Vertebrate Fauna Survey

A project undertaken as part of the NSW Comprehensive Regional Assessments

December 1998

VERTEBRATE FAUNA SURVEY

NEW SOUTH WALES NATIONAL PARKS AND WILDLIFE SERVICE

A project undertaken for
the Joint Commonwealth NSW Regional Forest Agreement Steering Committee
as part of the

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ABBREVIATIONS

APAIS	Australian Public Affairs Information Service
BSS	Biological Survey System
CAR	Comprehensive, Adequate, Representative
CRA	Comprehensive Regional Assessments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEM	Digital Elevation Model
EIS	Environmental Impact Statement
ESFM	Ecologically Sustainable Forest Management
ESRI	Environmental Systems Research Institute
IBRA	Interim Bioregionalisation of Australia
JANIS	Joint ANZECC / MCFFA National Policy Statement Implementation Sub-committee
JOGP	Joint Oldgrowth Project
Landsat TM	Landsat Thematic Mapping
LGA	Local Government Area
LNE	Lower North East
NEFBS	North East Forests Biodiversity Study
NRAC	Natural Resources Audit Council
NRDD	Natural Resources Data Directory
PVA	Population Viability Analysis
RACD	Resource and Conservation Division, Dept. Urban Affairs and Planning
RAOU	Royal Australasian Ornithologists' Union
RFA	Regional Forest Agreement
SFNSW	State Forests of NSW

UNE	Upper North East

NOMENCLATURE

Nomenclature used in this report follows the Census of Australian Vertebrate Species (CAVS, version 1995), as maintained by the Biological Resources Study, Commonwealth Department of Environment, Sports and Territories.

Both common and scientific names are given in the first reference to a species. Thereafter, 'report' names are used. Common names, where available, are the report names for birds and mammals (except bats). Scientific names are used for all other taxa.

PROJECT SUMMARY

This working paper describes a project undertaken as part of the comprehensive regional assessments of forests in New South Wales. The comprehensive regional assessments (CRAs) provide the scientific basis on which the State and Commonwealth Governments will sign regional forest agreements (RFAs) for major forest areas of New South Wales. These agreements will determine the future of these forests, providing a balance between conservation and ecologically sustainable use of forest resources.

Project Objective/s

The CRA Vertebrate Fauna Survey project aimed to obtain comprehensive data on fauna distributions in order to fulfill biodiversity requirements of CRAs in NSW. Accurate information on the distribution of vertebrate fauna is an essential component of the data required to develop a comprehensive, adequate, representative (CAR) reserve system. Such information is also integral to the development of the ecologically sustainable forest management (ESFM) practices which are to become part of the Regional Forest Agreements (RFAs).

The project had four main objectives:

- collation and checking of existing data;
- identification of environmental, geographic and taxonomic gaps in existing data;
- systematic and targeted survey to fill the identified gaps; and
- entry and storage of final digital dataset.

Methods

Both systematic and targeted surveys were undertaken, in an attempt to make best use of available resources. Significant effort was expended in the collation and checking of existing records, and new sampling techniques were designed with reference to the major existing datasets, to enable merging of data for subsequent analysis.

Key results and products

Four hundred and fifty sites were systematically surveyed in the northern CRA regions, one hundred and eighty eight in the central CRA region and three hundred and eighty seven in the southern CRA regions. These surveys have provided more than 1.2M collected records and 145 000 new survey records to the NSW CRA process to date. These data, together with numerous targeted surveys and data collated from other sourves, were used in the CRA fauna modelling and response to disturbance projects.

1. INTRODUCTION

1.1 PROJECT OBJECTIVES

The CRA Vertebrate Fauna Survey project aimed to obtain comprehensive data on fauna distributions in order to fulfill biodiversity requirements of CRAs in NSW. Accurate information on the distribution of vertebrate fauna is an essential component of the data required to develop a comprehensive, adequate, representative (CAR) reserve system. Such information is also integral to the development of the ecologically sustainable forest management (ESFM) practices which are to become part of the Regional Forest Agreements (RFAs).

The project had four main objectives:

- collation and checking of existing data;
- identification of environmental, geographic and taxonomic gaps in existing data;
- systematic and targeted survey to fill the identified gaps; and
- entry and storage of final digital dataset.

Significant effort was expended during the data audit phase of the project (Section 3.1), in order to maximise use of existing data. Relevant existing datasets for forest vertebrates were collated and checked.

A digital 'Gap Analysis Tool' was developed to automate the identification of gaps in the available data and to aid the selection of systematic survey sites (Section 2.1).

Both systematic and targeted surveys were undertaken. Systematic surveys comprised standard techniques conducted at standard sites (Section 2.2.1). These surveys were designed to sample efficiently across all functional groups. Standard techniques were also implemented opportunistically at non-standard sites during systematic surveys. It was acknowledged that some taxa of conservation concern ('priority taxa') warranted extra survey resources, since they were considered to be poorly sampled by the standard techniques and / or standard site selection. Additional surveys were undertaken in order to gather information for these 'target taxa'. Targeted surveys comprised both standard and non-standard techniques used at non-standard sites (Section 2.2.2). Results of the new survey work are summarised in Section 4.

Databases were developed for the entry and storage of both collated and new survey data. Data entry included automated error detection procedures. Data management is described in Section 3. Digital data and accompanying metadata statements have been provided to RACD.

1.2 STUDY AREAS

The CRA Vertebrate Fauna Survey project was conducted on a state-wide basis. It incorporated all five NSW CRA regions being assessed during 1997-9: Upper North East (UNE), Lower North East (LNE), Sydney Basin, Southern and Eden (Figure 1.2(a)). The study areas were based on Local Government Areas (LGAs). Component LGAs are listed in Table 1.2(a). Table 1.2(b) shows the distribution of land tenures within each study area and Figures 1.2(b - f) show NSW NPWS and SFNSW estate and forest cover. The biophysical attributes of each study area are described below.

TABLE 1.2(A): COMPONENT LGAS OF NSW CRA STUDY AREAS

CRA study area	Local Government Areas
UNE	Ballina, Byron, Casino, Coffs Harbour, Copmanhurst, Glen Innes, Grafton, Guyra, Kyogle, Lismore, Maclean, Nymboida, Richmond Range, Severn, Tenterfield, Tweed, Ulmarra
LNE	Armidale, Bellingen, Cessnock, Dumaresq, Dungog, Gloucester, Gosford, Great Lakes, Greater Taree, Hastings, Hawkesbury (part), Kempsey, Lake Macquarie, Maitland, Muswellbrook, Nambucca, Newcastle, Nundle, Port Stephens, Scone, Singleton, Uralla, Walcha, Wyong
Sydney Basin	Ashfield, Auburn, Bankstown, Baulkham Hills, Blacktown, Blue Mountains, Botany, Burwood, Camden, Campbelltown, Canterbury, Concord, Drummoyne, Evans, Fairfield, Gosford, Greater Lithgow, Hawkesbury (part), Holroyd, Hornsby, Hunters Hill, Hurstville, Kiama, Kogarah, Ku-ring-gai, Lane Cove, Leichhardt, Liverpool, Manly, Marrickville, Merriwa, Mosman, Mudgee, Mulwaree, Muswellbrook, North Sydney, Oberon, Parramatta, Penrith, Pittwater, Randwick, Rockdale, Ryde, Rylstone, Shellharbour, Shoalhaven, Singleton, South Sydney, Strathfield, Sutherland, Sydney, Warringah, Waverley, Willoughby, Wingecarribee, Wollondilly, Wollongong, Woollahra
Southern	Bega Valley (part), Bombala (part), Cooma-Monaro (part), Crookwell, Eurobodalla, Goulburn, Gunning, Holbrook, Mulwaree, Oberon, Queanbeyan, Shoalhaven, Snowy River, Tallaganda, Tumbarumba, Tumut, Yarrowlumla, Yass
Eden	Bega Valley (part), Bombala (part), Cooma-Monaro (part)

TABLE 1.2(B) MAJOR LAND TENURES WITHIN NSW CRA STUDY AREAS

Tenure	UNE	LNE	Sydney Basin	Southern	Eden
NSW NPWS	373 799	871 670	562 661	1 159 933	219 427
SFNSW	569 353	785 239	101 863	590 403	217 065
Vacant Crown Land	41 940	102 325	33 716	136 192	10 365
Private (leasehold and freehold)	951 364	1 181 475	1 100 033	3 619 638	362 246

1.2.1 UNE study area

The UNE study area covers approximately 3.9 Mha in north-east NSW (Figure 1.2(a)), of which approximately 2 Mha are forested, and 1.2 Mha are public lands (Figure 1.2(b)). The study area is bounded by the Queensland border to the north and the Dorrigo Plateau to the south. The western boundary falls slightly east of the western edge of the New England Interim Biological Regionalisation of Australia (IBRA) region and the Pacific Ocean forms the eastern boundary.

Altitude ranges from sea level in the east to over 1300 m above sea level along the rugged escarpment in the west of the study area. The tablelands in the west of the study area are

FIGURE 1.2(A) NSW CRA STUDY AREAS

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FIGURE 1.2(B) LAND TENURE AND FOREST COVER WITHIN THE UNE CRA STUDY AREA

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typified by gentle relief to the north with steeper areas in the higher country to the south. The coastal plain has a rugged, dissected topography near the escarpment and flattens towards the coast. Extensive floodplains occur along the Clarence, Richmond and Tweed rivers.

The climate of the UNE study area is largely warm temperate. Annual rainfall is influenced by distance from the coast and topography. Mean annual rainfall ranges from 628 mm near Ebor to almost 3500 mm near Whian Whian State Forest. Mean annual temperature ranges from 9.4°C at Round Mountain to 20.1°C at Tweed Heads.

The wide range of environmental variation within this study area is reflected in the richness of plant species and communities. About half of the vascular plant species found in NSW are known from the study area. The major vegetation systems of the area are rainforest, open forest and woodlands, swamp forest, heath, scrub and grasslands (NSW NPWS 1995).

The UNE study area is of great zoogeographical significance. It supports unique faunal assemblages and a high number of endemic and threatened species. The study area contains elements of four major Australian zoogeographic subdivisions, as identified by Schodde and Calaby (1972); the only region in Australia to do so (NSW NPWS 1994). The study area supports 75 Vulnerable and 11 Endangered forest dependent species, as listed in the NSW Threatened Species Conservation (TSC) Act (1995).

1.2.2 LNE study area

The LNE study area covers approximately 5.8 Mha in north-east NSW (Figure 1.2(a)), of which approximately 3.1 Mha are forested and 2 Mha are public lands (Figure 1.2(c)). The study area includes the Dorrigo Plateau to the north and is bounded by the Hawkesbury River to the south. The western boundary approximates the western edge of the New England Tablelands and Sydney Basin IBRA regions. The Pacific Ocean forms the eastern boundary.

Altitude ranges from sea level to over 1400 m above sea level. The Great Escarpment bisects the study area in a north-south direction. Associated steep gorges are also a dominant feature, with lower elevation foothills and a coastal plain to the east. The Northern Tablelands occupy much of the western part of the study area (NSW NPWS 1994).

The climate of the LNE study area is largely warm temperate. Annual rainfall is influenced by distance from the coast and topography. Mean annual rainfall ranges from under 400 $mmyr^{-1}$ near Walcha to almost 2900 $mmyr^{-1}$ near Dorrigo. Mean annual temperature ranges from 8.4°C in Barrington Tops National Park to 18.7°C between Bellingen and Dorrigo.

The wide range of environmental variation within the UNE study area is also apparent in the LNE study area, although sub-tropical influences are less evident. Plant species and communities are once again diverse. Forest vegetation ranges from subtropical rainforests, through wet and dry sclerophyll forests to dry open woodlands.

The LNE is an area of highly diverse habitat. Five IBRA regions occur within this study area; NSW North Coast, New England Tablelands, Nandewar, Sydney Basin and Brigalow Belt South. The study area supports 33 Vulnerable and five Endangered forest dependent species, as listed in the NSW TSC Act (1995).

1.2.3 Sydney Basin study area

The Sydney Basin study area covers about 2 Mha in central eastern NSW (Figure 1.2(a)), of which almost 1.2 Mha is forested (Figure 1.2(d)). The study area incorporates approximately half of the Sydney Basin bioregion. The area stretches along the coast from Gerroa in the south to Broken Bay where the Hawkesbury River forms part of the northern boundary. The boundary then follows the Colo River and Wollemi Creek north-west to Goulburn River National Park. The western boundary runs north-south through the western ranges towns of Sofala and Tarana and approximates the boundary of the Blue Mountains and Kanangra-Boyd national parks. The southern boundary cuts through the northern sections of Morton and Budderoo national parks. The Sydney Basin bioregion encompasses the Narrabeen and Hawkesbury Sandstone Groups, and sandstone is the predominant geology of the study area. Other geologies include the underlying Illawarra Coal Measures exposed around Wollongong, the alluvial flats of the Cumberland Plain, and the fertile basalt caps of Mt Corricudgy and Mt Nullo. The rugged topography of the sandstone formations has resulted in much remaining uncleared while the Cumberland Plain and coastal flats have been heavily cleared for agriculture and urbanisation.

Rainfall generally decreases from east to west across the study area, however, there is a band of orographic rainfall parallel to the coast where moist ocean air meets a rise in altitude. This supports rainforest communities on the Illawarra Escarpment, at Barrington Tops and the Wattagan Mountains, all of which have an average annual rainfall of approximately 1500 mm. By contrast, the south-western part of the Cumberland Plain, which is in a rain shadow, receives less than 650 mm per annum. Average temperature also relates to elevation and proximity to the coast, with a slight cline with latitude also apparent.

Forested environments within the Sydney Basin study area are classed as rainforest, tall open forest (moist forest), open forest (dry forest) and woodland. All except rainforest are eucalypt dominated. Non-forested environments include heath, scrub, sedgeland swamp, freshwater communities, mangrove, saltmarsh and coastal dunes (Fairley and Moore 1989).

Within the Sydney Basin study area, 61 forest dependent fauna species are classified as threatened or vulnerable under the NSW Threatened Species Conservation Act (TSC Act) 1995, including five frogs, three reptiles, 21 mammals and 32 birds. There are ten forest dependent species whose range is mostly or wholly within the Sydney Basin study area, including *Pseudophryne australis* (Red-crowned Toadlet) and *Hoplocephalus bungaroides* (Broad-headed Snake).

1.2.4 Southern study area

The Southern study area covers about 5.55 Mha in south-east NSW (Figure 1.2(a)), of which almost 2.8 Mha is forested (Figure 1.2(e)). The study area extends southwards along the coast from Nowra to the Eden study area at Bermagui. The southern boundary abuts the northern and western boundaries of the Eden study area and then follows the NSW/Victorian state border westwards and along the upper River Murray almost to Albury. The western boundary follows various LGA boundaries northeastwards to just north of Oberon in the southern Blue Mountains. Here the boundary turns southeast towards Nowra. Much of the forested land within the Southern study area is managed by SFNSW or NSW NPWS (see Table 1.2(b).

The Snowy Mountains extend north-south through the centre of the Southern study area. Maximum altitude is 2228 m asl at Mount Kosciuszko, decreasing westwards to 192 m on the far western slopes, and decreasing eastwards across the tablelands and down the escarpment to the

coastal areas of Narooma, Bateman's Bay and Ulladulla. The northern tip of the study area extends into the southern Blue Mountains.

FIGURE 1.2(C) LAND TENURE AND FOREST COVER WITHIN THE LNE CRA STUDY AREA

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FIGURE 1.2(D) LAND TENURE AND FOREST COVER WITHIN SYDNEY BASIN CRA STUDY AREA

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FIGURE 1.2(E) LAND TENURE AND FOREST COVER WITHIN THE SOUTHERN CRA STUDY AREA

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Mean annual rainfall varies from 465 mm at Cooma on the Monaro grasslands to 2357 mm at Charlottes Pass in the mountains. Rainfall is lowest around the Monaro plains, increasing east towards the coast and west to the mountains. Mean annual temperature ranges from 2°C near Mount Kosciuszko to 16°C along the coastal plains north of Ulladulla. Temperature increases both east and westwards away from the mountain ranges.

The northeastern section of the Southern study area is dominated by Permian siltstones and sandstones, with a band of Ordovician sediments extending southwards through Yadboro and Dampier state forests. The north-south running escarpment is characterised by low fertility sediments. Granitic outcrops occur throughout coastal plains and in the central northern and southern sections of the tablelands. The high plateaux in the north comprise Ordovician and Devonian sediments and in the south metamorphic sediments with granite outcrops. The western slopes are predominantly granitic and sedimentary.

Vegetation is highly varied, due to the wide altitudinal and geographic range. The north of the study area supports vegetation types typical of the warm temperate sandstone environments around Sydney and Wollongong. Cooler climates are reflected further south. Vegetation communities in coastal areas comprise predominantly wet and dry sclerophyll forests with patches of rainforest in the escarpment gullies, and coastal and plateau heathlands. The tablelands and western slopes are dominated by dry sclerophyll forests, grassy woodlands and open native grasslands. The mountains support dry and wet sclerophyll forests on the lower to mid altitude slopes, with pockets of rainforest in the western gullies. Higher slopes are dominated by moister forests grading into sub-alpine woodland with increasing altitude. Alpine heathlands and herbfields are found at the highest altitudes.

The wide range of habitats supported by the Southern study area is reflected in a high diversity of fauna species. Forty-nine vertebrate species are classified as Endangered or Vulnerable under the NSW TSC Act (1995), including the highly threatened *Potorous longipes* (Long-footed Potoroo), *Litoria spenceri* (Spotted Tree Frog) and *Xanthomyza phrygia* (Regent Honeyeater). The area supports several species that are endemic to southeastern NSW and eastern Victoria including *Pseudomys fumeus* (Smoky Mouse), *Pseudophryne corroboree* (Corroboree Frog) and the *Potorous longipes* (Long-footed Potoroo), as well as almost 40 species of regional conservation significance.

1.2.5 Eden study area

The Eden study area is based on the State Forests of NSW (SFNSW) Eden Native Forest Management Area. This area covers just over 800 000 ha in south-east NSW (Figure 1.2(a)), of which almost 550 000 ha is forested (Figure 1.2(f)). The study area extends north to Bermagui and south to the Victorian border. The western boundary is formed by the Monaro Tableland, along a line between Nimmitabel and Bombala. The Pacific Ocean forms the eastern boundary.

Altitude peaks at around 1000 m asl along the Monaro Tableland escarpment, falling away towards the Bega Valley and the coastal areas of Eden and Narooma.

Mean annual rainfall varies from 447 mm near Nimmitabel in the extreme northwest of the study area to 1116 mm at Mt Imlay southwest of Eden, generally decreasing east to west, but with a higher band along the escarpment parallel to the coast. Mean annual temperature ranges from 7°C north-east of Bega to 15°C in Nadgee Nature Reserve. There is generally a decrease in temperature from east to west relating to elevation and from north to south due to latitude.

The geology of the Eden CRA region is dominated by granites with Ordovician sediments and alluvial fans. Basalt outcrops are dispersed amongst these rock types. To the north, in Wadbilla National Park, is a large dissected sandstone plateau, and in the south deep alluvial sediments cover the Bega Valley. Aeolian sand systems are found in the flat coastal areas from Nadgee Nature Reserve to Bermagui.

Vegetation is dominated by wet and dry sclerophyll forests, with small patches of rainforest on the escarpment and south facing gullies; coastal and plateau heathlands; and scattered patches of grasslands and grassy woodlands. Much of the forested area is managed by SFNSW or NSW NPWS (see Table 1.2(b)).

The Eden study area supports 32 species listed as Endangered or Vulnerable under the NSW TSC Act (1995) (2 frogs, 12 birds, 18 mammals). Seven of these species have their NSW range mostly or wholly in the Eden study area, including *Isoodon obesulus* (Southern Brown Bandicoot), *Sminthopsis leucopus* (White-footed Dunnart) and the highly threatened *Potorous longipes* (Long-footed Potoroo).

FIGURE 1.2(F) LAND TENURE AND FOREST COVER WITHIN THE EDEN CRA STUDY AREA

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2. METHODOLOGY

2.1 SITE SELECTION

Three approaches were used for the selection of CRA fauna survey sites:

- automated Gap Analysis, using a computer application designed as part of this project (standard survey sites);
- 'traditional' GIS-based stratification of study areas, using mapped biotic and abiotic variables (standard survey sites); and
- targeted site selection, based on expert knowledge and maps of predicted habitat (targeted survey sites).

The following sections describes site selection for both systematic and targeted surveys

2.1.1 Site selection for systematic surveys

UNE study area

Fourteen systematic surveys were conducted in the UNE study area during the period December 1996 - March 1997. The computer Gap Analysis Tool was not operational for this survey season. Traditional stratification of environmental variables was therefore used to select survey sites. Because of the high number of existing systematic survey sites, it was possible to further enhance the traditional NSW NPWS stratification methodology (used for example by the North East Forests Biodiversity Study (NEFBS) and Natural Resources Audit Council (NRAC) projects). Details of survey technique were included, to allow consideration of existing sites where only a subset of standard techniques had been undertaken.

Four environmental variables were used to identify 142 environmental strata which occurred within the UNE study area. Table 2.1.1(a) shows the selected variables and component classes.

In order to prioritise strata for CRA survey effort, sampling intensity of existing datasets was first calculated. Existing survey sites for eight techniques were plotted in turn against environmental strata and the intensity of sampling within each stratum was derived for each technique. Each stratum was then assigned a ranking of 0, 1 or 2 for each technique, according to the intensity of previous survey. A ranking of 0 indicated previous survey of at least average intensity (according to the average intensity of that technique across all strata), 1 denoted an intensity less than the average but not less than half of the average value, and 2 denoted an existing intensity of less than half the average value. The eight rankings were summed for each stratum to indicate the need for systematic survey effort in that stratum.

Sites were then selected within priority strata, subject to logistic constraints. Each survey area had to be accessible by a four-wheel drive vehicle plus trailer, and included a gully, ridge and midslope site linked by a 2 km transect. Until late March 1997, all survey work was conducted on NSW NPWS or SFNSW estate or Vacant Crown Land.

