Gehyra sp. nov.	*						2	2	2
Heteronotia binoei	3	8	4		5	2	4	6	26
Heteronotia spelea	*			1		1	2	4	4
Oedura mamorata				1				1	1
Oedura rhombifer						1		1	1
Rhynchoedura ornata		1	1					2	2
Delma borea				1	1	1	1	4	4
Delma nasuta				3				1	3
Pygopus nigriceps	*							1	0
Ctenophorus caudicinctus			3		2		2	3	7
Ctenophorus isolepis	6		5					2	11
Diporiphora lalliae			1		6	2		3	9
Diporiphora magna	2		2					2	4
Gemmatophora gilberti		6				*	6	3	12
Varanus acanthurus			1	3		2		3	6

Herpetofauna cont'd

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Varanus glebopalma							2	1	2
Varanus kingorum						1		1	1
Varanus mertensi				1	*		1	3	2
Varanus mitchelli		1					1	2	2
Varanus tristis					2			1	2
Varanus panoptes			2					1	2
Carlia amax				6		2		2	8
Carlia munda							3	1	3
Cryptoblepharus megastictus				1			2	2	3
Cryptoblepharus plagiocephalus	1	2				3	2	4	8
Ctenotus inornatus	5	1			1			3	7
Ctenotus pantherinus		3			5	4	3	4	15
Ctenotus piankai	3	3			1			3	7
Ctenotus saxatilis			4	11	4	3	5	5	27
Ctenotus sp.	1							1	1
Cyclodomorphus melanops	2		3		1			3	6
Egernia striata				4				1	4
Eremiascincus richardsonii					1			1	1
Lerista bipes	9	4	3					3	16
Lerista borealis		1						1	1
Lerista sp.	2							1	2
Menetia greyii		2				4		2	6
Morethia ruficanda	1	5	1	3			4	5	14
Notoscincus ornatus		3						1	3
Proablepharus tenuis			2		3	3		3	8
Tiliqua scincoides							1	1	1
Ramphotyphlops guentheri							1	1	1
Bothrochilus childrensi					1			1	1
Demansia atra							1	1	1
Demansia olivacea						2		1	2
Dendrelaphis punctulata				1			*	2	1
Furina ornata							1	1	1

Herpetofauna cont'd

SPECIES	SITES							TOTAL	
	1	2	3	4	5	6	7	Sites	Quadrats
Pseudonaja modesta			1					1	1
Rhinoplocephalus punctatus	2	2	1		1			4	6

ADDITIONAL SPECIES RECORDED FROM B.B.N.P.:

Cyclorana australis
Cyclorana longipes
Litoria cearulea
Litoria splendida

Varanus glauerti

Acanthophis praelongus
Aspidites melanocephalus