TABLE 2.1.1(A) ENVIRONMENTAL VARIABLES AND CLASSES USED FOR STRATIFICATION OF THE UNE STUDY AREA

Variable	Class number and description	Information source
Mean annual rainfall	1: < 901 mm 2: 901 - 1200 mm 3: 1201 - 1500 mm 4: > 1500 mm	Compiled and mapped from 25 m resolution Digital Elevation Model (DEM) layers and ESOCLIM data.
Mean annual temperature	1: < 13 °C 2: 13 - 16 °C 3: > 16 °C	Compiled and mapped from 25 m resolution Digital Elevation Model (DEM) layers and ESOCLIM data.
Soil fertility	1: Very low 2: Low 3: Moderate 4: High / Very high	Developed from geology classes (W of New England Highway), geology classes and soil landscape data (E of highway).
Broad vegetation type (LandsatTM)	1: Rainforest 2: Moist open forest 3: Dry open forest incl. woodland 4: Coastal complex 5: Plateau / rocky complex	Broad vegetation layer collated as part of the Eastern Bushlands Study (Roberts 1992).

LNE study area

Two systematic survey seasons were conducted in the LNE study area: December 1996 - March 1997 (14 surveys) and November 1997 - February 1998 (nine surveys). The Gap Analysis Tool was not available during the 1996 - 7 survey season and site selection proceeded as described for the UNE study area for all but the far south of this study area. Because the stratification variables used for the majority of this study area did not extend to the NSW NPWS Hunter District in the far south, a separate stratification was carried out for the Hunter District. This small area was stratified as for the Sydney Basin study area in both survey seasons.

Site selection during the 97 - 8 season used the Gap Analysis Tool, developed by NSW NPWS GIS Division as part of this project. The Gap Analysis Tool identifies environmental, geographic and taxonomic gaps in existing survey data and automates selection of new survey sites to fill those gaps. Priority areas for survey effort are identified by evaluating the dissimilarity between existing survey sites and a set of randomly selected points within the study area. The Gap Analysis Tool operates as an extension to the ArcVeiw GIS package (ESRI) in a Windows NT operating environment. Models and variable weightings are derived using the S-Plus statistical package. Detailed statistical information explaining the functions of the Gap Analysis Tool is given in Appendix 3.

Gap analysis was undertaken for each of 13 sampling techniques: hair-sampling funnels, diurnal herpetofauna census, diurnal bird census, nocturnal call playback, nocturnal streamside search, bat ultrasonic call recording, bat harp trapping, scat searches, cage, Elliott and pitfall trapping, and vehicle and foot-based spotlighting.

Gap Analysis operated across all forested land, thus avoiding any tenure bias in prioritisation of strata for sampling. However, surveys were conducted on public land within selected strata whenever possible.

Sydney Basin study area

The Gap Analysis Tool could not be used for site selection in the Sydney Basin study area because of the lack of existing systematic survey sites.

Selection of systematic survey sites in the Sydney Basin study area was directed by traditional stratification of the study area, using biotic and abiotic variables. The component classes of each variable are shown in Table 2.1.1(b). Each variable was categorised to best define important features and variations across the study area (RACAC 1997).

TABLE 2.1.1(B) ENVIRONMENTAL VARIABLES AND CLASSES USED FOR STRATIFICATION OF THE SYDNEY BASIN STUDY AREA

Variable	Class number and description	Information source
Mean annual rainfall	1: < 800 mm 2: 800 - 1100 mm 3: > 1100 mm	Derived by combining ESOCLIM rainfall model (Hutchinson 1989) with a DEM.
Mean annual temperature	1: < 13°C 2: 13 - 16.6°C 3: >16.6°C	Derived by combining ESOCLIM temperature model (Hutchinson 1989) with a DEM.
Soil fertility	1: Very low (sandstones, quartz sandstones, Quaternary sand) 2: Low (sedimentary high quartz, granites, leucogranites, Quaternary sediments) 3: Moderate (sedimentary low quartz, Wianamatta shale, limestones) 4: High (acid volcanics, Quaternary alluvium, serpentinite) 5: Very high (basic igneous)	Based on 1:100 000 or 1:250 000 soil landscape maps, produced by Soil Conservation Service of NSW. Where these maps were unavailable, 1:250 000 geology mapping (Geological Survey of NSW) was used.
Broad forest type	1: Woodland 2: Dry open forest 3: Moist open forest 4: Rainforest	Derived from the Eastern Bushlands Database (Roberts 1992) and other databases held by NSW NPWS. See RACAC 1997 for further details.

Where strata occurred across a wide area, sites were selected to sample across the full geographic range.

Southern study area

Gap analysis and site selection were conducted using the traditional NSW NPWS environmental stratification and locations of existing survey sites. The computerised Gap Analysis Tool was not used because of the paucity of existing sites.

Environmental stratification of the Southern study area was based on three variables: lithology, temperature and rainfall. The component classes of each variable are shown in Table 2.1.1(d).

The sampling intensity of existing survey sites was used to guide the allocation of sites to strata. Site selection aimed to achieve a roughly equivalent density of sites within each stratum but with

a tendency to favour smaller strata at the expense of the largest strata. Within large strata, sites were selected to sample the full geographic range of the stratum. Strata less than 2000 ha in size were not sampled due to resource and logistical constraints.

TABLE 2.1.1(D) ENVIRONMENTAL VARIABLES AND CLASSES USED FOR STRATIFICATION OF THE SOUTHERN STUDY AREA

Variable	Class number and description	Information source
Lithology	1: Coastal beach deposit 2: Unconsolidated sediment 3: Volcanic/Hypabyssal: Ultrabasic-basic 4: Volcanic/Hypabyssal: Intermediate-acid 5: Plutonic: High alkali Feldspar 6: Plutonic: Medium alkali Feldspar 7: Plutonic: Low alkali Feldspar 8: Sedimentary: High quartz 9: Sedimentary: Low quartz 10: Sedimentary: Limestone 11: Metamorphic: Medium-high grade	Lithology layer derived by CSIRO under contract to NSW NPWS. See CSIRO 1997 for further details
Mean annual temperature	1: 4 - 7°C 2: 8 - 10°C 3: 11 - 12°C 4: 13 - 14°C 5: 15 °C 6: 16 - 17°C	Compiled and mapped from 100 m resolution Digital Elevation Model (DEM) layers & ESOCLIM data. Values mapped as integers.
Mean annual rainfall	1: 380-640 mm 2: 650-750 mm 3: 760 - 890 mm 4: 900 - 1290 mm 5: 1300 - 2090 mm	Compiled and mapped from 100 m resolution Digital Elevation Model (DEM) layers & ESOCLIM data. Values mapped as integers.

Sites were selected regardless of the tenure, but more often than not the largest and least disturbed habitat occurred on public land and was generally more accessible. Additional constraints on final site location were accessibility by four-wheel drive vehicle for several consecutive days in any weather condition, and combinations of strata that could be sampled during one survey trip.

In order to sample moisture gradients within each stratum, sites were selected in groups of three, comprising ridge, gully and midslope sites. The 2 km transect between triplets of sites, as used in other study areas, was not used in the Southern region, in order to maximise collection of site-based records that could be subjected to more refined analysis techniques. Sites were located at least 1 km apart to avoid interaction of animals between sites.

Eden study area

The Gap Analysis Tool was not operational during site selection for the Eden study area. Gap analysis and site selection used traditional NSW NPWS environmental stratification and locations

of known study sites. The environmental stratification was based on three variables: lithology, temperature and rainfall. The component classes of each variable are shown in Table 2.1.1(e).

Due to the small size of the Eden study area, the gap analysis and site selection procedures also considered areas to the north of the study area. Existing data from here were used in the data analysis to enhance the resultant fauna models.

TABLE 2.1.1(E) ENVIRONMENTAL VARIABLES AND CLASSES USED FOR STRATIFICATION OF THE EDEN STUDY AREA

Variable	Class number and description	Information source
Lithology	1: Coastal beach deposit 2: Unconsolidated sediment 3: Volcanic/Hypabyssal: Ultrabasic-basic 4: Volcanic/Hypabyssal: Intermediate-acid 5: Plutonic: High alkali Feldspar 6: Plutonic: Medium alkali Feldspar 7: Plutonic: Low alkali Feldspar 8: Sedimentary: High quartz 9: Sedimentary: Low quartz 10: Sedimentary: Limestone 11: Metamorphic: Medium-high grade	Lithology layer derived by CSIRO under contract to NSW NPWS. For further details see CSIRO 1997.
Mean annual rainfall	1: < 600 mm 2: 600 - 900 mm 3: 900 - 1200 mm 4: 1200 - 1600 mm 5: > 1600 - mm	Compiled and mapped from 25 m resolution Digital Elevation Model (DEM) layers and ESOCLIM data. Values mapped as integers.
Mean annual temperature	1: <5°C 2: 6 - 8°C 3: 9 - 12°C 4: 13 - 14°C 5: 15 - 16°C 6: >17°C	Compiled and mapped from 25 m resolution Digital Elevation Model (DEM) layers and ESOCLIM data. Values mapped as integers.

Site selection used an index of sampling intensity (no. sites / log of stratum area) to guide the allocation of sites to strata. This index ensured sampling of rare strata as well as adequate coverage of more expansive strata.

At the time of initial site selection, no other full systematic survey data were available (i.e. sites where all faunal groups had been systematically surveyed). As surveys progressed, other datasets were collated, however most were for only one or a few faunal groups. These existing survey sites were considered when selecting CRA survey sites, even though the associated records were yet to be obtained. Sites were selected regardless of tenure, but more often than not the largest and least disturbed habitat occurred on public land and was generally more accessible. Additional constraints on final site location were accessibility by four-wheel drive vehicle for several consecutive days in any weather condition, and combinations of strata that could be sampled during one survey trip.

In order to sample moisture gradients within each stratum, sites were selected in groups of three, comprising ridge, gully and midslope sites linked by a 2 km transect. Within large strata, sites were selected to sample the full geographic range of the stratum.

2.1.2 Site selection for targeted surveys

Whilst systematic survey design is preferred for analysis of resulting data, very poor returns are obtained for some rare and cryptic taxa. CRA targeted surveys aimed to record target taxa (see box) via purpose-designed surveys.

PRIORITY AND TARGET TAXA

Priority taxa were identified for each study area. These were taxa of conservation concern, identified via the CRA Response to Disturbance project's interpretation of the various JANIS criteria. Field teams were encouraged to implement extra survey effort (standard or non-standard techniques) within suitable habitat to detect these taxa.

Target taxa were a subset of the priority taxa for each study area. Selection was based on rarity and / or poor detection rates in previous systematic surveys. Only those taxa for which targeted survey was expected to yield good returns were selected. Taxa considered as candidates for Population Viability Analysis (PVA) were also targeted. CRA targeted surveys were designed specifically to detect these taxa.

Appendix 1 lists priority and target taxa for each study area.

UNE and LNE study areas

Selection of target survey sites followed the steps outlined in Figure 2.1.2.

Sydney Basin study area

Targeted surveys in the Sydney Basin study area were designed to sample large forest owls (*Ninox strenua* (Powerful Owl), *N. connivens* (Barking Owl), *Tyto tenebricosa* (Sooty Owl) and *T. novaehollandiae* (Masked Owl)) during winter. Most existing systematic surveys had been conducted during spring and summer, when owls are not breeding and so are less likely to respond to call playback. These surveys had two aims: to gather records for poorly sampled species and to investigate the effect of variations in survey season and methodology.

Strata were selected as for systematic survey sites in this study area (see Section 2.1.1), with the aim of filling geographic and environmental gaps in existing survey coverage. Sites were located at least 2 km apart, but not necessarily across the moisture gradient within each stratum.

Southern and Eden study areas

As there were very few existing systematic survey data for these study areas, most CRA survey effort was channeled into standard systematic surveys which sampled all species. However, more intensive specialised surveys were conducted for *Phascolarctos cinereus* (Koala), *Pseudomys fumeus* (Smoky Mouse) and *Dasyurus maculatus* (Tiger Quoll). Koala and Tiger Quoll surveys within the Southern study area were conducted jointly with SFNSW.

Elliott traps and/or small hair-sampling funnels were used during the 1997 field season to survey suitable habitats for Smoky Mouse at 22 survey sites (11 in Southern and 11 in Eden). Suitable habitat was identified by experts.

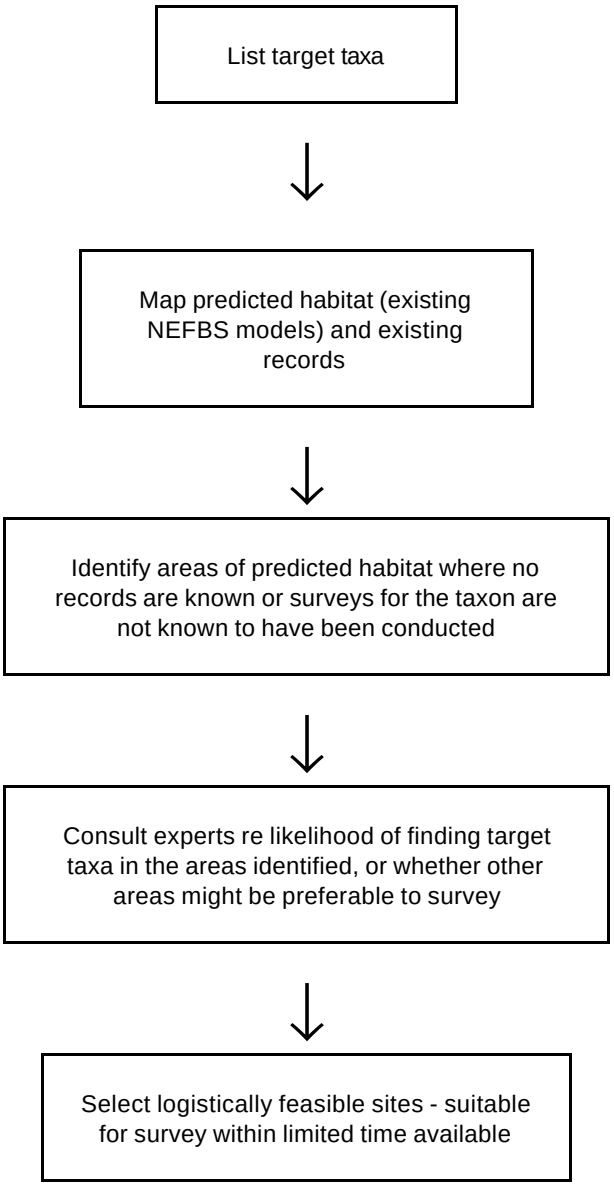
Koala sites were selected in a grid over the whole coastal area, using a broad environmental stratification to allow sampling within accessible areas. This sampling protocol ensured

compatibility with previous surveys conducted by SFNSW in the Eden area (Jurskis *et al.* 1997). Over 350 sites were surveyed in spring 1998.

Tiger Quoll survey sites were selected in the Southern study area using the same environmental stratification as for systematic CRA sites and current known records of the species. Forty sites were surveyed in spring 1998 throughout Buckenbowra, Dampier and Yadboro state forests and Deua, Wadbilliga and Budawang national parks. Suitable habitats for quolls in each priority stratum were sampled, where accessible for the required trapping period.

In addition to these specific targeted surveys, field teams on the standard systematic surveys surveyed extra opportunistic targeted sites in suitable areas for particular groups of species using standard methods. In this way, over 50 extra sites were surveyed for either reptiles, frogs, birds, bats, ground mammals and/or arboreal mammals/nocturnal birds. As the Southern CRA surveys will not be completed until February 1999, further targeted work may be conducted in this study area.

FIGURE 2.1.2 SELECTION OF TARGETED SURVEY SITES IN UNE AND LNE STUDY AREAS



2.2 SURVEY TECHNIQUES

This project used both standard and non-standard sampling techniques.

Standard sampling techniques expend a measured search effort in undertaking a well defined sampling technique. Because systematic surveys use standard site selection and standard sampling techniques, both species presence and absence records can be included in subsequent data analysis, allowing use of more discriminating statistical techniques. A set of nine standard techniques was endorsed for systematic surveys (Section 2.2.1).

Because many cryptic and/or rare animals are poorly sampled by the standard techniques used on systematic surveys, non-standard (specialised) techniques were also used during targeted surveys (Section 2.2.2). Although of limited use in statistical analysis, non-standard techniques often generate important records for priority taxa.

Sampling techniques were designed with reference to the major existing datasets, to enable merging of data for analysis. Field survey proformas are shown in Appendix 4.

Incidental observations of priority fauna were recorded during all surveys.

Surveys were conducted under appropriate licences, see Appendix 5 for details.

2.2.1 Survey techniques used in systematic surveys

Systematic surveys were designed to sample all functional groups via standard sampling techniques at standard (stratified) sampling sites. They were an efficient way to gather presence/absence data for a wide range of taxa.

Each systematic survey was sampled in groups of three: a gully, midslope and ridge site, generally in the same stratum. Sampling sites were 2 ha in size, generally configured as a 100 x 200 m rectangle. Field teams comprising a team leader and three to four other team members who generally completed nine standard sites over six days.

In general, the full suite of standard techniques was conducted at each standard survey site. Because of the large number of survey teams (nineteen team leaders across five CRA study areas), and extended period of fauna survey (December 1996 - January 1999) it was inevitable that survey techniques would evolve during the project and that differences would appear between study areas. Deviations from the standard methodology are described in Section 2.3.

Voucher specimens were collected according to the guidelines shown in Appendix 5.

Standard techniques used at standard survey sites

Site attributes

Several attributes were measured at each standard site in order to characterise fauna habitat and provide environmental variables which could later be used in modeling the predicted distribution of sampled taxa. Recorded attributes included physiogeographic, disturbance, vegetation structure and floristics, microhabitat and stream data. Vegetation attributes were developed in consultation with CRA flora survey staff to avoid duplication and to maximise the efficient use of resources.

A 20 m x 20 m quadrat was sampled within each 2 ha survey site to estimate typical habitat characteristics. This size quadrat is the NSW NPWS standard for sampling detailed structural and floristic information (NPWS 1994c, 1995a, 1996b).

Standard codes for soil and vegetation types were used wherever possible, as provided by the Australian Soil and Land Survey Handbook (McDonald *et al.* 1990).

Hair-sampling funnels

Fifty large hair-sampling funnels (approximately 12.5 cm maximum diameter; Faunatech Wildlife Technical Consultants) were used within each stratum (i.e. each set of ridge, midslope and gully sites). Each funnel was fitted with a sticky wafer designed to collect hairs of small and medium sized mammals investigating the bait. Twenty funnels were placed at 100 m intervals along a transect, where possible running between the ridge, midslope and gully site within each stratum. Ten funnels were placed within each standard survey site at 10 - 15 m intervals. Alternate funnels were baited with singed meat (usually chicken) or a vegetarian bait comprising a mixture of peanut butter, oats and essence of pistachio nut oil, with or without honey. Meat baited funnels were set to attract carnivorous and omnivorous species: *Dasyurus maculatus* (Tiger Quoll), *Dasyurus viverrinus* (Eastern Quoll), *Felis catus* (Cat), *Canis familiaris* (Dog, including Dingo), bandicoots etc. *Potorous tridactylus* (Long-nosed Potoroo), *Aepyprymnus rufescens* (Rufous Bettong) and other small macropods were targeted by vegetarian bait.

Funnels were left on site for approximately ten nights. Hair samples were identified by specialists using the techniques described by Brunner and Coman (1974). Identifications were divided into three levels of reliability: definite, probable and possible. Whilst all records were entered into the database, only definite identifications were included in the subsequent analyses.

Diurnal herpetofauna census

A 0.5 ha plot (50 x 100 m) was sampled at each standard CRA fauna survey site. The search was standardised to one person-hour at each site. Censuses were restricted to the mid-morning to late afternoon period, when temperature and insolation were sufficient to ensure maximum reptile activity. This technique was not conducted on overcast or rainy days.

Potential reptile and frog microhabitats were actively searched within the 0.5 ha sample area. Active or basking reptiles were identified by sight or by capture and keying out where possible. Sheltering or cryptic species were detected by destructively searching fallen logs, litter, decorticating and fallen bark, rock outcrops and other likely substrates. Voucher specimens were taken as necessary. These were preserved, numbered and lodged with the Australian Museum for verification of field identifications and as representatives for taxonomic studies. Census time and temperature at ground level were recorded at the time of the search.

Nocturnal call playback

The standard CRA survey census included broadcasting the calls of the four large forest owls, *Ninox strenua* (Powerful Owl), *N. connivens* (Barking Owl), *Tyto novaehollandiae* (Masked Owl and *T. tenebricosa* (Sooty Owl), from the centre of each site. The calls of other nocturnal birds and arboreal marsupials were also played at the discretion of the team leader.

The site was initially searched by spotlight. A pre-recorded tape of each species' call series was then played on a Sony Professional Walkman, amplified through a nine volt transistor megaphone. Each species' call was played for three minutes, followed by a two minute listening period. The surrounding area was again searched by spotlight after the last listening period. After the census the date, time, and amount of cloud cover were recorded, as well as any fauna

records. Very windy and rainy nights were avoided where possible. Censuses conducted in poor weather were noted as such by the team leader.

Bat ultrasonic ('Anabat') call recording

Insectivorous microchiropteran bats were sampled by two techniques: ultrasonic recording and harp trapping. Harp trapping is discussed later in this section.

Ultrasonic recorders (Corben 1989) are an important tool in bat surveys. They are particularly useful for detection of high flying species, which often comprise more than one third of an area's bat species (Parnaby 1992a), but are under sampled by harp trapping (Richards 1992).
The basic recording equipment for the CRA surveys comprised an 'Anabat II' detector and a tape recorder. Census duration was 30 minutes of continuous recording. Censuses begun at or soon after dusk, and were conducted up to two hours after dusk, a peak activity period for microchiropteran bats.

Bat detectors were used according to the protocol specified by Parnaby (1992a). That is, detectors were placed on the ground and microphones inclined upwards at 45° to the substrate. A 40 kHz calibration tone was recorded for a few seconds at the start and finish of each recording session.

Recordings were analysed by recognised experts in this field. Identification was classed as either definite, probable or possible, as per the methodology of Parnaby (1992a).

Diurnal bird census

Diurnal bird censuses comprised a standard 20 minute search within each standard site, conducted by an experienced bird surveyor. Censuses were conducted only during periods of relatively high bird activity (early morning, late afternoon) and reasonable detectability (i.e. low cicada activity). All bird species and individuals seen or heard were recorded. Individuals were scored as 'on-site' if they were detected within the 2 ha plot. Individuals recorded outside the plot, in adjacent vegetation types or flying overhead, were recorded as 'off-site'. Sample plot configurations were varied according to the nature and configuration of the habitat being sampled at the site. For example, plots at gully sites tended to be more linear than those at midslope and ridge sites.

Foot-based spotlighting

Spotlight surveys for arboreal marsupials were undertaken along a 2 km transect running between and through the gully, midslope and ridge site within each stratum. All fauna seen or heard within 50 m of the transect were recorded.

Two 50 W spotlights were used.

Predator and herbivore scat search

The analysis of predator scats and pellets to identify prey remains is proven as an efficient sampling technique. The large numbers of hairs and sometimes skeletal remains in predator scats results in a high level of confidence in identifications of prey species. However, the immeasurable time delay between prey ingestion and defecation means that the location in which the prey lived cannot be accurately known. For predictive modeling purposes such records are obviously of lower value than actual known localities, although they may constitute a useful adjunct to more accurately located records. Some species are known only from a particular area by scat records. The predator species that deposits the scat will usually be identified as part of

the analysis, providing locality records for *Dasyurus maculatus* (Tiger Quoll), *Vulpes vulpes* (Fox), *Canis familiaris* (Dog/Dingo) and *Sus scrofa* (Pig).
Standard CRA sites were searched on foot for predator scats. All predator scats and unassigned scats of other fauna were collected. Each scat was identified and analysed by a specialist in this field, using the methods used for hair funnel samples.

Bat (harp) trapping

This method complements bat ultrasonic call recording. While ultrasonic recorders are used principally to detect high flying bat species, collapsible harp traps (Tidemann and Woodside 1978) generally capture low flying species.

Many microchiropteran bat species forage along forest streams and harp traps across streams have the potential to trap a number of target species. Each CRA standard survey used a harp trap for two nights at one location within the gully site. If the gully site was unsuitable (e.g. inaccessible or overgrown) an alternative trap position was selected in a suitable area as near as possible to the site within the same environmental stratum.

Another two nights survey were conducted in the same environmental stratum but the exact location was at the team leader's discretion. These sites were usually perceived 'flyways' on forest roads, over creeks or at water bodies where bats could potentially be interrupted along their flight paths.

Traps were checked each morning. Captured bats were identified by external morphology, forearm measurement and body weight, and keyed using Parnaby (1992b). Animals were released on the following night at the point of capture.

Representative voucher specimens were retained, preserved and lodged with the Australian Museum for verification of field identifications. This regional collection will be valuable in resolving some of the many uncertainties of bat taxonomy (Parnaby 1991).

Nocturnal streamside search

Nocturnal streamside searches were conducted at each gully site to target frogs. A standard census comprised one person-hour of searching for active, basking or calling frogs for 200 m along the drainage line, stream or river.

Time, temperature, identity and number of frogs and other detected fauna were recorded at the completion of the census.

Voucher specimens were retained, preserved and lodged with the Australian Museum for verification of field identifications and as representatives for taxonomic studies. Most captured individuals were not required for collection and were released that night at the point of capture. This technique was conducted only at gully sites.

2.2.2 Survey techniques used in targeted surveys

Targeted surveys were designed to record target taxa. They were conducted in areas of known and predicted habitat, based on expert knowledge and predictions from existing habitat models (primarily for the UNE and LNE regions). Because target taxa are inherently difficult to detect, a range of techniques believed most likely to detect these taxa was used.

In order to maximise returns from limited time and resources, target surveys were designed to sample one or more target taxa, whilst also being appropriate for other priority taxa. These techniques were also implemented during standard systematic surveys at the discretion of the team leader.

Non-standard techniques used at non-standard sites

Wet weather frog transects

Frog activity increases during wet weather when individuals can be found crossing and sitting on forest roads. An efficient way to sample at these times is to drive along these roads slowly (5 - 15 kmh^{-1}) during and soon after rainy periods. Individual frogs were captured by hand during these surveys and either released following identification or retained as voucher specimens. Resulting data were treated as incidental records.

Diurnal bird and frog playback and recording

Playback and recording of bird and frog calls can be an efficient sampling technique to assist in species identification. These techniques were implemented opportunistically.

Predator scats

Predator scats were collected opportunistically during targeted surveys and away from standard sites during systematic surveys. Scats were sent to specialists for identification and analysis.

Vehicle-based spotlighting

Teams traveling between standard sites within the same environmental stratum implemented this technique where time permitted. The location of all identified sightings was noted by odometer readings from known landmarks. The road-based transects and the location of records were later digitised for incorporation into GIS layers.

Cage trapping

Limited cage trapping was conducted in the Sydney Basin study area and southern LNE, targeting Tiger Quoll and Long-nosed Potoroo. Ten traps were laid along each of three 2 km transects. Alternate traps were baited with sardines or a peanut butter / rolled oats mix. Traps were left out for four nights.

Targeted winter owl playbacks

Owls records are more easily obtained during the winter breeding season (Kavanagh 1997). Owl playback was conducted at 187 sites within Sydney Basin and southern LNE regions during the winters of 1997 and 1998.

Targeted Tableland frog surveys (UNE and LNE study areas)

These surveys were designed to sample several species.

Litoria booroolongensis CRA systematic surveys did not sample the Tablelands habitat of this possibly regionally extinct species. Targeted surveys for *L. booroolongensis* provided the opportunity to survey for other

	Tablelands stream frogs known to be in decline. The standard nocturnal streamside search technique was used.
Philoria sp.1	Very rare southern form of *P. sphagnicolus*, predicted to occur over much wider area than existing records. Calls during day from soaks, none sampled by the CRA systematic survey. Non-standard technique used for targeted surveys.
Philoria richmondensis	Similar habitats to *P.* sp.1, so not well covered by CRA systematic surveys.
Mixophyes iteratus	Predicted, but not previously recorded, from regions known to support *P. richmondensis*.

Rapid Vulnerable bat searches (UNE study area)

Vulnerable microchiropteran bats were targeted within the UNE study area by identifying species' calls recorded directly onto a laptop computer. This efficient technique was used at a large number of sites not sampled by the corresponding systematic technique (recording onto a tape recorder).

Small terrestrial mammal trapping

Elliott and pitfall traps were used to target species of particular conservation concern, for example *Pseudomys gracilicaudatus* (Eastern Chestnut Mouse), *Planigale maculata* (Common Planigale) and *Phascogale tapoatafa* (Brush-tailed Phascogale) in the UNE and LNE study areas and Smoky Mouse in the Eden and Southern areas.

Black-breasted Button Quail searches (UNE and LNE study areas)

This species is predicted, but not recorded, in northern NSW, close to recent Queensland records. The Black-breasted Button Quail was not surveyed by standard techniques. Characteristic 'scrapes' were sought within suitable habitat. Individuals were then sought in the vicinity of scrapes.

Tablelands diurnal herpetofauna search (UNE and LNE study areas)

The standard diurnal herpetofauna search technique was used to sample *Underwoodisaurus sphyrurus* at targeted sites. *U. sphyrurus* is threatened under the Threatened Species Conservation Act, endemic to north-east NSW. Sites were selected in areas of predicted habitat. These surveys allowed a significant number of gaps in tablelands reptile surveys to be filled.

Tiger Quoll trapping (Southern study area)

Five cage traps, baited with chicken and placed at 50 m intervals, were used at 40 quoll survey sites. Traps were wired open and quolls free fed for the first two days, then traps set for ten days. Traps were placed in riparian zones or saddles between catchments in undersampled strata.

Koala surveys (Southern study area)

Koalas were surveyed using call playback at over 350 sites throughout the coastal area of the Southern study area using the methods of Jurskis *et al.* (1997). Although this technique detected only male Koalas, it is an accepted and relatively quick and effective method to survey a large area in a short time.

Standard techniques used at non-standard sites

The following techniques were implemented opportunistically during systematic surveys, sometimes away from the standard survey sites.

Elliott trapping

A CRA Elliott trapping session was configured to suit the individual site, but included at least ten small (10 x 10 x 30 cm) Elliott traps set at 10 m intervals for four nights. Traps were baited with peanut butter, honey and oats. Trapped animals were identified by species and sex, then either released or retained as voucher specimens. Hair samples were taken from some captured individuals and retained as reference material for specialists conducting hair funnel and scat analysis.

Pitfall trapping

Dry pitfall traps were used when appropriate for priority species. Twenty litre plastic buckets were set so that the bucket lip was level with the ground. The number of buckets, use of drift fencing, search effort (number of nights x number of buckets) and prevailing weather conditions were recorded.

Trip lines

Limited triplining was conducted in the Sydney Basin study area and southern LNE. Multiple wires of fishing line were erected over small dams or ponds. Bats hitting the lines fell into the water and were retrieved for identification then set free.

Mist netting (bats)

Mist netting for microchiropteran bats was conducted in Sydney Basin study area and southern LNE. Mist nets were erected across perceived flyways and monitored constantly. Trapped bats were removed immediately for identification, then freed.

2.2.3 Incidental records

Teams driving through survey areas recorded grid references when significant records were obtained. All mammals, less common birds, large and less common reptiles, and frogs were recorded in this manner (i.e. all priority species plus some others). In order to facilitate accurate mapping and recording of sampling locations, odometer readings were also noted for track intersections and standard and additional survey sites.

2.3 DEVIATIONS FROM STANDARD TECHNIQUES

Deviations from the standard sampling techniques are described in Table 2.3. Deviations generally appear minor. In the case of nocturnal call playback, the playback and listening periods were deliberately varied to provide data for statistical tests of the compatibility of existing datasets - see table for details.

TABLE 2.3 DEVIATIONS FROM STANDARD SURVEY TECHNIQUES - SYSTEMATIC SITES

Technique	UNE	LNE	Sydney Basin	Southern	Eden
Standard techniques used at standard sites					
Hair-sampling funnels	Pistachio nut oil not used.	1996-7 season only. Pistachio nut oil not used.	No deviation	This technique replaced by 10 small Elliott traps at 20 m intervals for 3 nights at each site. Two cage traps (1 meat, 1 vegetarian) also used at each site.	No deviation
Diurnal herpetofauna census	No deviation	No deviation	No deviation	No deviation	No deviation
Nocturnal call playback	*Podargus ocellatus* (Marbled Frogmouth) call used in addition to the three standard owl calls.	No deviation during 1996-7 season. During 1997-8 season all sites were separated by at least 2 km. Initial 10 min. listening period, followed by 3 min. playback and 2 min. listening, then final 10 min. listening period. Where possible, 3 people were involved: 1 operator plus 2 stationed 200 m either side of the megaphone.	No deviation during 1996-7 season. During 1997-8, an initial 15 min. listening period was used at most sites, followed by 5 min. playback and 5 min. listening (Kavanagh and Bamkin 1995). For sites at Coolah Tops, the methodology of Kavanagh 1995 was used, to concur with extensive existing data. Results from the three techniques were compared (ANOVA: P. B. Banks, unpub. data); no significant difference was found.	Calls of *Petaurus australis* (Yellow-bellied Glider) and *P. norfolcensis* (Squirrel Glider) also used. Koala calls used at selected sites. Initial 10min listening period, followed by 2-3 mins playback of each species, then 10 min listening period.	Calls of *Petaurus australis* (Yellow-bellied Glider), *P. norfolcensis* (Squirrel Glider) and Koala used at selected sites.
Bat ultrasonic ('Anabat') call recording	No deviation	No deviation during 1996-7 season. Transects were 500, 1000, 1500 or 2000 m during 1997-8 season. All transects were marked onto 1:25 000 topographic maps.	No deviation	Detector was held in the hand and directed upwards. Bats were 'traced' when heard to increase length of call. Calibration tone used at the end of each call to assist tape analysis.	No deviation

Table 2.3 cont.

Technique	UNE	LNE	Sydney Basin	Southern	Eden
Diurnal bird censusing	No deviation	No deviation	No deviation	No deviation	No deviation
Foot-based spotlighting	No deviation	No deviation	No deviation	2 km transect not used. Instead, spotlighting conducted for 40 mins along a 500 x 100m transect centred on each site.	No deviation
Predator and herbivore scat search	Additional effort: 2 people walked each 2 km transect searching for scats.	Additional effort: 2 people walked each 2 km transect searching for scats.	Not conducted at all systematic survey sites.	No deviation	No deviation
Bat (harp) trapping	No deviation	Only 2 trap nights per systematic survey in 1997-8 season.	No deviation	Two trap nights at two of the three sites in each stratum.	No deviation
Nocturnal streamside search	Search conducted for at least 100 m.	Search conducted for at least 100 m.	No deviation	No deviation	No deviation

3. DATA MANAGEMENT

3.1 DATA AUDIT

The data audit component of this project involved identification of relevant existing datasets followed by the prioritised collation of selected data. Several large, readily available datasets were collated prior to site selection to allow previous survey effort to contribute to the identification of priority areas for new work. These and other collated datasets contributed to the final vertebrate fauna database, and thus to the following tasks within CRA projects:

- identification of areas of high species diversity or abundance;
- derivation of new or refinement of existing fauna distribution models;
- classification of forest ecosystems; and
- establishment of long term biodiversity monitoring sites or programs as part of implementing ESFM.

3.1.1 Identification of existing datasets

External datasets were identified via data libraries such as the Natural Resources Data Directory (NRDD) and the Australian Public Affairs Information Service (APAIS); an advertisement placed in the Sydney Morning Herald and major regional newspapers; and through contacts with field zoologists, NSW NPWS and SFNSW staff, the Australian Museum, Universities and other organisations. Questionnaires were sent to all local councils in the UNE, LNE and Sydney Basin regions, seeking information about relevant data.

3.1.2 Collation of prioritised datasets

Highest priority was given to acquisition of data which met any of the following criteria: systematic surveys, presence/absence sampling techniques, datasets including abundance information, priority taxa (see Appendix 1), datasets likely to have high accuracy, data in digital format and records from poorly-sampled forest.

Datasets were not acquired if they contained only records prior to 1970, or site localities were not accurately specified.

Appendix 2 lists datasets collated for each CRA study area. Collated datasets may be subject to various licence conditions, including restriction of use to this project.

3.2 DATA STORAGE

The NSW NPWS maintains the 'Atlas of NSW Wildlife', a centralised, remotely-accessible relational database for the storage of flora and fauna records. Until 1997, the Atlas did not contain fields for the storage of systematic site-based fauna survey data. The 'Biological Survey System' (BSS) was developed by NSW NPWS during 1997 as a fully integrated component of the Atlas, specifically designed for systematic site-based data. However, the BSS was not fully operational for all sampling techniques during the CRA Vertebrate Fauna Survey project. Some CRA data were therefore entered into the existing Atlas of NSW Wildlife, or directly into local Microsoft Access relational databases (one for each CRA study area). Table 3.2(a) shows databases used to store data for each study area.

TABLE 3.2(A) STORAGE OF FAUNA SURVEY DATA FOR EACH CRA STUDY AREA

Survey technique	UNE	LNE	Sydney Basin	Southern	Eden
Standard techniques used at standard survey sites					
Hair-sampling funnels	On-site BSS Off-site MS Access	On-site BSS Off-site MS Access	BSS (at sites, no transect data entered)	BSS	Atlas
Diurnal herpetofauna census	BSS	BSS	BSS	BSS	Atlas
Nocturnal call playback	BSS	BSS	BSS	BSS	Atlas
Bat ultrasonic ('Anabat') call recording	MS Access	MS Access	BSS	BSS	Atlas
Diurnal bird census	BSS	BSS	BSS	BSS	Atlas
Foot-based spotlighting	BSS	BSS	BSS	BSS	Atlas
Predator and herbivore scat search	BSS	BSS	BSS	BSS	Atlas
Bat (harp) trapping	BSS	BSS	BSS	BSS	Atlas
Nocturnal streamside search	BSS	BSS	BSS	BSS	Atlas
Standard techniques used at non-standard sites					
Elliott trapping	BSS	BSS	BSS	BSS	Atlas
Pitfall trapping	BSS	BSS	n/a	n/a	n/a
Trip lines	Atlas	Atlas/BSS*	n/a	n/a	n/a
Mist netting (bats)	Atlas	Atlas/BSS*	n/a	n/a	n/a

* Entered into BSS as opportunisitic data, since BSS did not contain all data fields.
Records from non-standard techniques were entered into Atlas as incidental observations.

Relational databases contain several data tables, linked via common fields. They are preferred for storage of complex datasets because they allow compact storage and efficient data entry and processing. Data stored in the BSS or Atlas were copied into the relevant MS Access database in preparation for data analysis, to enable easy data manipulation.

Data checking

Manual data entry checks

Once data entry was complete, all data sheets were checked against the database to detect typographical errors. Plotted site locations and AMGs were also checked. This was conducted for UNE, LNE, Sydney and Southern databases. Checking was limited for the Eden CRA data due to the very short timeframe for data preparation. The Eden data was later more thoroughly checked before inclusion in the Southern data analysis.

Manual checks of CRA field proformas

Incoming CRA field survey proformas were checked for completeness and unusual entries. Any problems were resolved in consultation with the relevant team leader.

Automated data entry checks

All databases (BSS, Atlas of NSW Wildlife and local MS Access databases) incorporated automated checking procedures. These performed two types of validations; sighting validations, used to detect errors in species and observation details, and location validations, which confirmed that site details were correct. Sighting and location validations within the Atlas and BSS are outlined in Table 3.2(b). Sighting validations apply to individual records; location validations apply to all records from the affected site. Similar validations were performed within other databases.

TABLE 3.2(B) DATA VALIDATION WITHIN THE ATLAS AND BSS

Validation	Description
Sighting validations	
Accepted distribution of species*	A list of 1:100 000 map sheets defines the 'accepted distribution' for each species. If the calculated map sheet for the sighting is not on this list, validation is failed.
Potential duplicate	Compares key fields: Species Code, First Date, Last Date, Easting and Northing (to 100 m). If values for these fields match an existing record, validation is failed.
Microhabitat type	Accepted microhabitat types are listed for each species. If the entered value is not listed, validation is failed.
Observation type	Accepted observation types are listed for each species. If the entered value is not listed, validation is failed.
Location validations	
Altitude	Each map sheet has a minimum and a maximum altitude. Validation is failed if the altitude entered for the location does not fall between these two values.
District	Component map sheets are listed for each NSW NPWS district. The map sheet is calculated from the entered AMGs. If the calculated map sheet is not listed for the entered district, validation is failed.
District/Reserve	Component reserves are listed for each NSW NPWS district. If the entered reserve name is not listed, validation is failed.
Local Government Area	Component map sheets are listed for each LGA. If the calculated map sheet is not on the list for the entered LGA, validation is failed.
Map sheet	Validation is failed if the entered map sheet differs from the map sheet calculated from the entered AMGs. If a larger scale map sheet is entered for the location (for example, map sheet 9030-2-N), validation occurs only to the 1:100 000 map sheet level.
Reserve/Map	Component map sheets are listed for each reserve. If the calculated map sheet is not on the list for the entered reserve, validation is failed.

* Map sheets are included in the accepted distributions for fauna according to the following criteria:

Frogs and reptiles Map sheets containing at least one record from the Australian Museum or Commonwealth Scientific and Industrial Research Organisation (CSIRO) specimen registers

Mammals Map sheets containing at least one record from the AM specimen register

Birds	Map sheets containing at least one record from the Royal Australasian Ornithologists' Union (RAOU) Atlas of Australian Birds
All fauna species	Map sheets containing at least five existing records within the Atlas of NSW Wildlife

Accepted distributions are under continuous review.

For the BSS and MS Access databases, data entry screens were designed to resemble CRA field proformas, to reduce risk of data entry error.

For MS Access database, data entry could not proceed for records which failed a validation. These records were investigated by data entry staff and rectified if possible. The Atlas and BSS databases operated slightly differently. If no error could be found, the operator could continue to enter the record, but only into the 'Quarantine' area of the database. This was an important difference from MS Access, since records which failed validation were not necessarily incorrect. Database administrators were able to accept Quarantined records into Atlas and BSS in a modified or unmodified form, or with lowered reliability ranking.

4. RESULTS

Appendix 6 lists CRA survey records by technique and also notes the number of collated records from other sources for each taxon.

Appendix 7 details voucher specimens lodged with the Australian Museum.

4.1 UNE

4.1.1 Systematic surveys

Fourteen systematic surveys were conducted during the period December 1996 - March 1997. A total of 172 sites were sampled. Figure 4.1.1 shows the location of these sites.

Table 4.1.1(a) shows systematic sampling density (sites / 1000 ha) in UNE environmental strata both before and after the CRA Vertebrate Fauna Survey project. Table 4.1.1(b) shows sampling density by stratum for major land tenures.

4.1.2 Targeted surveys

Thirteen targeted surveys were conducted during the period January - March 1997. Figure 4.1.2 shows the location of survey sites.

TABLE 4.1.1(A): SYSTEMATIC SAMPLING DENSITY IN THE UNE STUDY AREA - ENVIRONMENTAL STRATA

Note: strata are coded according to values of the four stratification variables, in the following order; mean annual rainfall, mean annual temperature, soil fertility and broad vegetation type. Variable codes are shown below.

Key to strata listed in Table 4.1.1

Mean annual rainfall	Mean annual temperature	Soil fertility	Broad vegetation type (from Landsat TM)
1: < 901 mm 2: 901 - 1200 mm 3: 1201 - 1500 mm 4: > 1500 mm	1: < 13 °C 2: 13 - 16 °C 3: > 16 °C	1: Very low 2: Low 3: Moderate 4: High / Very high	1: Rainforest 2: Moist open forest 3: Dry open forest incl. 4: Coastal complex 5: Plateau / rocky

Thus code 1111 represents land with mean annual rainfall of < 901 mm, mean annual temperature of < 13°C, very low soil fertility and supporting rainforest vegetation.

Sixty-seven strata, each less than 10 000 ha in areal extent and containing no systematic survey sites have been omitted from the following tables. These strata account for 21 950 ha in total.

Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total no. sites	Sites / 1000 ha pre-CRA	Sites / 1000 ha post-CRA
4311	0.01	1	0	1	111.11	111.11
3144	0.04	0	1	1	0.00	24.39
3311	0.17	2	0	2	11.49	11.49
3212	0.09	1	0	1	11.24	11.24
3243	0.28	3	0	3	10.68	10.68
4315	10.83	83	0	83	7.66	7.66
4312	0.95	5	0	5	5.28	5.28
4345	1.94	9	0	9	4.64	4.64
1122	0.22	1	0	1	4.59	4.59
2144	0.24	0	1	1	0.00	4.24
3315	27.71	112	0	112	4.04	4.04
4325	2.14	8	0	8	3.73	3.73
3345	5.76	21	0	21	3.65	3.65
3114	0.55	0	2	2	0.00	3.64
2122	4.54	16	0	16	3.53	3.53
2241	1.47	4	0	4	2.72	2.72
3121	1.16	3	0	3	2.58	2.58
4241	8.92	23	0	23	2.58	2.58
4321	3.94	9	0	9	2.29	2.29
2212	9.20	20	0	20	2.17	2.17
2224	3.33	7	0	7	2.10	2.10
2121	0.48	1	0	1	2.10	2.10
3321	5.30	11	0	11	2.07	2.07
1114	11.11	23	0	23	2.07	2.07
2211	1.10	2	0	2	1.82	1.82
1222	1.76	1	2	3	0.57	1.70
3241	5.28	9	0	9	1.70	1.70
2124	1.84	0	3	3	0.00	1.63
4323	3.13	5	0	5	1.60	1.60
4341	7.93	12	0	12	1.51	1.51
1212	2.79	0	4	4	0.00	1.44
3332	4.47	6	0	6	1.34	1.34
3122	1.50	2	0	2	1.33	1.33
3343	3.81	5	0	5	1.31	1.31
3242	2.32	3	0	3	1.29	1.29
4221	4.48	5	0	5	1.12	1.12
2221	15.24	17	0	17	1.12	1.12
3221	5.42	6	0	6	1.11	1.11
3341	10.04	11	0	11	1.10	1.10
2214	18.58	20	0	20	1.08	1.08
3123	10.46	11	0	11	1.05	1.05
2222	70.48	70	0	70	0.99	0.99
3312	9.19	6	2	8	0.65	0.87
3222	32.83	28	0	28	0.85	0.85
3322	46.94	37	3	40	0.79	0.85
3323	105.48	65	8	73	0.62	0.69
2341	9.03	6	0	6	0.66	0.66
3313	42.54	24	3	27	0.56	0.63
2123	37.51	19	4	23	0.51	0.61
2213	48.81	23	5	28	0.47	0.57
2114	7.11	0	4	4	0.00	0.56
2223	183.62	101	0	101	0.55	0.55
2342	13.57	2	5	7	0.15	0.52
2322	93.73	46	2	48	0.49	0.51
2345	4.04	2	0	2	0.50	0.50
4242	2.07	1	0	1	0.48	0.48
4322	61.20	29	0	29	0.47	0.47
3325	19.59	9	0	9	0.46	0.46
1214	14.92	6	0	6	0.40	0.40
2343	7.70	1	2	3	0.13	0.39
3342	29.32	4	7	11	0.14	0.38
3223	18.76	7	0	7	0.37	0.37
2315	5.58	2	0	2	0.36	0.36
1123	19.40	0	6	6	0.00	0.31
2321	7.73	2	0	2	0.26	0.26
2323	409.79	73	25	98	0.18	0.24
2313	104.57	23	2	25	0.22	0.24
2113	15.83	1	2	3	< 0.1	0.19
1213	98.08	9	8	17	< 0.1	0.17
1313	16.18	0	2	2	0.00	0.12
1223	97.76	3	5	8	< 0.1	< 0.1
1323	32.20	2	0	2	< 0.1	< 0.1
4342	29.90	1	0	1	< 0.1	< 0.1
2312	11.47	1	0	1	< 0.1	< 0.1
4332	10.80	1	0	1	< 0.1	< 0.1
1113	21.61	0	0	0	0.00	0.00
1143	1.91	0	0	0	0.00	0.00
Totals	**1941.78**	**1082**	**108**	**1190**	**232.63**	**272.04**

TABLE 4.1.1(B): SYSTEMATIC SAMPLING DENSITY IN THE UNE STUDY AREA - MAJOR TENURE CLASSES

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
3243	0.02	3	0	125.0	0.03	0	0	0.00	0.08	0	0	0.00	6.54	1	0	0.15
1122	0.03	1	0	30.30	0.06	0	0	0.00	0.00	0	0	n/a	0.00	0	0	n/a
2241	0.56	3	0	5.32	0.78	0	0	0.00	0.00	0	0	n/a	0.00	0	0	n/a
2213	4.66	9	4	2.79	15.3	9	0	0.59	0.00	0	0	n/a	0.08	0	0	0.00
3223	1.48	4	0	2.70	8.64	3	0	0.35	0.00	0	0	n/a	0.07	0	0	0.00
4241	8.77	23	0	2.62	0.14	0	0	0.00	0.04	0	0	0.00	7.81	0	0	0.00
1123	0.79	0	2	2.54	3.33	0	4	1.20	0.00	0	0	n/a	0.00	0	0	n/a
3121	0.88	2	0	2.28	0.22	1	0	4.61	0.10	0	0	0.00	2.77	1	0	0.36
2211	0.94	2	0	2.14	0.04	0	0	0.00	0.06	0	0	0.00	0.29	0	0	0.00
3321	1.99	4	0	2.01	3.06	5	0	1.63	0.00	0	0	n/a	0.00	0	0	n/a
3222	1.67	3	0	1.80	25.5	2	0	0.08	0.00	0	0	n/a	1.39	0	0	0.00
1313	1.14	0	2	1.76	0.78	0	0	0.00	0.00	0	0	0.00	0.07	0	0	0.00
3123	0.59	1	0	1.70	4.98	1	0	0.20	0.31	0	0	0.00	2.40	0	0	0.00
3221	1.26	2	0	1.59	3.81	1	0	0.26	0.03	0	0	0.00	4.87	0	0	0.00
2122	0.69	1	0	1.45	3.49	13	0	3.72	0.00	0	0	n/a	0.00	0	0	n/a
3241	2.82	4	0	1.42	2.39	1	0	0.42	0.00	0	0	n/a	0.00	0	0	0.00
2224	2.28	3	0	1.31	0.53	0	0	0.00	0.00	0	0	n/a	0.26	0	0	0.00
2322	13.4	17	0	1.26	45.7	25	2	0.59	0.00	0	0	n/a	0.25	0	0	0.00
2222	26.5	31	0	1.17	37.2	28	0	0.75	0.00	0	0	n/a	0.29	0	0	0.00
2221	13.2	12	0	0.90	1.62	5	0	3.09	0.00	0	0	n/a	0.58	0	0	0.00
1222	1.12	1	0	0.90	0.34	0	2	5.83	0.00	0	0	n/a	0.01	0	0	0.00
3322	5.11	4	0	0.78	29.4	18	3	0.71	1.48	0	0	0.00	2.75	0	0	0.00
2114	4.03	0	3	0.74	0.46	0	0	0.00	0.02	0	0	0.00	0.17	0	0	0.00
3323	13.4	9	0	0.67	41.9	24	6	0.71	0.00	0	0	0.00	0.12	0	0	0.00
4341	6.00	4	0	0.67	0.44	8	0	18.31	5.57	0	0	0.00	69.29	3	0	0.04
2323	35.6	13	9	0.62	121	26	15	0.34	0.04	0	0	0.00	1.52	0	0	0.00
4242	1.69	1	0	0.59	0.37	0	0	0.00	0.01	0	0	0.00	1.41	0	1	0.71
1213	32.5	9	7	0.49	4.82	0	0	0.00	0.00	0	0	n/a	0.02	0	0	0.00
2223	58.9	28	0	0.48	64.1	49	0	0.76	0.01	0	0	0.00	0.11	0	0	0.00
2123	7.31	3	0	0.41	14.7	12	4	1.13	0.00	0	0	n/a	0.19	0	0	0.00
3342	5.97	1	1	0.33	4.77	2	6	1.68	0.11	0	0	0.00	6.43	0	1	0.16
3313	4.18	1	0	0.24	18.1	16	3	1.05	0.00	0	0	n/a	0.00	0	0	n/a
2214	10.3	2	0	0.19	3.88	1	0	0.26	0.26	0	0	0.00	0.26	0	0	0.00
3341	5.82	1	0	0.17	3.60	0	0	0.00	0.58	0	0	0.00	13.68	0	0	0.00
3315	22.0	2	0	0.09	1.07	1	0	0.93	0.00	0	0	n/a	1.50	0	0	0.00
1223	12.1	1	0	0.08	5.49	1	4	0.91	0.00	0	0	n/a	0.05	0	0	0.00
2313	15.7	1	0	0.06	13.75	0	2	0.15	0.00	0	0	n/a	0.13	1	0	7.94
3143	0.06	0	0	0.00	0.00	0	0	n/a	0.25	1	0	4.05	4.14	1	0	0.24
4114	0.06	0	0	0.00	0.00	0	0	n/a	0.89	1	0	1.13	15.14	1	0	0.07
4243	0.04	0	0	0.00	0.00	0	0	n/a	0.28	0	0	0.00	8.32	8	0	0.96
4345	0.45	0	0	0.00	0.00	0	0	n/a	6.94	0	0	0.00	244.93	1	1	0.01
3212	0.02	0	0	0.00	0.07	1	0	15.38	0.00	0	0	n/a	0.62	0	0	0.00
1114	0.16	0	0	0.00	2.17	14	0	6.46	0.00	0	0	n/a	0.00	0	0	n/a
2124	0.06	0	0	0.00	0.36	0	2	5.52	0.00	0	0	n/a	0.25	0	0	0.00

Table 4.1.1(b) cont.

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
1214	2.86	0	0	0.00	0.39	2	0	5.18	0.00	0	0	n/a	0.01	0	0	0.00
4321	1.50	0	0	0.00	1.17	5	0	4.28	0.15	0	0	0.00	8.44	0	0	0.00
2121	0.22	0	0	0.00	0.25	1	0	3.94	0.04	0	1	27.03	0.14	0	0	0.00
1212	0.00	0	0	0.00	1.09	0	4	3.67	0.01	0	0	0.00	0.00	0	0	0.00
3122	0.36	0	0	0.00	0.89	2	0	2.26	0.05	0	0	0.00	2.94	0	0	0.00
2342	3.06	0	0	0.00	3.12	2	5	2.25	0.00	0	0	n/a	0.00	0	0	n/a
2212	0.47	0	0	0.00	5.87	13	0	2.22	0.00	0	0	n/a	0.00	0	0	n/a
3242	0.48	0	0	0.00	1.50	3	0	2.00	0.00	0	0	n/a	0.07	0	0	0.00
3343	0.30	0	0	0.00	0.52	1	0	1.92	0.02	0	0	0.00	0.57	0	0	0.00
2341	4.97	0	0	0.00	3.65	6	0	1.64	0.01	0	0	0.00	0.12	0	0	0.00
3312	0.74	0	0	0.00	4.01	3	2	1.25	0.00	0	0	n/a	1.74	0	0	0.00
2113	0.02	0	0	0.00	2.50	1	2	1.20	0.00	0	0	n/a	0.02	0	0	0.00
4322	2.37	0	0	0.00	21.16	24	0	1.13	0.00	0	0	n/a	0.24	0	0	0.00
2343	0.06	0	0	0.00	1.06	0	1	0.94	0.02	0	0	0.00	2.18	0	0	0.00
4323	0.26	0	0	0.00	1.12	1	0	0.89	5.50	0	0	0.00	54.94	0	1	0.02
4342	5.10	0	0	0.00	2.56	1	0	0.39	0.04	0	0	0.00	0.38	0	0	0.00
2321	2.19	0	0	0.00	4.16	1	0	0.24	0.01	0	0	0.00	0.03	0	0	0.00
4325	0.24	0	0	0.00	0.09	0	0	0.00	3.86	3	0	0.78	56.36	8	0	0.14
2312	0.63	0	0	0.00	2.98	0	0	0.00	0.00	0	0	0.00	0.02	0	1	66.6
4332	0.04	0	0	0.00	8.14	0	0	0.00	0.37	0	0	0.00	9.50	2	0	0.21
3345	2.87	0	0	0.00	0.09	0	0	0.00	0.69	0	0	0.00	14.45	0	0	0.00
4223	0.01	0	0	0.00	0.02	0	0	0.00	0.19	0	0	0.00	22.04	0	0	0.00
4222	0.23	0	0	0.00	3.36	0	0	0.00	2.15	0	0	0.00	18.19	0	0	0.00
4312	0.10	0	0	0.00	0.00	0	0	0.00	0.58	0	0	0.00	33.89	1	0	0.03
4315	4.55	0	0	0.00	0.01	0	0	0.00	0.47	0	0	0.00	37.19	0	0	0.00
4335	0.07	0	0	0.00	0.03	0	0	0.00	4.63	0	0	0.00	74.05	1	0	0.01
4143	0.00	0	0	n/a	0.00	0	0	n/a	1.95	0	0	0.00	9.14	2	0	0.22
4122	0.00	0	0	n/a	0.00	0	0	n/a	0.09	0	0	0.00	13.23	0	0	0.00
4141	0.00	0	0	n/a	0.00	0	0	n/a	0.12	0	0	0.00	18.47	0	0	0.00
2345	0.00	0	0	n/a	0.35	0	0	0.00	0.17	0	1	6.06	2.39	0	0	0.00
3332	0.00	0	0	n/a	3.89	0	0	0.00	0.09	0	0	0.00	7.30	0	0	0.00
3333	0.00	0	0	n/a	0.11	0	0	0.00	0.06	0	0	0.00	12.33	3	0	0.24
4233	0.00	0	0	n/a	0.00	0	0	0.00	0.53	0	0	0.00	19.85	0	0	0.00
4231	0.00	0	0	n/a	0.34	0	0	0.00	0.59	0	0	0.00	24.89	2	0	0.08
4232	0.00	0	0	n/a	0.88	0	0	0.00	1.48	0	0	0.00	27.42	1	1	0.07
4333	0.00	0	0	n/a	0.10	0	0	0.00	0.59	0	0	0.00	49.43	2	2	0.08
Totals	241804	360.59	206	28	199.57	563.57	333	67	113.02	41052	5	2	39.05	92006	39	8

FIGURE 4.1.1 UNE SYSTEMATIC SURVEY SITES

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FIGURE 4.1.2 UNE TARGETED SURVEY SITES

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4.2 LNE

4.2.1 Systematic surveys

Two systematic survey seasons were conducted in the LNE study area: December 1996 - March 1997 (14 systematic surveys) and November 1997 - February 1998 (9 systematic surveys). A total of 279 sites were surveyed. Figure 4.2.1 shows the location of these sites. Because of the availability of stratification variables, the southern part of the LNE study area (NSW NPWS Hunter District) was stratified separately. Results for the northern section are shown in parts a and c, results for Hunter District are in parts b and d.

4.2.2 Targeted surveys

Two targeted surveys were conducted in the LNE study area, one in January 1997 and one in March 1997. Figure 4.2.2 shows the location of these survey sites.

TABLE 4.2.1(A): SYSTEMATIC SAMPLING DENSITY IN THE LNE STUDY AREA (NORTHERN SECTION) - ENVIRONMENTAL STRATA

Note: strata are coded according to values of the four stratification variables, in the following order; mean annual rainfall, mean annual temperature, soil fertility and broad vegetation type. Variable codes are shown below.

Key to strata listed in Table 4.2.1(a) and (c) - northern section

Mean annual rainfall	Mean annual temperature	Soil fertility	Broad vegetation type (from Landsat TM)
1: < 901 mm	1: < 13 °C	1: Very low	1: Rainforest
2: 901 - 1200 mm	2: 13 - 16 °C	2: Low	2: Moist open forest
3: 1201 - 1500 mm	3: > 16 °C	3: Moderate	3: Dry open forest incl.
4: > 1500 mm		4: High / Very high	4: Coastal complex
			5: Plateau / rocky

Thus code 1111 represents land with mean annual rainfall of < 901 mm, mean annual temperature of < 13°C, very low soil fertility and supporting rainforest vegetation.

Ninety-two strata, each less than 10 000 ha in areal extent and containing no systematic survey sites, have been omitted from tables a and c. These strata account for 129 930 ha in total.

Stratum	Area ('1000s of ha)	No. pre-CRA sites	No. CRA sites	Total no. sites	Sites / 1000 ha pre-CRA	Sites / 1000 ha post-CRA
4312	0.10	0	2	2	0.00	19.80
4241	0.91	5	0	5	5.49	5.49
3331	0.49	2	0	2	4.12	4.12
3121	8.19	31	1	32	3.78	3.91
2131	0.26	1	0	1	3.85	3.85
4124	0.94	3	0	3	3.21	3.21
3133	0.32	1	0	1	3.15	3.15
4325	1.01	0	3	3	0.00	2.96
1321	0.79	2	0	2	2.55	2.55
4321	1.76	4	0	4	2.28	2.28
2141	4.88	10	1	11	2.05	2.25
4315	3.26	0	7	7	0.00	2.15
4142	1.01	2	0	2	1.98	1.98
4121	6.22	11	0	11	1.77	1.77
4331	1.19	2	0	2	1.68	1.68
4335	2.10	0	3	3	0.00	1.43
2133	0.79	1	0	1	1.27	1.27
3321	2.46	3	0	3	1.22	1.22
3332	7.38	9	0	9	1.22	1.22
4122	10.02	12	0	12	1.20	1.20
3124	3.80	4	0	4	1.05	1.05
3143	19.68	18	1	19	0.91	0.97
4221	15.08	14	0	14	0.93	0.93
2113	4.84	1	3	4	0.21	0.83
3342	3.77	0	3	3	0.00	0.80
4323	5.18	0	4	4	0.00	0.77
2142	26.81	17	3	20	0.63	0.75
3122	38.32	26	1	27	0.68	0.70
4242	2.97	2	0	2	0.67	0.67
3142	9.05	5	1	6	0.55	0.66
2321	9.16	3	3	6	0.33	0.66
4342	1.53	1	0	1	0.65	0.65
2332	1.64	1	0	1	0.61	0.61
2122	57.50	28	7	35	0.49	0.61
3231	3.31	2	0	2	0.60	0.60
3123	26.34	8	7	15	0.30	0.57
3221	14.86	8	0	8	0.54	0.54
2123	91.83	28	19	47	0.30	0.51
4222	43.94	15	7	22	0.34	0.50
4332	2.02	0	1	1	0.00	0.49
2221	16.91	4	4	8	0.24	0.47
2121	6.47	1	2	3	0.15	0.46
4223	4.49	2	0	2	0.45	0.45
2143	49.05	15	4	19	0.31	0.39
3232	11.22	4	0	4	0.36	0.36
3345	8.50	0	3	3	0.00	0.35
3325	11.43	0	4	4	0.00	0.35
3315	45.00	0	15	15	0.00	0.33
3222	137.08	42	3	45	0.31	0.33
1222	10.86	3	0	3	0.28	0.28
3322	381.60	54	49	103	0.14	0.27
4322	73.39	5	14	19	0.07	0.26
1113	12.13	0	3	3	0.00	0.25
2222	97.60	16	7	23	0.16	0.24
1122	8.79	2	0	2	0.23	0.23
3141	5.07	1	0	1	0.20	0.20
3323	159.82	17	13	30	0.11	0.19
1123	84.58	1	13	14	0.01	0.17
2223	115.60	9	10	19	0.08	0.16
3223	37.51	4	2	6	0.11	0.16

Table 4.2.1(a) cont.

Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total no. sites	Sites / 1000 ha pre-CRA	Sites / 1000 ha post-CRA
2323	194.69	21	4	25	0.11	0.13
1233	14.82	1	0	1	0.07	< 0.1
3335	16.41	0	1	1	0.00	< 0.1
1223	262.99	12	0	12	0.05	< 0.1
1323	211.09	9	0	9	0.04	< 0.1
1213	83.97	0	0	0	0.00	0.00
2213	66.52	0	0	0	0.00	0.00
1313	48.96	0	0	0	0.00	0.00
2333	28.80	0	0	0	0.00	0.00
2313	27.60	0	0	0	0.00	0.00
1224	24.49	0	0	0	0.00	0.00
1324	18.62	0	0	0	0.00	0.00
2315	16.87	0	0	0	0.00	0.00
1243	11.80	0	0	0	0.00	0.00
1333	11.69	0	0	0	0.00	0.00
Totals	**2752.13**	**503**	**228**	**731**	**54.09**	**87.39**

TABLE 4.2.1(B): SYSTEMATIC SAMPLING DENSITY IN THE LNE STUDY AREA (NSW NPWS HUNTER DISTRICT) - ENVIRONMENTAL STRATA

Key to strata listed in Tables 4.2.1(b) and (d) - NSW NPWS Hunter District

Mean annual rainfall	Mean annual temperature	Soil fertility	Broad forest type
1: < 800 mm	1: < 13 °C	1: Very low	1: Woodland
2: 800 - 1100 mm	2: 13 - 16.6 °C	2: Low	2: Dry open forest
3: > 1100 mm	3: > 16.6 °C	3: Moderate	3: Moist open forest incl.
		4: High	4: Rainforest
		5: Very high	

Thus code 1111 represents land with mean annual rainfall < 800 m, mean annual temperature < 13 °C, very low soil fertility and supporting woodland vegetation.

Sixty-four strata, each less than 2000 ha in areal extent and containing no systematic survey sites, have been omitted from tables b and d. These strata account for 23 180 ha in total.

Stratum	Area ('000s of ha)	No. pre-CRA sites	No. CRA sites	Total no. sites	Sites / 1000 ha pre-CRA	Sites / 1000 ha post-CRA
3131	0.15	1	0	1	6.80	7.14
2214	0.36	0	2	2	5.60	6.80
3231	1.21	0	4	4	3.32	5.60
3312	1.93	2	2	4	2.07	3.32
2254	2.18	4	0	4	1.83	2.07
2123	2.77	0	5	5	1.81	1.83
3244	3.41	6	0	6	1.76	1.81
3251	0.63	1	0	1	1.58	1.76
3151	11.30	16	0	16	1.42	1.58
3253	10.10	13	0	13	1.29	1.42
3154	4.79	6	0	6	1.25	1.29
3311	4.88	1	5	6	1.23	1.25
3223	6.62	7	1	8	1.21	1.23
2311	4.50	0	5	5	1.11	1.21
3232	1.12	1	0	1	0.89	1.11
3153	7.93	7	0	7	0.88	0.89
2121	7.15	0	6	6	0.84	0.88
3211	12.05	7	3	10	0.83	0.84
3341	2.63	2	0	2	0.76	0.83
3222	22.87	14	3	17	0.74	0.76
3332	13.29	4	5	9	0.68	0.74
3254	1.66	1	0	1	0.60	0.68
3212	9.95	4	2	6	0.60	0.60
2153	8.48	4	1	5	0.59	0.60
3333	7.25	4	0	4	0.55	0.59
3221	5.52	0	3	3	0.54	0.55
2151	3.79	2	0	2	0.53	0.54
3322	22.63	6	5	11	0.49	0.53
2132	8.24	4	0	4	0.49	0.49
1212	10.71	0	5	5	0.47	0.49
3321	19.71	0	9	9	0.46	0.47
1322	15.63	3	4	7	0.45	0.46
2154	2.31	1	0	1	0.43	0.45
2342	7.06	0	3	3	0.42	0.43
2233	7.21	3	0	3	0.42	0.42
3233	5.12	2	0	2	0.39	0.42
2322	31.18	2	10	12	0.38	0.39
2253	10.48	4	0	4	0.38	0.38
2122	20.53	0	7	7	0.34	0.38
2231	12.79	4	0	4	0.31	0.34
2312	3.22	0	1	1	0.31	0.31
3323	3.53	0	1	1	0.28	0.31
1222	129.88	20	11	31	0.24	0.28
2133	4.41	1	0	1	0.23	0.24
2211	97.84	4	18	22	0.22	0.23
2222	64.73	6	8	14	0.22	0.22
2332	4.85	1	0	1	0.21	0.22
2212	80.17	0	16	16	0.20	0.21
3243	10.42	2	0	2	0.19	0.20
1221	99.06	3	16	19	0.19	0.19
2331	16.49	0	3	3	0.18	0.19
2232	21.35	2	1	3	0.14	0.18
1211	22.37	0	3	3	0.13	0.14
2221	41.75	0	5	5	0.12	0.13
2321	43.05	5	0	5	0.12	0.12
1321	51.41	0	1	1	<0.1	0.12
Remnant	1934.94	6	17	23	<0.1	0.02
1231	33.42	0	0	0	0.00	0.00
2152	18.56	0	0	0	0.00	0.00
3331	6.64	0	0	0	0.00	0.00
1251	6.53	0	0	0	0.00	0.00
1252	6.14	0	0	0	0.00	0.00
2252	6.11	0	0	0	0.00	0.00
3152	5.52	0	0	0	0.00	0.00
1331	5.33	0	0	0	0.00	0.00
1242	4.78	0	0	0	0.00	0.00
2323	3.84	0	0	0	0.00	0.00
2242	3.59	0	0	0	0.00	0.00
2341	3.51	0	0	0	0.00	0.00
1342	3.28	0	0	0	0.00	0.00
2223	3.06	0	0	0	0.00	0.00
1241	2.75	0	0	0	0.00	0.00
1341	2.73	0	0	0	0.00	0.00

Table 4.2.1(b) cont.

Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total no. sites	Sites / 1000 ha pre-CRA	Sites / 1000 ha post-CRA
1223	2.71	0	0	0	0.00	0.00
2251	2.54	0	0	0	0.00	0.00
3343	2.47	0	0	0	0.00	0.00
3342	2.23	0	0	0	0.00	0.00
TOTAL	**890.39**	**175**	**168**	**343**	**0.39**	**0.01**

TABLE 4.2.1(C): SYSTEMATIC SAMPLING DENSITY IN THE LNE STUDY AREA (NORTHERN SECTION) - MAJOR TENURE CLASSES

	NSW NPWS				**SFNSW**				**Vacant Crown Land**				**Private (leasehold and freehold)**			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
4312	0.04	0	1	28.57	0.01	0	0	0.00	0.01	0	0	0.00	0.04	0	1	24.39
3331	0.38	5	0	13.19	0.05	0	0	0.00	0.01	0	0	0.00	0.05	0	0	0.00
4241	0.45	5	0	11.04	0.18	0	0	0.00	0.00	0	0	0.00	0.28	0	0	0.00
2325	0.46	0	5	10.82	0.75	1	0	1.33	0.67	0	0	0.00	7.11	0	0	0.00
4325	0.28	0	3	10.60	0.08	0	0	0.00	0.00	0	0	n/a	0.50	0	0	0.00
2232	0.18	0	1	5.62	0.17	0	0	0.00	0.00	0	0	0.00	1.32	0	0	0.00
2211	0.19	0	1	5.35	0.00	0	0	n/a	0.00	0	0	n/a	0.00	0	0	n/a
4331	0.37	2	0	5.35	0.64	0	0	0.00	0.00	0	0	n/a	0.18	2	0	11.36
2242	0.21	1	0	4.83	0.46	0	0	0.00	0.00	0	0	0.00	0.41	0	0	0.00
4332	0.22	0	1	4.50	1.14	0	0	0.00	0.01	0	0	0.00	0.65	0	0	0.00
4124	0.69	3	0	4.34	0.00	0	0	0.00	0.24	0	0	0.00	0.00	0	0	n/a
4142	0.52	2	0	3.84	0.01	0	0	0.00	0.01	0	0	0.00	0.47	0	0	0.00
1321	0.54	2	0	3.71	0.02	0	0	0.00	0.01	0	0	0.00	0.22	0	0	0.00
3121	3.88	13	1	3.61	3.95	18	0	4.55	0.11	0	0	0.00	0.25	0	0	0.00
4342	0.33	1	0	3.08	0.44	0	0	0.00	0.01	0	0	0.00	0.76	0	0	0.00
4315	2.04	0	6	2.95	0.01	0	0	0.00	0.15	0	0	0.00	0.65	0	1	1.53
4321	1.17	3	0	2.57	0.43	1	0	2.33	0.00	0	0	0.00	0.16	0	0	0.00
4121	3.94	8	0	2.03	2.14	3	0	1.40	0.00	0	0	0.00	0.14	0	0	0.00
4335	1.50	0	3	2.00	0.04	0	0	0.00	0.00	0	0	0.00	0.51	0	0	0.00
3123	5.69	4	5	1.58	9.03	4	2	0.66	0.17	0	0	0.00	11.32	1	0	0.09
3313	1.40	1	1	1.43	0.02	0	0	0.00	0.14	0	0	0.00	2.01	1	0	0.50
2123	17.0	16	8	1.42	28.1	23	9	1.14	1.20	0	0	0.00	45.61	2	2	0.09
4122	7.05	9	0	1.28	2.66	3	0	1.13	0.16	0	0	0.00	0.15	0	0	0.00

Table 4.2.1(c) cont.

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
2221	8.22	8	2	1.22	3.34	0	2	0.60	0.19	0	0	0.00	5.16	0	0	0.00
3122	10.0	12	0	1.20	23.1	14	1	0.65	1.15	0	0	0.00	4.06	0	0	0.00
2141	4.36	5	0	1.15	0.52	11	1	23.17	0.00	0	0	n/a	0.01	0	0	0.00
2121	3.60	2	2	1.11	2.19	0	0	0.00	0.06	0	0	0.00	0.62	0	0	0.00
3143	9.15	10	0	1.09	4.75	17	1	3.79	0.08	0	0	0.00	5.70	0	0	0.00
2212	2.85	0	3	1.05	0.80	0	0	0.00	0.01	0	0	0.00	0.15	0	0	0.00
2321	1.91	1	1	1.05	1.08	0	2	1.86	0.31	2	0	6.54	5.87	0	1	0.17
2214	1.02	0	1	0.98	0.00	0	0	n/a	0.00	0	0	n/a	0.02	0	0	0.00
2313	16.7	0	14	0.84	2.15	2	0	0.93	3.99	0	1	0.25	3.58	0	0	0.00
3323	4.00	0	3	0.75	45.2	13	13	0.57	7.22	8	0	1.11	103.28	0	1	0.01
2122	8.08	5	1	0.74	36.6	28	7	0.96	0.26	0	0	0.00	12.60	1	2	0.24
3325	2.76	0	2	0.73	0.92	0	3	3.27	0.29	0	0	0.00	7.46	0	0	0.00
2314	1.39	0	1	0.72	0.01	0	0	0.00	0.03	0	0	0.00	0.09	0	0	0.00
4322	4.22	0	3	0.71	43.7	4	11	0.34	0.18	0	0	0.00	25.22	1	0	0.04
3315	28.3	0	20	0.71	0.00	0	0	0.00	3.78	0	0	0.00	12.09	0	0	0.00
3231	2.84	2	0	0.71	0.44	1	0	2.26	0.01	1	0	111.1	0.02	0	0	0.00
4221	7.33	5	0	0.68	5.09	9	0	1.77	0.01	0	0	0.00	2.65	0	0	0.00
2142	3.16	2	0	0.63	13.6	20	3	1.69	0.16	0	0	0.00	9.88	0	1	0.10
1122	1.58	0	1	0.63	4.98	2	0	0.40	0.11	0	0	0.00	2.12	0	0	0.00
2222	14.6	6	2	0.55	42.0	22	4	0.62	1.84	1	0	0.54	39.14	1	2	0.08
4222	9.67	3	2	0.52	25.6	9	5	0.55	0.56	3	0	5.36	8.14	0	0	0.00
3345	6.06	0	3	0.50	0.09	0	0	0.00	0.34	0	0	0.00	2.01	0	0	0.00
1322	2.03	0	1	0.49	0.22	0	0	0.00	0.10	0	0	0.00	0.85	0	0	0.00
2143	2.22	1	0	0.45	15.1	14	4	1.19	0.29	0	0	0.00	31.45	1	0	0.03
2322	9.45	2	2	0.42	14.2	8	1	0.63	2.19	0	0	0.00	45.67	0	1	0.02
3232	5.32	2	0	0.38	3.54	6	0	1.69	0.20	1	0	5.03	2.16	0	0	0.00
3335	2.74	0	1	0.37	0.34	0	0	0.00	1.16	0	0	0.00	12.15	0	0	0.00
2223	35.0	4	8	0.34	19.8	14	5	0.96	2.07	0	0	0.00	58.59	4	0	0.07
2213	49.0	0	15	0.31	5.36	12	0	2.24	3.88	0	2	0.52	6.48	0	0	0.00
1213	62.3	0	18	0.29	1.47	0	0	0.00	6.27	0	0	0.00	13.88	0	1	0.07
1123	33.5	0	9	0.27	6.98	0	6	0.86	1.41	0	0	0.00	42.62	1	2	0.07
3141	4.54	1	0	0.22	0.40	0	0	0.00	0.00	0	0	n/a	0.13	0	0	0.00
2323	24.3	0	5	0.21	37.2	32	12	1.18	10.38	0	4	0.39	119.92	14	5	0.16
3322	20.6	0	4	0.19	184	52	44	0.52	2.82	2	0	0.71	173.88	1	2	0.02
1223	145	0	21	0.14	29.9	24	1	0.84	9.08	0	0	0.00	78.63	11	0	0.14
1224	24.2	0	3	0.12	0.00	0	0	n/a	0.01	0	0	0.00	0.32	0	0	0.00
3223	8.33	0	1	0.12	14.0	4	1	0.36	1.89	1	0	0.53	13.29	2	1	0.23
1313	37.9	0	3	0.08	1.51	0	0	0.00	1.84	0	0	0.00	7.65	0	0	0.00
1323	92.8	5	1	0.06	16.0	8	0	0.50	17.46	2	0	0.11	83.69	2	1	0.04
2315	0.42	0	0	0.00	0.00	0	0	n/a	7.07	0	0	0.00	7.48	1	0	0.13
1214	0.44	0	0	0.00	0.00	0	0	n/a	0.02	0	0	0.00	4.30	0	0	0.00

Table 4.2.1(c) cont.

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
1124	3.79	0	0	0.00	0.00	0	0	n/a	0.00	0	0	0.00	0.15	0	0	0.00
1334	1.55	0	0	0.00	0.00	0	0	n/a	0.23	0	0	0.00	1.36	0	0	0.00
3332	2.03	0	0	0.00	1.36	13	0	9.54	0.17	1	0	5.99	3.81	1	0	0.26
3342	0.39	0	0	0.00	0.32	0	3	9.35	0.15	0	0	0.00	2.90	0	0	0.00
2332	0.01	0	0	0.00	0.73	6	0	8.25	0.04	0	0	0.00	0.86	1	0	1.16
2233	1.85	0	0	0.00	0.93	3	3	6.43	0.01	0	0	0.00	1.99	0	0	0.00
2131	0.09	0	0	0.00	0.17	1	0	5.88	0.00	0	0	n/a	0.00	0	0	n/a
3321	0.64	0	0	0.00	0.68	3	0	4.39	0.48	0	0	0.00	0.66	0	0	0.00
3133	0.00	0	0	0.00	0.31	1	0	3.19	0.00	0	0	n/a	0.00	0	0	n/a
2113	0.06	0	0	0.00	1.55	1	3	2.58	0.22	0	0	0.00	3.01	0	0	0.00
3142	3.32	0	0	0.00	3.06	6	1	2.29	0.05	0	0	0.00	2.62	0	0	0.00
2333	0.14	0	0	0.00	7.44	10	5	2.02	0.88	0	0	0.00	20.10	1	0	0.05
4242	0.18	0	0	0.00	1.05	2	0	1.90	0.00	0	0	0.00	1.73	0	0	0.00
4323	0.29	0	0	0.00	2.57	0	4	1.56	0.02	0	0	0.00	2.28	0	0	0.00
3221	7.62	0	0	0.00	6.13	8	0	1.31	0.23	0	0	0.00	0.89	0	0	0.00
3333	0.46	0	0	0.00	1.26	0	1	0.79	0.09	0	0	0.00	2.84	0	0	0.00
1222	2.41	0	0	0.00	4.15	3	0	0.72	0.10	0	0	0.00	4.21	0	0	0.00
3222	34.3	0	0	0.00	75.6	41	2	0.57	3.12	3	0	0.96	24.00	3	1	0.17
4223	0.36	0	0	0.00	1.29	0	0	0.00	0.53	2	0	3.76	2.31	0	0	0.00
3124	1.71	0	0	0.00	0.52	0	0	0.00	1.36	4	0	2.94	0.18	0	0	0.00
1324	13.1	0	0	0.00	0.01	0	0	0.00	1.15	0	0	0.00	4.39	0	0	0.00
1233	8.03	0	0	0.00	0.88	0	0	0.00	0.19	0	0	0.00	5.72	1	0	0.17
1113	0.68	0	0	0.00	0.07	0	0	0.00	0.78	0	0	0.00	10.58	0	3	0.28
1243	0.93	0	0	0.00	0.04	0	0	0.00	0.22	0	0	0.00	10.60	0	0	0.00
1333	3.51	0	0	0.00	0.87	0	0	0.00	0.46	0	0	0.00	6.85	0	0	0.00
2335	2.00	0	0	0.00	0.05	0	0	0.00	0.37	0	0	0.00	6.14	0	0	0.00
2114	2.79	0	0	0.00	1.93	0	0	0.00	0.43	0	0	0.00	2.38	0	0	0.00
1343	0.93	0	0	0.00	0.03	0	0	0.00	0.33	0	0	0.00	5.73	0	0	0.00
1143	0.63	0	0	0.00	0.09	0	0	0.00	0.08	0	0	0.00	5.23	0	0	0.00
1114	0.60	0	0	0.00	1.33	0	0	0.00	0.05	0	0	0.00	1.70	0	0	0.00
4123	3.12	0	0	0.00	0.12	0	0	0.00	0.02	0	0	0.00	0.29	0	0	0.00
1221	0.59	0	0	0.00	0.84	0	0	0.00	0.32	0	0	0.00	1.14	0	0	0.00
2345	0.17	0	0	0.00	0.22	0	0	0.00	0.13	0	0	0.00	2.33	0	0	0.00
2343	0.06	0	0	0.00	0.09	0	0	0.00	0.01	0	0	0.00	2.10	0	0	0.00
3242	0.81	0	0	0.00	0.03	0	0	0.00	0.00	0	0	0.00	1.33	0	0	0.00
2133	0.00	0	0	n/a	0.58	1	0	1.72	0.00	0	0	n/a	0.20	0	0	0.00
3212	0.00	0	0	n/a	0.66	1	0	1.52	0.00	0	0	n/a	0.00	0	0	0.00
3213	0.00	0	0	n/a	4.80	2	0	0.42	0.22	0	0	0.00	1.59	0	0	0.00
Totals	**859.57**	**151**	**189**	**156.44**	**778.27**	**481**	**160**	**131.37**	**104.06**	**31**	**7**	**145.84**	**1170**	**53**	**28**	**41.67**

TABLE 4.2.1(D): SYSTEMATIC SAMPLING DENSITY IN THE LNE STUDY AREA (NSW NPWS HUNTER DISTRICT) - MAJOR TENURE CLASSES

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)				Other			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
2132	0.14	4	0	29.20	1.97	0	0	0.00	0.04	0	0	0.00	6.10	0	0	0.00	0.00	0	0	n/a
3322	0.40	0	4	10.00	8.66	5	1	0.69	0.23	0	0	0.00	13.1	0	0	0.00	0.14	0	0	0.00
2233	0.26	2	0	7.66	0.79	0	0	0.00	0.00	0	0	0.00	6.17	0	0	0.00	0.00	1	0	n/a
3312	0.40	1	2	7.54	0.01	0	0	0.00	0.83	0	0	0.00	0.69	0	0	0.00	0.00	2	0	n/a
2214	0.35	0	2	5.70	0.01	0	0	0.00	0.00	0	0	0.00	0.00	0	0	0.00	0.00	0	0	n/a
3321	1.69	0	9	5.33	0.28	0	0	0.00	0.06	0	0	0.00	15.9	0	0	0.00	1.63	0	0	0.00
2254	1.19	4	0	3.38	0.96	0	0	0.00	0.00	0	0	0.00	0.03	0	0	0.00	0.00	0	0	n/a
3253	0.41	1	0	2.43	7.14	12	0	1.68	0.00	0	0	0.00	2.55	0	0	0.00	0.00	0	0	n/a
2311	2.51	0	5	1.99	0.18	0	0	0.00	0.78	0	0	0.00	0.99	0	0	0.00	0.02	0	0	0.00
3311	2.59	0	5	1.93	0.00	0	0	n/a	0.14	0	0	0.00	1.80	0	0	0.00	0.33	1	0	3.03
2253	2.56	4	0	1.56	5.22	0	0	0.00	0.00	0	0	0.00	2.63	0	0	0.00	0.07	0	0	0.00
3211	1.94	0	3	1.55	2.83	11	0	3.89	0.32	0	0	0.00	5.61	0	0	0.00	0.04	0	0	0.00
2153	1.33	2	0	1.50	2.47	2	1	1.21	0.00	0	0	0.00	4.59	0	0	0.00	0.11	0	0	0.00
3244	3.38	5	0	1.48	0.01	0	0	0.00	0.00	0	0	0.00	0.03	0	0	0.00	0.00	0	0	n/a
2123	1.67	0	2	1.20	1.00	0	3	3.01	0.00	0	0	0.00	0.11	0	0	0.00	0.00	0	0	n/a
2121	6.05	0	6	0.99	0.75	0	0	0.00	0.00	0	0	0.00	0.40	0	0	0.00	0.00	0	0	n/a
1212	5.29	0	5	0.94	0.61	0	0	0.00	0.25	0	0	0.00	4.58	0	0	0.00	0.00	0	0	n/a
1322	5.01	0	4	0.80	1.00	2	0	2.01	0.11	0	0	0.00	9.33	0	0	0.00	0.16	1	0	<0.01
3153	1.68	1	0	0.60	3.57	6	0	1.68	0.00	0	0	0.00	2.69	0	0	0.00	0.00	0	0	n/a

Table 4.2.1(d) cont.

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)				Other			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
3154	3.81	2	0	0.53	0.97	4	0	4.12	0.00	0	0	0.00	0.00	0	0	n/a	0.01	0	0	0.00
2154	1.95	1	0	0.51	0.25	0	0	0.00	0.00	0	0	0.00	0.10	0	0	0.00	0.00	0	0	n/a
2312	2.11	0	1	0.47	0.38	0	0	0.00	0.15	0	0	0.00	0.56	0	0	0.00	0.01	0	0	0.00
1211	6.95	0	3	0.43	0.64	0	0	0.00	0.53	0	0	0.00	14.2	0	0	0.00	0.00	0	0	n/a
2122	18.3	0	7	0.38	0.54	0	0	0.00	0.00	0	0	0.00	1.71	0	0	0.00	0.00	0	0	n/a
2322	7.73	0	2	0.26	4.72	2	5	1.48	0.23	0	0	0.00	17.2	0	1	0.06	0.53	0	2	3.80
1221	65.1	0	16	0.25	7.17	5	0	0.70	2.79	0	0	0.00	23.8	0	0	0.00	0.22	0	0	0.00
2232	4.25	0	1	0.24	1.68	3	0	1.79	0.18	0	0	0.00	15.2	0	0	0.00	0.00	0	0	n/a
2211	79.4	0	18	0.23	2.32	5	0	2.16	2.95	0	0	0.00	11.9	0	0	0.00	0.07	0	0	0.00
2212	65.7	0	14	0.21	2.34	0	0	0.00	0.82	0	0	0.00	4.32	0	0	0.00	0.02	0	2	90.91
2221	19.9	0	4	0.20	3.08	0	0	0.00	0.79	0	0	0.00	17.3	0	0	0.00	0.04	0	1	24.39
3243	6.30	1	0	0.16	1.12	1	0	0.89	0.00	0	0	0.00	3.00	0	0	0.00	0.00	0	0	n/a
2222	39.7	0	6	0.15	9.93	11	0	1.11	0.69	0	0	0.00	12.5	0	0	0.00	0.03	0	2	58.82
1222	80.5	0	11	0.14	22.2	29	0	1.30	0.29	0	0	0.00	26.4	0	0	0.00	0.30	0	0	0.00
1321	8.68	0	1	0.12	0.71	0	0	0.00	4.55	0	0	0.00	33.3	0	0	0.00	4.10	0	0	0.00
3343	0.82	0	0	0.00	0.20	0	0	0.00	0.00	0	0	0.00	1.45	0	0	0.00	0.00	0	0	n/a
3342	0.21	0	0	0.00	0.26	0	0	0.00	0.10	0	0	0.00	1.65	0	0	0.00	0.00	0	0	n/a
3341	0.05	0	0	0.00	0.01	0	0	0.00	0.00	0	0	0.00	2.55	0	0	0.00	0.00	1	0	n/a
3333	0.20	0	0	0.00	1.56	6	0	3.84	0.00	0	0	0.00	5.49	0	0	0.00	0.00	0	0	n/a
3332	0.01	0	0	0.00	4.61	1	5	1.30	0.17	0	0	0.00	8.49	0	0	0.00	0.01	4	0	285.7

Table 4.2.1(d) cont.

	NSW NPWS	SFNSW	Vacant Crown Land	Private (leasehold and freehold)	Other

Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
3331	0.13	0	0	0.00	0.28	0	0	0.00	0.02	0	0	0.00	6.14	0	0	0.00	0.07	0	0	0.00
3323	0.18	0	0	0.00	0.37	0	1	2.69	0.02	0	0	0.00	2.90	0	0	0.00	0.04	0	0	0.00
3254	0.42	0	0	0.00	1.23	1	0	0.82	0.00	0	0	0.00	0.01	0	0	0.00	0.00	0	0	n/a
3233	0.54	0	0	0.00	2.57	3	0	1.17	0.00	0	0	0.00	2.01	0	0	0.00	0.00	0	0	n/a
3232	0.00	0	0	0.00	0.46	0	0	0.00	0.00	0	0	0.00	0.66	0	0	0.00	0.00	1	0	n/a
3222	0.01	0	0	0.00	17.3	19	3	1.27	0.09	0	0	0.00	5.07	0	0	0.00	0.02	0	0	0.00
3221	0.00	0	0	0.00	2.91	0	2	0.69	0.02	0	0	0.00	2.34	0	0	0.00	0.05	0	1	21.28
3212	0.25	0	0	0.00	6.84	5	0	0.73	0.24	0	0	0.00	1.50	0	0	0.00	0.01	0	2	333.3
3152	0.64	0	0	0.00	0.66	0	0	0.00	0.00	0	0	0.00	4.20	0	0	0.00	0.00	0	0	n/a
3151	0.91	0	0	0.00	8.35	15	0	1.80	0.00	0	0	0.00	1.93	0	0	0.00	0.11	0	0	0.00
2342	0.16	0	0	0.00	0.46	0	3	6.52	0.00	0	0	0.00	6.34	0	0	0.00	0.10	0	0	0.00
2341	0.07	0	0	0.00	0.02	0	0	0.00	0.01	0	0	0.00	3.38	0	0	0.00	0.04	0	0	0.00
2332	0.07	0	0	0.00	0.96	1	0	1.05	0.03	0	0	0.00	3.74	0	0	0.00	0.05	0	0	0.00
2331	0.04	0	0	0.00	2.37	0	3	1.26	0.20	0	0	0.00	13.6	0	0	0.00	0.18	0	0	0.00
2323	1.34	0	0	0.00	0.57	0	0	0.00	0.00	0	0	0.00	1.91	0	0	0.00	0.00	0	0	0.00
2321	4.54	0	0	0.00	5.58	6	0	1.08	4.36	0	0	0.00	6.10	0	0	0.00	2.21	1	0	0.45
2252	0.34	0	0	0.00	0.44	0	0	0.00	0.00	0	0	0.00	5.17	0	0	0.00	0.17	0	0	0.00
2251	0.10	0	0	0.00	0.09	0	0	0.00	0.00	0	0	0.00	2.36	0	0	0.00	0.00	0	0	n/a
2242	0.04	0	0	0.00	0.00	0	0	n/a	0.00	0	0	0.00	3.47	0	0	0.00	0.00	0	0	n/a

Table 4.2.1(d) cont.

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)				Other			
Stratum	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
2231	1.64	0	0	0.00	1.84	6	0	3.26	0.11	0	0	0.00	9.20	0	0	0.00	0.00	0	0	n/a
2223	1.33	0	0	0.00	0.34	0	0	0.00	0.00	0	0	0.00	1.39	0	0	0.00	0.00	0	0	0.00
2152	0.65	0	0	0.00	0.77	0	0	0.00	0.00	0	0	0.00	17.1	0	0	0.00	0.10	0	0	0.00
2151	0.38	0	0	0.00	0.63	2	0	3.18	0.00	0	0	0.00	2.84	0	0	0.00	0.01	0	0	0.00
2133	0.02	0	0	0.00	1.90	1	0	0.53	0.00	0	0	0.00	2.49	0	0	0.00	0.00	0	0	n/a
1342	0.12	0	0	0.00	0.02	0	0	0.00	0.00	0	0	0.00	2.77	0	0	0.00	0.00	0	0	n/a
1341	0.09	0	0	0.00	0.00	0	0	n/a	0.00	0	0	0.00	2.39	0	0	0.00	0.18	0	0	0.00
1331	1.07	0	0	0.00	0.06	0	0	0.00	0.00	0	0	0.00	4.00	0	0	0.00	0.16	0	0	0.00
1252	0.56	0	0	0.00	0.04	0	0	0.00	0.01	0	0	0.00	5.43	0	0	0.00	0.09	0	0	0.00
1251	0.21	0	0	0.00	0.01	0	0	0.00	0.00	0	0	0.00	6.33	0	0	0.00	0.01	0	0	0.00
1242	0.43	0	0	0.00	0.01	0	0	0.00	0.00	0	0	0.00	3.40	0	0	0.00	0.00	0	0	n/a
1241	0.38	0	0	0.00	0.01	0	0	0.00	0.00	0	0	0.00	2.29	0	0	0.00	0.00	0	0	n/a
1231	4.63	0	0	0.00	0.86	0	0	0.00	0.01	0	0	0.00	8.12	0	0	0.00	0.26	0	0	0.00
1223	2.17	0	0	0.00	0.20	0	0	0.00	0.02	0	0	0.00	0.32	0	0	0.00	0.00	0	0	0.00
Remnant	0.00	0	16	n/a	0.00	4	0	n/a	0.00	0	0	0.00	0.00	0	0	n/a	0.00	2	1	n/a
3251	0.00	0	0	n/a	0.08	1	0	12.99	0.00	0	0	0.00	0.56	0	0	0.00	0.00	0	0	n/a
3231	0.00	0	0	n/a	0.52	0	4	7.75	0.00	0	0	0.00	0.69	0	0	0.00	0.00	0	0	n/a
3223	0.00	0	0	n/a	3.56	10	1	3.09	0.02	0	0	0.00	2.95	0	0	0.00	0.00	0	0	n/a
3131	0.00	0	0	n/a	0.10	1	0	10.10	0.00	0	0	0.00	0.05	0	0	0.00	0.00	0	0	n/a
TOTAL	**473.98**	**28**	**147**	**90.06**	**164.61**	**180**	**32**	**92.84**	**22.16**	**0**	**0**	**0**	**423.57**	**0**	**1**	**0.06**	**11.7**	**14**	**11**	**821.72**

FIGURE 4.2.1 LNE SYSTEMATIC SURVEY SITES

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FIGURE 4.2.2 LNE TARGETED SURVEY SITES

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4.3 SYDNEY BASIN

4.3.1 Systematic surveys

Sixty-three systematic surveys were conducted during the period January 1997 - March 1998. A total of 188 sites were sampled. Figure 4.3.1 shows the location of these sites.

4.3.2 Targeted surveys

Targeted owl surveys were conducted during the period July - September 1997. A total of 117 sites were sampled. Figure 4.3.2 shows the location of these sites.

TABLE 4.3.1(A): SYSTEMATIC SAMPLING DENSITY IN SYDNEY BASIN - ENVIRONMENTAL STRATA

Note: strata are coded according to values of the four stratification variables, in the following order; mean annual rainfall, mean annual temperature, soil fertility and broad forest type. Variable codes are shown below.

There were no existing systematic survey sites in the Sydney Basin study area.

Key to strata listed in Table 4.3.1

Mean annual rainfall	Mean annual temperature	Soil fertility	Broad forest type
1: < 800 mm	1: < 13 °C	1: Very low	1: Woodland
2: 800 - 1100 mm	2: 13 - 16.6°C	2: Low	2: Dry open forest
3: > 1100 mm	3: > 16.6°C	3: Moderate	3: Moist open forest incl.
		4: High	4: Rainforest
		5: Very high	

Thus code 1111 represents areas with mean annual rainfall < 800 m, mean annual temperature < 13 °C, very low soil fertility and supporting woodland vegetation.

Eighty-six strata, each less than 2000 ha in areal extent and containing no systematic survey sites, have been omitted from the following table. These strata account for 33 690 ha in total.

Stratum	Area ('000s of ha)	No. CRA sites	Sites / 1000 ha post-CRA
2153	0.26	2	7.7
3334	0.29	1	3.4
2123	0.57	1	1.8
3234	4.03	7	1.7
3222	1.20	2	1.7
3221	0.74	1	1.3
3233	6.63	8	1.2
3324	1.36	1	0.7
2322	4.59	3	0.7
3213	6.47	4	0.6
3321	1.79	1	0.6
3231	24.79	11	0.4
1131	34.21	13	0.4
2112	14.68	5	0.3
2222	30.46	10	0.3
1211	10.91	3	0.3
3112	10.99	3	0.3
2132	15.08	4	0.3
1141	8.48	2	0.2
2141	12.74	3	0.2
3111	22.68	5	0.2
1121	36.41	7	0.2
3131	10.81	2	0.2
3212	43.50	8	0.2
3232	16.60	3	0.2
1132	5.69	1	0.2
2131	30.16	5	0.2
2232	56.42	9	0.2
1231	60.27	9	0.1
2312	13.83	2	0.1
2121	51.33	7	0.1
1241	24.74	3	0.1
2211	58.16	7	0.1
3132	9.31	1	0.1
3211	58.89	6	0.1
2221	19.99	2	0.1
2111	54.19	5	0.1
2212	86.89	8	0.1
2231	53.55	2	0.0
Cleared	859.54	11	0.0
1221	47.38	0	0.0
1222	21.41	0	0.0
2122	19.27	0	0.0
2331	16.82	0	0.0
2311	14.50	0	0.0
3312	12.98	0	0.0
1122	11.85	0	0.0
3311	8.79	0	0.0
1242	7.57	0	0.0
2341	5.72	0	0.0
1331	4.68	0	0.0
2233	4.29	0	0.0
1341	3.59	0	0.0
2151	3.48	0	0.0
3121	3.11	0	0.0
2332	2.98	0	0.0
3251	2.82	0	0.0

Table 4.3.1(a) cont.

Stratum	Area (1000s of ha)	No. CRA sites	Sites / 1000 ha post-CRA
1322	2.62	0	0.0
3122	2.60	0	0.0
1311	2.48	0	0.0
3253	2.32	0	0.0
2223	2.22	0	0.0
2142	2.14	0	0.0
1111	2.12	0	0.0
1321	2.12	0	0.0
TOTAL	**1973.06**	**188**	**0.1**

TABLE 4.3.1(B): SYSTEMATIC SAMPLING DENSITY IN THE SYDNEY BASIN STUDY AREA - MAJOR TENURE CLASSES

Note: the 'other' category included in this table comprises other public land (i.e. not NSW NPWS, SFNSW or VCL) - mostly owned by the Water Board. This category was insignificant in other study areas.

Stratum	NPWS			SFNSW			VCL			Private			Other		
	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha
3234	0.94	4	<0.01	0.11	0	0	0.11	2	0.01	2.31	0	0	0.55	1	<0.0
3233	1.72	1	<0.01	0.82	0	0	0.00	3	n/a	2.17	3	<0.01	1.90	1	<0.0
3231	4.19	4	<0.01	3.05	0	0	0.08	4	0.05	5.55	3	<0.01	11.9	0	0.00
3222	1.02	2	<0.01	0.01	0	0	0.04	0	0	0.10	0	0	0.00	0	n/a
3221	0.37	1	<0.01	0.00	0	n/a	0.03	0	0	0.32	0	0	0.01	0	0.00
3212	24.0	8	<0.01	1.67	0	0	0.00	0	0	7.28	0	0	10.4	0	0.00
3211	23.0	5	<0.01	6.29	0	0	0.05	0	0	7.42	1	<0.01	22.0	0	0.00
3132	6.28	1	<0.01	0.10	0	0	0.05	0	0	1.98	0	0	0.90	0	0.00
3131	6.45	2	<0.01	0.15	0	0	0.41	0	0	3.12	0	0	0.68	0	0.00
3112	7.71	3	<0.01	1.01	0	0	0.21	0	0	1.90	0	0	0.14	0	0.00
3111	12.4	5	<0.01	1.85	0	0	1.08	0	0	6.83	0	0	0.49	0	0.00
2322	1.96	3	<0.01	0.00	0	n/a	0.00	0	n/a	1.72	0	0	0.83	0	0.00
2312	4.82	2	<0.01	0.00	0	0	0.00	0	n/a	6.98	0	0	2.01	0	0.00
2232	40.8	9	<0.01	0.91	0	0	0.26	0	0	10.3	0	0	3.93	0	0.00
2231	14.1	2	<0.01	0.78	0	0	0.57	0	0	20.0	0	0	18.0	0	0.00
2222	23.2	6	<0.01	0.21	0	0	1.35	3	<0.0	5.44	0	0	0.20	1	<0.0
2221	11.6	2	<0.01	0.14	0	0	0.81	0	0	7.30	0	0	0.04	0	0.00
2212	66.9	8	<0.01	0.32	0	0	0.12	0	0	12.6	0	0	4.30	0	0.00
2211	40.4	5	<0.01	0.46	0	0	0.36	0	0	8.66	2	<0.01	8.24	0	0.00
2141	7.23	3	<0.01	0.16	0	0	0.06	0	0	5.31	0	0	0.00	0	n/a
2132	8.40	4	<0.01	2.04	0	0	0.88	0	0	3.60	0	0	0.17	0	0.00

Table 4.3.1(b) cont.

Stratum	NPWS			SFNSW			VCL			Private			Other		
	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	No. CRA sites	Total sites / 1000 ha
2131	8.67	5	<0.01	6.28	0	0	2.13	0	0	12.9	0	0	0.20	0	0.00
2121	9.96	5	<0.01	13.5	2	<0.01	3.12	0	0	24.0	0	0	0.54	0	0.00
2112	9.72	4	<0.01	0.98	1	<0.01	0.97	0	0	2.84	0	0	0.19	0	0.00
2111	17.1	5	<0.01	16.8	0	0	5.85	0	0	13.4	0	0	0.85	0	0.00
1241	9.85	3	<0.01	0.03	0	0	0.05	0	0	14.8	0	0	0.06	0	0.00
1231	18.5	9	<0.01	1.00	0	0	0.67	0	0	23.3	0	0	0.69	0	0.00
1211	4.47	3	<0.01	0.07	0	0	0.34	0	0	5.40	0	0	0.64	0	0.00
1131	3.26	7	<0.01	4.88	0	0	0.43	1	<0.0	24.4	3	<0.01	1.21	2	<0.0
1121	5.96	7	<0.01	3.68	0	0	2.29	0	0	19.6	0	0	4.83	0	0.00
3334	0.00	0	0	0.00	0	n/a	0.00	0	n/a	0.29	0	0	0.00	1	n/a
3324	0.72	0	0	0.00	0	n/a	0.00	0	n/a	0.64	0	0	0.00	1	n/a
3321	0.21	0	0	0.00	0	n/a	0.00	0	n/a	1.57	1	<0.01	0.01	0	0.00
3312	8.03	0	0	0.00	0	n/a	0.00	0	n/a	4.70	0	0	0.24	0	0.00
3311	6.58	0	0	0.06	0	0	0.00	0	n/a	1.80	0	0	0.32	0	0.00
3253	0.19	0	0	0.00	0	n/a	0.00	0	n/a	2.10	0	0	0.03	0	0.00
3251	0.05	0	0	0.00	0	n/a	0.00	0	n/a	2.65	0	0	0.12	0	0.00
3232	9.64	0	0	0.24	0	0	0.00	0	n/a	3.77	3	<0.01	2.93	0	0.00
3213	1.75	0	0	0.19	1	<0.01	0.00	3	n/a	0.54	0	0	3.98	0	0.00
3122	1.72	0	0	0.02	0	0	0.52	0	0	0.32	0	0	0.00	0	n/a
3121	1.89	0	0	0.06	0	0	0.62	0	0	0.53	0	0	0.00	0	n/a
2341	0.01	0	0	0.29	0	0	0.00	0	n/a	4.74	0	0	0.69	0	0.00
2332	0.53	0	0	0.01	0	0	0.00	0	n/a	2.24	0	0	0.20	0	0.00
2331	0.19	0	0	0.00	0	0	0.00	0	n/a	12.0	0	0	4.58	0	0.00
2311	1.79	0	0	0.04	0	0	0.00	0	n/a	9.16	0	0	3.49	0	0.00
2233	3.30	0	0	0.05	0	0	0.00	0	n/a	0.32	0	0	0.63	0	0.00
2223	1.76	0	0	0.00	0	n/a	0.17	0	0	0.26	0	0	0.01	0	0.00
2153	0.05	0	0	0.20	2	<0.01	0.00	0	n/a	0.00	0	0	0.00	0	n/a
2151	0.74	0	0	0.99	0	0	0.02	0	0	1.72	0	0	0.00	0	n/a
2142	0.99	0	0	0.02	0	0	0.01	0	0	1.12	0	0	0.00	0	n/a
2123	0.18	0	0	0.31	1	<0.01	0.04	0	0	0.04	0	0	0.00	0	n/a
2122	8.55	0	0	3.63	0	0	2.09	0	0	4.66	0	0	0.32	0	0.00
1341	0.04	0	0	0.00	0	n/a	0.00	0	n/a	3.48	0	0	0.02	0	0.00
1331	0.09	0	0	0.00	0	n/a	0.00	0	n/a	4.55	0	0	0.04	0	0.00
1322	0.85	0	0	0.00	0	n/a	0.00	0	n/a	1.36	0	0	0.41	0	0.00
1321	0.43	0	0	0.00	0	n/a	0.00	0	n/a	1.39	0	0	0.32	0	0.00
1311	0.22	0	0	0.00	0	n/a	0.00	0	n/a	2.13	0	0	0.13	0	0.00
1242	4.00	0	0	0.00	0	n/a	0.00	0	0	3.60	0	0	0.00	0	0.00
1222	14.5	0	0	0.16	0	0	0.26	0	0	5.65	0	0	0.78	0	0.00
1221	16.0	0	0	1.63	0	0	0.72	0	0	25.2	0	0	3.93	0	0.00
1141	0.16	0	0	0.03	0	0	0.00	0	0	8.27	0	0	0.05	2	0.04
1132	1.66	0	0	0.70	0	0	0.21	0	0	3.00	0	0	0.10	1	<0.0
1122	4.36	0	0	1.08	0	0	1.45	0	0	3.86	0	0	1.11	0	0.00
1111	0.77	0	0	0.18	0	0	0.07	0	0	0.78	0	0	0.31	0	0.00
Cleared	0.00	8		0.00	2		0.00	0		0.00	1		0.00	0	
TOTAL	**487.**	**12**	**0.262**	**78.4**	**7**	**0.089**	**29.2**	**16**	**0.54**	**401.**	**16**	**0.039**	**124.**	**10**	**0.08**

FIGURE 4.3.1 SYDNEY BASIN SYSTEMATIC SURVEY SITES

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FIGURE 4.3.2 SYDNEY BASIN TARGETED SURVEY SITES

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4.4 SOUTHERN

One hundred and thirty-seven systematic sites were surveyed in the coastal section of the Southern study area in the periods January - April 1997 (80 sites) and January - March 1998 (57 sites). Fifteen sites in the tablelands part of the study area were surveyed in the 1997 survey season, and 72 surveyed during the 1998 - 99 spring-summer season.

Because field survey is still underway, it is not possible to present results here. It is anticipated that a supplementary report detailing results for this study area will be prepared during March 1999.

4.5 EDEN

4.5.1 Systematic surveys

One hundred and fifty-five systematic sites were sampled in the period January - April 1997. Figure 4.5.1 shows the location of these sites.

4.5.2 Targeted surveys

Targeted surveys for Smokey Mouse, (11 sites), were conducted during the period January - April 1997. Elliott traps and/or small hair tubes were set at nine CRA survey sites and at two other selected sites in suitable habitat, as advised by scientific experts. Figure 4.5.2 shows the location of these sites.

TABLE 4.5.1(A): SYSTEMATIC SAMPLING DENSITY IN THE EDEN STUDY AREA: ENVIRONMENTAL STRATA

Note: Strata are coded according to values of the three stratification variables, in the following order; lithology, mean annual rainfall and mean annual temperature. Variable codes are shown below.

Existing systematic survey sites in the Eden study area were scarce, compared with other study areas, and limited sampling techniques had been undertaken at these sites. CRA systematic site selection was able to take these existing sites into account by examining sampling density on a functional group basis.

Key to strata listed in Table 4.5.1

Lithology	Mean annual rainfall	Mean annual temperature
01: Coastal beach deposit	1: < 600 mm	1: <5°C
02: Unconsolidated sediment	2: 600 - 900 mm	2: 6 - 8°C
03: Volcanic/Hypabyssal: Ultrabasic-basic	3: 900 - 1200 mm	3: 9 - 12°C
04: Volcanic/Hypabyssal: Intermediate-acid	4: 1200 - 1600 mm	4: 13 - 14°C
05: Plutonic: High alkali Feldspar	5: > 1600 - mm	5: 15 - 16°C
06: Plutonic: Medium alkali Feldspar		6: >17°C
07: Plutonic: Low alkali Feldspar		
08: Sedimentary: High quartz		
09: Sedimentary: Low quartz		
10: Sedimentary: Limestone		
11: Metamorphic: Medium-high grade		

Thus code 111 represents areas of coastal beach deposit with mean annual rainfall < 600 mm and mean annual temperature < 5 °C.

Forty strata, each less than 2000 ha in areal extent and containing no systematic survey sites, have been omitted from the following tables. These strata account for 14 834 ha in total. Areas given in the following tables reflect forested land only within each stratum.

		Pre-CRA sites by functional group								
Stratum	Area (1000s of ha)	Arboreal mammals and nocturnal birds	Bats	Diurnal birds	Ground mammals	Total pre-CRA sites	No. CRA sites	* Total no. sites	* Sites / 1000 ha pre-CRA	* Sites / 1000 ha post-CRA
0423	1.26	0	0	0	0	0.00	1	1.00	0.00	0.79
0124	1.34	0	0	8	0	1.33	1	2.33	1.00	1.75
0125	0.16	0	0	3	0	0.50	0	0.50	3.18	3.18
0222	0.65	2	0	0	0	0.33	0	0.33	0.51	0.51
0523	1.70	0	0	0	1	0.17	0	0.17	0.10	0.10
0625	0.20	0	1	0	0	0.17	0	0.17	0.82	0.82
0633	1.72	1	0	1	0	0.33	0	0.33	0.19	0.19
0732	0.87	0	0	2	0	0.33	0	0.33	0.38	0.38
0225	2.45	5	0	2	11	3.00	1	4.00	1.22	1.63
0925	21.04	4	30	11	38	13.83	2	15.83	0.66	0.75
0924	79.09	49	47	52	54	33.67	23	56.67	0.43	0.72
0923	9.45	1	0	19	0	3.33	6	9.33	0.35	0.99
0224	22.14	20	0	24	2	7.67	8	15.67	0.35	0.71

Table 4.5.1(a) cont.

		Pre-CRA sites by functional group								
Stratum	Area (1000s of ha)	Arboreal mammals and nocturnal birds	Bats	Diurnal birds	Ground mammals	Total pre-CRA sites	No. CRA sites	* Total no. sites	* Sites / 1000 ha pre-CRA	* Sites / 1000 ha post-CRA
0725	2.51	2	0	3	0	0.83	1	1.83	0.33	0.73
0833	2.17	1	0	0	3	0.67	0	0.67	0.31	0.31
0624	41.07	7	16	13	9	7.50	12	19.50	0.18	0.47
0824	49.97	17	1	9	6	5.50	26	31.50	0.11	0.63
0724	43.88	11	0	30	0	6.83	10	16.83	0.16	0.38
0922	12.02	0	0	10	0	1.67	3	4.67	0.14	0.39
0424	16.72	8	0	2	0	1.67	7	8.67	0.10	0.52
1122	9.80	0	0	2	0	0.33	7	7.33	0.03	0.75
0722	54.03	0	0	33	0	5.50	12	17.50	0.10	0.32
0623	29.92	1	4	7	1	2.17	6	8.17	0.07	0.27
0723	59.06	0	0	9	3	2.00	18	20.00	0.03	0.34
0322	4.32	0	0	0	0	0.00	2	2.00	0.00	0.46
0932	2.30	0	0	1	0	0.17	0	0.17	0.07	0.07
0823	30.72	2	0	0	1	0.50	6	6.50	0.02	0.21
0822	9.94	0	0	0	0	0.00	2	2.00	0.00	0.20
0622	17.88	0	0	0	1	0.17	1	1.17	0.01	0.07
0612	2.06	0	0	0	0	0.00	0	0.00	0.00	0.00
0912	3.05	0	0	0	0	0.00	0	0.00	0.00	0.00
1112	2.05	0	0	0	0	0.00	0	0.00	0.00	0.00
1123	5.17	0	0	0	0	0.00	0	0.00	0.00	0.00

* Pre-CRA site numbers have been divided by six, to allow comparison with CRA systematic survey sites where techniques were employed to detect all six fauna detection groups (amphibians, reptiles, arboreal mammals and nocturnal birds, bats, diurnal birds, ground mammals).

TABLE 4.5.1(B): SYSTEMATIC SAMPLING DENSITY IN THE EDEN STUDY AREA - MAJOR TENURE CLASSES

	NSW NPWS				SFNSW				Vacant Crown Land				Private (leasehold and freehold)			
Stratum	Area (1000s of ha)	*No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	*No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	*No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha	Area (1000s of ha)	*No. pre-CRA sites	No. CRA sites	Total sites / 1000 ha
423	0.48	0.0	1	2.10	0.77	0.0	0	<0.01	0.00	0.0	0	n/a	0.02	0.0	0	0.00
932	0.00	0.0	0	n/a	2.27	0.1	0	0.07	0.00	0.0	0	0.00	0.03	0.0	0	0.00
125	0.03	5.6	0	166.6	0.00	0.0	0	n/a	0.00	0.0	0	n/a	0.12	0.5	0	4.10
225	1.87	3.0	1	2.14	0.07	0.0	0	0.00	0.00	0.0	0	n/a	0.51	0.0	0	0.00
124	1.25	1.0	1	1.60	0.00	0.0	0	n/a	0.00	0.3	0	n/a	0.00	0.0	0	n/a
424	3.32	0.0	5	1.51	9.88	1.3	1	0.24	0.12	0.0	0	0.00	3.41	0.3	1	0.39
224	6.47	1.1	6	1.11	10.7	4.3	2	0.59	0.84	0.1	0	0.20	4.11	1.8	0	0.45
925	4.31	3.6	1	1.08	11.4	10	1	0.96	0.24	0.0	0	0.00	5.08	0.1	0	0.03
624	8.94	4.1	5	1.03	27.5	3.1	7	0.37	0.29	0.0	0	0.00	4.27	0.1	0	0.04
1122	7.02	0.0	7	1.00	0.33	0.3	0	1.02	0.90	0.0	0	0.00	1.55	0.0	0	0.00
924	18.9	7.0	11	0.95	48.4	26	8	0.68	0.45	0.1	0	0.37	11.2	1.3	4	0.47
824	31.6	3.8	22	0.82	13.2	1.3	2	0.25	0.87	0.0	0	0.00	4.25	0.3	2	0.55
922	3.80	0.0	3	0.79	3.18	1.0	0	0.31	0.04	0.0	0	0.00	5.00	0.6	0	0.13
724	7.69	0.1	5	0.67	5.77	3.1	1	0.72	0.13	0.0	0	0.00	30.2	3.5	4	0.25
723	28.8	0.3	16	0.57	19.3	0.6	2	0.14	0.08	0.0	0	0.00	10.7	0.1	0	0.02
722	15.2	0.5	8	0.56	14.2	3.6	3	0.47	1.09	0.0	0	0.00	23.4	1.3	1	0.10
923	4.41	0.3	2	0.53	4.71	3.0	4	1.49	0.00	0.0	0	n/a	0.33	0.0	0	0.00
623	10.4	0.5	5	0.52	18.0	1.6	1	0.15	0.09	0.0	0	0.00	1.25	0.0	0	0.00
833	2.08	0.6	0	0.32	0.08	0.0	0	0.00	0.00	0.0	0	0.00	0.01	0.0	0	0.00
622	3.65	0.1	1	0.32	2.36	0.0	0	0.00	0.99	0.0	0	0.00	10.8	0.0	0	0.00
823	29.1	0.5	6	0.22	1.46	0.0	0	0.00	0.01	0.0	0	0.00	0.12	0.0	0	0.00
822	9.52	0.0	2	0.21	0.00	0.0	0	n/a	0.01	0.0	0	0.00	0.42	0.0	0	0.00
523	1.59	0.1	0	0.10	0.00	0.0	0	n/a	0.00	0.0	0	n/a	0.00	0.0	0	n/a
222	0.23	0.0	0	0.00	0.07	0.0	0	0.00	0.00	0.0	0	n/a	0.35	0.3	0	0.97
322	0.60	0.0	0	0.00	0.90	0.0	1	1.11	0.11	0.0	1	9.43	2.72	0.0	0	0.00
612	0.36	0.0	0	0.00	0.00	0.0	0	n/a	0.59	0.0	0	0.00	1.12	0.0	0	0.00
625	0.12	0.0	0	0.00	0.07	0.1	0	2.56	0.00	0.0	0	n/a	0.02	0.0	0	0.00
633	0.41	0.0	0	0.00	1.30	0.3	0	0.26	0.00	0.0	0	0.00	0.00	0.0	0	n/a
725	0.02	0.0	0	0.00	0.02	0.0	0	0.00	0.00	0.0	0	n/a	2.48	0.8	1	0.74
732	0.44	0.0	0	0.00	0.00	0.3	0	n/a	0.00	0.0	0	n/a	0.00	0.0	0	n/a
912	0.12	0.0	0	0.00	0.00	0.0	0	n/a	1.30	0.0	0	0.00	1.63	0.0	0	0.00
1112	0.40	0.0	0	0.00	0.00	0.0	0	n/a	1.15	0.0	0	0.00	0.51	0.0	0	0.00
1123	5.16	0.0	0	0.00	0.02	0.0	0	0.00	0.00	0.0	0	n/a	0.00	0.0	0	n/a
TOTAL	**208.5**	**32.8**	**108**	**0.68**	**196.3**	**59.8**	**33**	**0.47**	**9.30**	**0.67**	**1**	**0.18**	**125.9**	**11.5**	**13**	**0.19**

* Pre-CRA site numbers have been divided by six, to allow comparison with CRA systematic survey sites where techniques were employed to detect all six fauna detection groups (amphibians, reptiles, arboreal mammals and nocturnal birds, bats, diurnal birds, ground mammals).

FIGURE 4.5.1 EDEN SYSTEMATIC SURVEY SITES

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FIGURE 4.5.2 EDEN TARGETED SURVEY SITES

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5. DISCUSSION

The CRA fauna survey project has provided more than 1.2M collated records and 145 000 new survey records to the NSW CRA process to date. The project was one of the largest of its kind ever undertaken in that state, in terms of study area size and survey effort. An inter-agency (NSW NPWS and SFNSW) project debrief was held in May 1997, to assess the merits and shortcomings of both the technical and management aspects of the project. The following comments draw heavily on the outcomes of that review.

5.1 SURVEY TECHNIQUES

Survey techniques were discussed in turn. Whilst all techniques were deemed effective for at least some taxa, the review suggested minor modifications to many techniques. For example, walking spotlight transects could be improved by ensuring a minimum distance between surveyors, thus reducing noise. It was also recognised such improvements might have been implemented by some team leaders during the course of the project, and process was needed whereby such modifications could be officially adopted and implemented statewide.

The review also suggested efficiencies to be made in the deployment of survey resources. For example, it was acknowledged that non-specialist (and therefore cheaper) personnel could be employed to lay out and collect hair-sampling funnels. This would release specialist staff for more appropriate tasks. Another suggestion was the relaxation of strict guidelines on the placement of point techniques such as bat traps and streamside searches. It was felt that specialist opinion in the field might yield more records, although at the expense of tightly-defined methodological detail.

5.2 MANAGEMENT ISSUES

The review noted that survey team structures generally worked well, although there was some concern that specialists' time was spent on logistic tasks which would have been better performed by agency staff.

Discrepancies were identified between the CRA survey techniques and those currently used by NSW NPWS Operations Division. Methodologies should be standardised, ideally for all major contributors, but initially at least within agencies involved in CRAs.

Fauna survey involves certain unavoidable hazards. Whilst this project was without major incident, and safety procedures were in place for each study area, it was acknowledged that statewide standardisation of safety training is desirable.

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APPENDIX 1

RECORDS OF TARGET AND PRIORITY TAXA

This appendix lists all records of target and priority taxa obtained from CRA surveys. Lists of priority taxa were not finalised prior to commencement of surveys. The following list therefore reflects the draft lists provided to survey team leaders in each study area. Priority and target taxa were specific to each study area: non-priority taxa for each study area are marked as 'n/a', target taxa are denoted by shading.

No data are provided for the Southern study area because survey work is still underway. These results will be available in March 1999.

Key to legal status field

E Listed as Endangered on Schedule 1 of the NSW Threatened Species Conservation Act, 1995
NE Listed as Nationally Endangered on Schedule 1 Part 1 of the Commonwealth Endangered Species Protection Act, 1992
V Listed as Vulnerable on Schedule 2 of the NSW Threatened Species Conservation Act, 1995
NV Listed as Nationally Vulnerable on Schedule 1 Part 2 of the Commonwealth Endangered Species Protection Act, 1992

Species name	Legal status	UNE	LNE	Sydney Basin	Southern	Eden
FROGS						
Assa darlingtoni	V	22	0	n/a	n/a	n/a
Crinia tinnula	V	81	91	0	n/a	n/a
Heleioporus australiacus	V	n/a	12	2		0
Limnodynastes terraereginae		n/a	0	n/a	n/a	n/a
Mixophyes balbus	V	39	71	0		0
Mixophyes fasciolatus		n/a	55	0	n/a	n/a
Mixophyes fleayi	V	0	n/a	n/a	n/a	n/a
Mixophyes iteratus	V	9	0	0	n/a	n/a
Paracrinia haswelli		0	45	30	n/a	n/a
Philoria kundagungan	V	0	n/a	n/a	n/a	n/a
Philoria loveridgei	V	0	n/a	n/a	n/a	n/a
Philoria sp. 1 (undescribed)	V	0	0	n/a	n/a	n/a
Philoria sp. 2 (undescribed)	V	0	n/a	n/a	n/a	n/a
Philoria sp. 3 (undescribed)	V	0	n/a	n/a	n/a	n/a
Philoria sphagnicolus	V	1	2	0	n/a	n/a
Pseudophryne australis	V	n/a	533	131		n/a
Pseudophryne bibronii		51	130	74	n/a	n/a
Pseudophryne corroboree	E	n/a	n/a	n/a		n/a
Pseudophryne pengilleyi	V	n/a	n/a	n/a		n/a
Uperoleia tyleri		n/a	5	2	n/a	n/a
Litoria aurea	E	0	0	4		n/a
Litoria barringtonensis		2	94	n/a	n/a	n/a
Litoria booroolongensis		0	0	5		0
Litoria brevipalmata	V	63	0	0	n/a	n/a
Litoria caerulea		35	40	n/a		n/a
Litoria castanea	E	0	0	n/a	n/a	n/a
Litoria citropa		n/a	2	29	n/a	n/a
Litoria freycineti		18	166	n/a	n/a	n/a
Litoria jervisiensis		5	16	4		n/a
Litoria littlejohni		n/a	1	2		0
Litoria olongburensis	V	0	n/a	n/a	n/a	n/a
Litoria pearsoniana		173	16	n/a	n/a	n/a
Litoria piperata	V	0	0	n/a	n/a	n/a
Litoria revelata		274	17	n/a	n/a	n/a
Litoria subglandulosa	V	3	56	0	n/a	n/a
Litoria spenceri	NE,E	n/a	n/a	n/a		n/a
Litoria vereauxii alpina		n/a	n/a	n/a		n/a
LIZARDS						
Elseya georgesi		n/a	0	n/a	n/a	n/a
Elseya latisternum		0	n/a	n/a	n/a	n/a
Elseya purvisi		n/a	0	n/a	n/a	n/a
Elseya sp. 2 (Gwydir & Namoi Rivers)	V	0	0	n/a	n/a	n/a
Emydura macquarii		0	0	n/a	n/a	n/a
Emydura macquarii (Bellingen River	V	n/a	0	n/a	n/a	n/a
Emydura sp. 1		n/a	0	n/a	n/a	n/a
Diplodactylus vittatus		n/a	17	n/a	n/a	n/a
Oedura lesueurii		n/a	201	139	n/a	n/a
Oedura tryoni		n/a	9	n/a	n/a	n/a
Phyllurus platurus		n/a	114	49	n/a	n/a
Saltuarius swaini		4	24	n/a	n/a	n/a
Underwoodisaurus milii		n/a	n/a	n/a		n/a
Underwoodisaurus sphyrurus	V	4	5	n/a		n/a

Species name	Legal status	UNE	LNE	Sydney Basin	Southern	Eden
LIZARDS CONT.						
Delma plebeia		1	2	0	n/a	n/a
Delma tincta		0	0	n/a	n/a	n/a
Pygopus lepidopodus		n/a	13	2		0
Diporiphora australis		2	n/a	n/a	n/a	n/a
Hypsilurus spinipes		2	6	n/a	n/a	n/a
Tympanocryptis diemensis		n/a	67	n/a	n/a	n/a
Varanus rosenbergi	V	n/a	4	6		n/a
Varanus varius		n/a	141	n/a		29
Anomalopus mackayi	E	0	0	n/a	n/a	n/a
Anomalopus swansoni		n/a	4	0	n/a	n/a
Anomalopus verreauxii		2	2	n/a	n/a	n/a
Calyptotis ruficauda		17	141	n/a	n/a	n/a
Calyptotis scutirostrum		129	0	n/a	n/a	n/a
Cautula zia		0	0	n/a	n/a	n/a
Coeranoscincus reticulatus	V	0	0	n/a	n/a	n/a
Ctenotus arcanus		0	n/a	n/a	n/a	n/a
Ctenotus eurydice		2	0	n/a	n/a	n/a
Cyclodomorphus casuarinae		n/a	1	0	n/a	n/a
Cyclodomorphus michaeli		0	2	n/a	n/a	n/a
Egernia frerei		2	1	n/a	n/a	n/a
Egernia major		6	15	n/a	n/a	n/a
Egernia mcpheei		18	18	n/a	n/a	n/a
Egernia modesta		n/a	53	n/a	n/a	n/a
Eulamprus kosciuskoi		46	49	0	n/a	n/a
Eulamprus leuraensis	T	n/a	n/a	0	n/a	n/a
Eulamprus martini		258	1	n/a	n/a	n/a
Eulamprus murrayi		23	74	n/a	n/a	n/a
Eulamprus tenuis		4	15	n/a	n/a	n/a
Furina diadema		n/a	n/a	n/a		n/a
Lampropholis amicula		3	12	n/a	n/a	n/a
Lampropholis caligula		n/a	2	0	n/a	n/a
Lampropholis elongata		n/a	0	n/a	n/a	n/a
Morethia boulengeri		22	14	n/a	n/a	n/a
Ophioscincus truncatus		5	0	n/a	n/a	n/a
Pseudomoia entrecasteauxii		1	9	n/a	n/a	n/a
Saproscincus challengeri sensu stricto		5	n/a	n/a	n/a	n/a
Saproscincus galli		7	3	n/a	n/a	n/a
Saproscincus rosei		1	11	0	n/a	n/a
Saproscincus sp. 'North Coast'		2	1	n/a	n/a	n/a
Ramphotyphlops proximus		1	0	n/a	n/a	n/a
Ramphotyphlops wiedii		1	0	n/a	n/a	n/a
SNAKES						
Liasis maculosus		0	n/a	n/a	n/a	n/a
Morelia spilota spilota		n/a	4	2		1
Tropidonophis mairii		0	n/a	n/a	n/a	n/a
Acanthophis antarcticus		1	2	n/a	n/a	n/a
Austrelaps ramsayi		1	1	0	n/a	n/a
Cacophis harriettae	V	1	0	n/a	n/a	n/a
Cacophis krefftii		n/a	3	n/a	n/a	n/a
Drysdalia coronoides		0	0	0	n/a	n/a
Drysdalia rhodogaster		n/a	n/a	0	n/a	n/a
Hoplocephalus bitorquatus	V	1	0	0	n/a	n/a

Species name	Legal status	UNE	LNE	Sydney Basin	Southern	Eden
SNAKES CONT.						
Hoplocephalus bungaroides	NE,E	n/a	2	1		n/a
Hoplocephalus stephensii	V	2	4	0	n/a	n/a
Pseudechis guttatus		0	0	n/a	n/a	n/a
Simoselaps australis		0	0	n/a	n/a	n/a
Suta flagellum	V	n/a	n/a	n/a		n/a
Tropidechis carinatus		n/a	0	n/a	n/a	n/a
BIRDS						
Malleefowl	E	n/a	n/a	0	n/a	n/a
Blue-billed Duck	V	n/a	0	0	n/a	n/a
Australasian Bittern	V	n/a	2	n/a	n/a	0
Black Bittern	V	0	0	n/a		n/a
Black-necked Stork	V	0	1	0	n/a	n/a
Grey Goshawk		9	5	n/a	n/a	n/a
Pacific Baza		9	7	n/a	n/a	n/a
Red Goshawk	NV,E	0	0	n/a	n/a	n/a
Brahminy Kite		0	2	n/a	n/a	n/a
Square-tailed Kite	V	0	1	0		0
Osprey	V	0	2	0	n/a	n/a
Grey Falcon	V	n/a	0	0	n/a	n/a
Peregrine Falcon		6	6	n/a	n/a	n/a
Bush-hen	V	0	0	n/a	n/a	n/a
Lewin's Rail		0	1	n/a	n/a	n/a
Black-breasted Button-quail	NV,E	0	0	n/a	n/a	n/a
Painted Snipe	V	n/a	0	0	n/a	n/a
Bush Stone-curlew	E	0	0	0		0
Little Tern	T	n/a	0	0	n/a	n/a
Emerald Dove		n/a	11	n/a		0
Squatter Pigeon	T	n/a	0	n/a	n/a	n/a
Brush Bronzewing		0	6	n/a	n/a	n/a
Wompoo Fruit-dove	V	21	4	0	n/a	n/a
Rose-crowned Fruit-dove	V	18	0	0	n/a	n/a
Superb Fruit-dove	V	3	0	0		n/a
Gang-gang Cockatoo		n/a	129	n/a	n/a	n/a
Red-tailed Black-Cockatoo	V	0	0	0	n/a	n/a
Yellow-tailed Black-Cockatoo		n/a	24	n/a		91
Glossy Black-Cockatoo	V	110	176	92		17
Double-eyed Fig-parrot	NE,E	0	0	n/a	n/a	n/a
Musk Lorikeet		80	52	n/a	n/a	n/a
Purple-crowned Lorikeet	V	n/a	n/a	0		n/a
Swift Parrot	NV,V	1	0	7		0
Turquoise Parrot	V	34	74	28		0
Ground Parrot	V	n/a	n/a	0	n/a	n/a
Superb Parrot	V	n/a	n/a	0		n/a
Little Bronze-Cuckoo		0	0	n/a	n/a	n/a
Black-eared Cuckoo		0	1	n/a	n/a	n/a
Oriental Cuckoo		0	0	n/a	n/a	n/a
Barking Owl	V	8	18	2		0
Powerful Owl	V	34	36	43		0
Eastern Grass Owl	V	0	n/a	o	n/a	n/a
Masked Owl	V	30	51	4		15
Sooty Owl	V	15	49	30		22
Marbled Frogmouth	V	4	5	n/a	n/a	n/a

Species name	Legal status	UNE	LNE	Sydney Basin	Southern	Eden
BIRDS CONT.						
Collared Kingfisher	V	0	n/a	n/a	n/a	n/a
Forest Kingfisher		0	1	n/a	n/a	n/a
Red-backed Kingfisher		0	0	n/a	n/a	n/a
Noisy Pitta		n/a	10	n/a		n/a
Albert's Lyrebird	V	0	n/a	n/a	n/a	n/a
Superb Lyrebird *(edwardsii?)*		24	27	n/a	n/a	n/a
Rufous Scrub-bird	V	0	0	0	n/a	n/a
Red-browed Treecreeper		n/a	15	n/a		44
Striated Fieldwren	V	n/a	n/a	0	n/a	n/a
Eastern Bristlebird	NV,V	0	0	n/a	n/a	n/a
Chestnut-rumped Heathwren		1	41	n/a	n/a	n/a
Rockwarbler		n/a	56	58	n/a	n/a
Painted Honeyeater	V	0	0	n/a		n/a
Mangrove Honeyeater	V	0	0	n/a	n/a	n/a
Yellow-tufted Honeyeater		42	21	n/a	n/a	n/a
Black-chinned honeyeater		n/a	9	7	n/a	n/a
Regent Honeyeater	NE,E	0	1	193		0
Hooded Robin		0	3	n/a	n/a	n/a
Pink Robin	V	n/a	n/a	n/a		0
Pale-yellow Robin		9	4	n/a	n/a	n/a
Grey-crowned Babbler		31	9	n/a	n/a	n/a
Varied Sittella		n/a	240	n/a		23
Little Shrike-thrush		2	1	n/a	n/a	n/a
Crested Shrike-tit		n/a	80	n/a		20
Gilbert's Whistler	V	n/a	0	0		n/a
Olive Whistler	V	0	3	0		2
White-eared Monarch	V	0	n/a	n/a	n/a	n/a
Barred Cuckoo-shrike	V	1	0	n/a	n/a	n/a
Varied Triller		5	3	n/a	n/a	n/a
Paradise Riflebird		13	1	n/a	n/a	n/a
Forest Raven		13	148	n/a	n/a	n/a
Regent Bowerbird		n/a	8	n/a	n/a	n/a
Black-throated Finch	E	0	0	n/a	n/a	n/a
Russet-tailed Thrush		5	0	n/a	n/a	n/a
MAMMALS						
Platypus		0	6	n/a	n/a	n/a
Dusky Antechinus		0	1	n/a	n/a	n/a
Tiger Quoll	V	6	13	2		0
Eastern Quoll	NV, E	0	0	0	n/a	n/a
Brush-tailed Phascogale	V	3	1	0		n/a
Common Planigale	V	2	1	n/a	n/a	n/a
White-footed Dunnart	V	n/a	n/a	n/a		0
Southern Brown Bandicoot	E	n/a	0	0		n/a
Long-nosed Bandicoot		n/a	127	n/a		7
Koala	V	55	115	13		0
Common Wombat		19	171	n/a	n/a	n/a
Eastern Pigmy-possum		1	3	n/a	n/a	n/a
Greater Glider		384	508	413		49
Yellow-bellied Glider	V	73	155	78		163
Sugar Glider		n/a	371	270	n/a	n/a
Squirrel Glider	V	30	32	9		0
Rufous Bettong	V	23	0	0	n/a	n/a

Species name	Legal status	UNE	LNE	Sydney Basin	Southern	Eden
MAMMALS CONT.						
Long-footed Potoroo	NE,E	n/a	0	n/a		0
Long-nosed Potoroo	V	1	0	0		1
Black-striped Wallaby	E	17	0	n/a	n/a	n/a
Parma Wallaby	V	5	11	0	n/a	n/a
Whiptail Wallaby		38	0	n/a	n/a	n/a
Brush-tailed Rock-wallaby	NV, V	11	26	2		n/a
Red-legged Pademelon	V	0	0	0	n/a	n/a
Nyctimene robinsoni	V	1	n/a	n/a	n/a	n/a
Pteropus alecto	V	0	n/a	n/a	n/a	n/a
Pteropus poliocephalus		32	33	6		0
Pteropus scapulatus		n/a	6	n/a		0
Syconycteris australis	V	0	8	n/a	n/a	n/a
Saccolaimus flaviventris	V	10	0	2		0
Mormopterus beccarii	V	0	0	n/a	n/a	n/a
Mormopterus norfolkensis	V	0	56	9		0
Mormopterus planiceps		0	8	n/a	n/a	n/a
Mormopterus sp. 1		0	57	n/a	n/a	n/a
Nyctinomus australis		90	165	66	n/a	n/a
Rhinolophus megaphyllus		28	85	52		26
Chalinolobus dwyeri	V	1	20	63		n/a
Chalinolobus nigrogriseus	V	23	0	n/a	n/a	n/a
Chalinolobus picatus	V	0	0	n/a	n/a	n/a
Falsistrellus tasmaniensis	V	29	148	49		81
Kerivoula papuensis	V	4	9	0		0
Miniopterus australis	V	138	790	2		0
Miniopterus schreibersii	V	15	172	126		102
Myotis adversus	V	2	67	35		32
Nyctophilus bifax	V	3	0	n/a	n/a	n/a
Nyctophilus timoriensis	V	0	7	0	n/a	n/a
Scoteanax rueppellii	V	17	30	17		17
Scotorepens balstoni		0	20	n/a	n/a	n/a
Scotorepens greyii		8	0	n/a	n/a	n/a
Scotorepens orion		13	84	n/a	0	n/a
Scotorepens sp. 1		23	3	n/a	n/a	n/a
Vespadelus pumilus		326	439	n/a	n/a	n/a
Vespadelus regulus		n/a	134	96		n/a
Vespadelus troughtoni	V	3	10	n/a		n/a
Broad-toothed Rat	V	n/a	0	0		n/a
Grassland Melomys		1	0	n/a	n/a	n/a
Smoky Mouse	E	n/a	n/a	0		0
Eastern Chestnut Mouse	V	0	1	0	n/a	n/a
New Holland Mouse		0	2	n/a	n/a	n/a
Hastings River Mouse	NE,E	0	0	0	n/a	n/a
Pale Field-rat		1	n/a	n/a	n/a	n/a
Total records for Priority taxa		**3344**	**7428**	**2274**	**0**	**742**
Total records for Target taxa		**260**	**1317**	**81**	**0**	**0**

APPENDIX 2

COLLATED DATASETS

UNE AND LNE* STUDY AREAS

*excludes NSW NPWS Hunter District

DATASET	DESCRIPTION
Australian Bird and Bat Banding Scheme	• NPWS Northern Zone; priority taxa records since 1970.
Australian Museum	• NPWS Northern Zone; priority taxa records.
CSIRO	• CSIRO data within the Licensed section of Atlas of NSW Wildlife
Eastlink	• EIS; systematic surveys from Armidale to Qld border. • Spring faunal survey of Eastlink powerline corridor.
Joint Old Growth Forest Project Fauna Survey	• Washpool and Red Rock; systematic surveys.
NRAC UNE Fauna Project	• Collated turtle data.
NSW NPWS	• Glen Innes District; systematic fauna survey. • NSW Atlas of Australian Wildlife. • NEFBS fauna records • NRAC fauna records
Rod Kavanaugh nocturnal playback data	• LNE andUNE.
Ross Mining	• Timbarra Gold Project; FIS & post-FIS fauna records.
SFNSW	• EIS fauna records provided 19/2/1998. • Wauchope Management Area; non-EIS surveys (e.g. pre-logging surveys)
Turtle and tortoise data	• From various custodians:
Joanna checking this list of Martin's	• CAVJ-NR (1996)
	• CMA NPWS (1996)
	• D. Andersen (1996)
	• D. Sharpe (1994)
	• J. Turbill (1995)
	• J. Turbill (1996)
	• K. Kendall (1993)
	• K. Metzler (1996)
	• K. Metzler (in prep)
	• K. Weinman & C. Harré (1996)
	• M. Stanton (1994)
	• R. Knowles (1994)
	• R. Knowles (1994)
	• TMA NPWS (1995)

Sydney Basin and LNE* study areas
*NSW NPWS Hunter District only

DATASET	DESCRIPTION
Wollondilly Shire Council	• East Buxton Local Environment Study; ecological assessment of Lots A DP 391587 and 62 DP 751270.
Arthur White	• Sydney Basin; *Litoria littlejohni* records.
Australian Defence Industries	• St Marys; general fauna survey.
Birds Australia, Regent Honeyeater Recovery Team	• Sydney Basin; Regent Honeyeater records.
Crown Solicitors/Dept. Land and Water Conservation	• Maroota Crown Lands; fauna and habitat assessment.
Department of Defence	• Holsworthy Training Environmental Audit; general fauna survey.
Dept. Land and Water Conservation	• Manobalai Vacant Crown Land; general fauna survey.
Michael Murray	• NSW Central Coast; nocturnal call playback.
Rust PPK / Dean Wills	• Microbat Study of Proposed Private Rd, Barnes Rd, Mangrove Mountain.
Mymbat Logistics Company	• Upper Hunter Valley; bird surveys.
NSW National Parks Association	• O'Hares Creek catchment, Wedderburn; reptile and frog survey.
NSW NPWS	• Urban Bushland Biodiversity Survey, western Sydney; general fauna survey. • Royal National Park; general fauna survey. • Popran National Park; Spotted-tailed Quoll survey.
NSW Roads and Traffic Authority	• Proposed Highway link F3 freeway to Branxton; general fauna survey. • Proposed state HWY 23 - W Charlestown Bypass, Windale to Kotara; FIS. • North Kiama Bypass EIS.; suplementary fauna assessment.
Pacific Power	• Bayswater-Sydney West 330 kV transmission line, Wollemi and Yengo national parks; general fauna survey.
Ray Williams	• Personal records for priority taxa, Sydney Basin.
SFNSW	• Chichester Management Area EIS. • Gloucester Management Area EIS. • Morisset District EIS.
Sydney Water	• Proposed Warragamba flood mitigation dam; site access and downstream areas; general fauna survey.

APPENDIX 3

GAP ANALYSIS

Introduction

A new Survey Gap Analysis Tool was developed by NSW NPWS as part of the CRA vertebrate fauna survey project, with some supplementary funding from the CRA UNE and LNE vegetation mapping projects. This software is designed to assist in evaluating the adequacy of existing survey coverage within a region and in locating additional survey sites to fill gaps in this coverage. The tool was used to select survey sites in the LNE study area during the second survey season of the CRA vertebrate fauna project. It was also used to select flora survey sites in UNE and LNE study areas during the CRA vegetation mapping project.

The analytical methodology underpinning the Survey Gap Analysis Tool is a refinement of the basic approach to survey design employed in previous forest surveys conducted by NSW NPWS in north-east NSW (North East Forest Biodiversity Study and NRAC Upper North East Audit). The aim of the original approach was to ensure that survey sites for a given biological group were spread representatively across major environmental gradients within a region. This was achieved by dividing each environmental variable (e.g. mean annual rainfall, soil fertility) into a small number of discrete classes (usually three or four) and then using a GIS to derive all possible combinations of these classes. For example, if four environmental variables are each divided into three classes then 3 x 3 x 3 x 3 = 81 combinations are generated. The objective of the survey design is then to locate a specified number or density of sites within each of these combinations, or 'strata' (Ferrier and Smith 1990). This basic approach has also been employed recently within CRA data audit software developed by Environment Australia.

The major advantage of the above approach is that it is conceptually simple and easy to apply. Nevertheless, extensive experience in the application of this technique over the past 10 years has identified a number of shortcomings:

- the strata generated by combining classes of environmental variables are essentially arbitrary divisions of a continuous environmental space. The pattern of gaps in survey coverage is sensitive to the number of classes used for each variable and the location of thresholds for these classes. In other words, if the classes for the variables are altered then the resulting pattern of survey gaps, and therefore priorities, may also change markedly;

- the approach does not properly consider information on the relationship (or similarity) between classes within each variable, or between strata derived by combining these classes. Each stratum is treated as being equally dissimilar from each of the other strata. In other words, the priority for additional survey effort within a stratum is based purely on the density of existing survey sites within that stratum, with little consideration of the density of survey

sites in closely related strata (i.e. strata with similar combinations of environmental classes). This problem is particularly apparent if a stratification is fine (i.e. has a large number of strata) relative to the number of sites that can be surveyed. If an adequate number of sites cannot be placed in every stratum then strata need to be prioritised in a sensible manner. This prioritisation is difficult without incorporating information on the relationships between strata; and

- the approach aims to spread sites environmentally but does not necessarily ensure that sites are also spread geographically. Previous attempts to incorporate geographical stratification into the approach (e.g. by using latitudinal classes) have been ad hoc and cumbersome.

The analytical approach employed in the Survey Gap Analysis Tool is designed to address all three of the above shortcomings. The main difference between the new approach and that employed previously is that survey coverage is analysed directly in relation to the underlying continuous environmental and geographical space rather than an arbitrary categorisation of this space. The approach is based largely on pioneering research by Faith and Walker (1996) into analytical techniques for selecting conservation reserves to provide the best possible coverage of environmental variation within a region. Faith and Walker employ coverage indices such as the p-median, derived from operations research, to measure how well a set of reserved sites covers (or represents) the continuous environmental space of a region and to evaluate the potential improvement that any given unreserved site would make to this coverage if it was added to the reserve system. While this analytical technique was originally developed as a reserve selection tool it is equally applicable to the problem of selecting survey sites. The basic objective is the same in both cases; to select a set of sites that representatively covers environmental and geographical variation.

Software

The Survey Gap Analysis Tool was developed by the NSW NPWS GIS Research and Development Unit in Armidale. The software is an ArcView GIS extension, written in the Avenue scripting language with calls to the ArcView GridIO library and DLLs written in C++.

Data inputs

Survey domain

The survey domain is provided to the software as a grid theme, and defines the surveyable area of the region of interest. For example, for the LNE fauna surveys this domain was defined as all extant forest within the study area.

Existing survey sites

The locations of any existing survey sites for the biological group or survey technique of interest are provided to the software as an ArcView point theme.

Candidate sites

Candidate sites are a set of sites located randomly throughout the surveyable domain of the region of interest. Candidate sites are the points at which the various indices of survey adequacy and priority will be calculated and displayed by the software. These sites can also be selected interactively as new survey sites. The software includes a function for automatically generating a specified number of candidate sites within the survey domain. Increasing the number of candidate sites improves the quality and useability of evaluation results but also increases computation time. A sample of 10 000 candidate sites provides a good compromise between computation speed and accuracy.

Environmental layers

Each of the environmental layers to be used in analysing survey coverage is provided to the software as an ordinal or interval level grid theme. For example, the environmental layers used in designing the LNE fauna surveys were mean annual temperature (°C), mean annual rainfall (mm), soil fertility rating (1-5) and broad vegetation type (1 = rainforest, 2 = moist open forest, 3 = dry open forest, 4 = coastal complex, 5 = Plateau / rocky complex).

Weights for environmental variables

The indices used to evaluate survey coverage and priority are all derived from estimates of the likely biological difference, or dissimilarity, between pairs of sites. The software predicts the biological dissimilarity between any two sites using a simple linear model based on the environmental values at those sites:

$$\text{Biological dissimilarity} = W_1D_1 + W_2D_2 + \ldots + W_nD_n$$

where D_x is the absolute difference between the values of variable x at the two sites
W_x is the specified weight to be applied to that difference

The weights to be used in this formula are provided by the user for each survey analysis. A weight can also be provided for the geographical separation (in metres) between two sites. This allows geographical space to be readily incorporated into the analysis alongside environmental space. The environmental and geographical weights can be estimated based on expert knowledge of the relative importance of each of the variables in driving biological variation. Alternatively the weights can be estimated through statistical analysis of biological and environmental data from previous surveys. For the LNE survey design, weights were estimated by applying matrix regression analysis (Manly 1986) to the results of previous fauna surveys within north-east NSW, using the S-PLUS statistical package. These weights were: mean annual temperature 0.022, mean annual rainfall 0.000382, soil fertility 0.00835, broad vegetation type 0.103, geographic distance 0.00000164.

Indices

Two indices of survey adequacy and priority can be calculated for each of the candidate sites in the dataset:

Delta p-median index

Faith and Walker (1996) provide a detailed introduction to, and description of, the p-median index. The p-median is a measure of the extent to which a selected subset of sites (in this case the existing survey sites) covers the space defined by a larger set of sites (in this case the candidate sites). It is calculated as the sum of the distances (in this case the predicted biological dissimilarity) between each candidate site and the nearest existing survey site. Smaller p-median values indicate better coverage of the region of interest. The 'delta p-median' index generated by the gap analysis software is calculated as the difference between two p-median values. The first value is simply the p-median index achieved with all existing survey sites. The second value, for a given candidate site, is the p-median index that would be achieved if that site were to be surveyed. The difference between these two values therefore measures the improvement in survey coverage that would be achieved by surveying the site in question.

Distance weighted density index

This index is derived as the ratio between two inverse distance weighted site densities, estimated around each candidate site. The first density is the density of existing survey sites, while the second density is the density of candidate sites. The measure of distance used in these calculations is the predicted biological dissimilarity between sites, as described above.

Application 1: Evaluation of adequacy of survey coverage

The Survey Gap Analysis Tool can be applied in two main ways. In the first application the software can be used to obtain an overview of the relative adequacy of existing survey coverage in different parts of a region. This is achieved by using the software to calculate an index of survey adequacy for every candidate site in the region. The distance weighted density index is particularly well suited for this purpose. Values for the index can be displayed as a point theme, using different coloured symbols for the candidate sites. Alternatively, standard ArcView functionality can be used to interpolate these values across the entire region thereby generating a grid theme of relative survey adequacy.

This process can be repeated at various stages during a survey program to give a graphical indication of improvement in survey coverage as additional sites are surveyed. A single quantitative measure of survey adequacy at each of these stages can also be obtained by calculating the overall p-median index.

Application 2: Selection of additional survey sites

In the second application the software can be used to provide guidance in selecting new survey sites. This is achieved by calculating an index of survey priority for every candidate site in the region. The delta p-median index is best suited to this purpose. Values for this index can be displayed as a point theme with coloured symbols chosen to accentuate the highest priority candidate sites. Other themes relating to accessibility (e.g. roads, tenure) can also be displayed to assist in selecting sites. The user can interactively select one or more sites as being flagged for survey, and these are then added to a log of selected sites. The software then automatically recalculates the delta p-median index for the remaining candidate sites, now treating the selected sites as having been surveyed. This process is repeated iteratively until the required number of new survey sites is obtained.

References

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APPENDIX 4

FIELD SURVEY PROFORMAS

1997/8 CRA SURVEYS

DIURNAL/NOCTURNAL HERPETOFAUNA CENSUS

CRA Region ..... Fauna Surveyor.....

Complete one sheet for each census.

Site No _____ Date _____

Start time (24 hr) _____ Finish time (24 hr) _____

Cloud cover[1]_____ Moon[2]_____

Wind speed[3]_____ Wind direction[4]_____

Rain[5]_____ Temperature Wet _____ Dry _____

Diurnal / Nocturnal _____

Sp code	Species name	No. Ind.	Ob type[6]	MH type	Breed	Notes/Field No./ Tissues taken

1 Cloud cover
In eighths of sky

2 Moon
0=none 1=1/4 moon 2=1/2 moon 3=3/4 moon 4=full moon

3 Wind speed
0=calm, 1= light (leaves rustle), 2= Moderate (branches move)

4 Wind direction
Nearest cardinal point

5 Rain
0=none 1=drizzle 2=drizzle - light rain

6 Observation type

O	Observed (sighted)	R	Road kill	F	Tracks, scratching
W	Heard call	D	Dog kill	Z	In raptor/owl pellet
X	In scat	C	Cat kill	M	Miscellaneous
P	Scat V	Fox kill		E	Nest or roost
T	Caught (trapped or netted)	K	Dead	B	Burnt
H	Hair or feathers	S	Shot	Y	Bones or teeth
N	Not located				

7 MH (microhabitat) type

AC	Flying above canopy	IB	In burrow	OB	On (beach) sand
BR	In/on bridge	IC	In cave	OL	On log
BU	In building	IG	In grss	OR	On rock
CK	Crevice in rock	IH	In tree hollow	OW	Over water
CL	Crevice in log	IL	In litter	RD	On road
DA	Farm/fire dam	IR	In reeds	TK	On trunk
DT	In dead tree (stag)	IS	In soil	UB	Under bark
EW	Edge of water	IT	In (live) tree	UC	Upper canopy
FC	In/on post or stump	IW	In water	UG	Undergrowth
FL	Flying within canopy	LC	Lower canopy	UL	Under log
GR	On ground	LS	Low shrub	UR	Under rock
HS	High shrub	MC	Mid canopy	UT	Under iron
				WH	Waterhole

8 Breeding type

-	not breeding	G	Gravid	M	Nestling
D	Distraction display	I	Immature	N	Nesting
E	Eggs	J	Juveniles	P	Pregnant
L	Lactating	Y	Yes, but no details		

NOTES ON DIURNAL HERPETOFAUNA CENSUS

Censuses must be conducted for 1person-hr at each site and cover 0.5 ha. A Site Attribute sheet is required for all sites.

The technique involves active searching of potential reptile and frog microhabitats. Destructive searching of fallen logs, litter, decorticating and fallen bark, rock outcrops and other likely substrates must be undertaken. If necessary, animals should be captured or vouchered to verify their identification.

NOTES ON NOCTURNAL STREAMSIDE CENSUS

Censuses must be conducted for 1 person-hr for 200m along the drainage line or waterbody at each site. No more than 2 experienced people should conduct the survey. A Site Attribute sheet is required for all sites.

Surveys should begin between about 1 hour after dusk and midnight. On colder nights surveys should begin as early as possible. The technique involves listening for calls and active searching of potential frog microhabitats using a head-torch or spotlight. Preferably conduct on warm, dark, humid and wet nights - avoid cold, windy or brightly moonlit nights. If necessary, animals should be captured or vouchered to verify their identification

1997/8 CRA SURVEYS **NOCTURNAL CALL PLAYBACK**

CRA Region ..... Fauna Surveyor.....

Complete one sheet for each survey.

Site No _____ Date _____

Start time (24 hr) _____ Finish time (24 hr) _____

Cloud cover[1]_____ Moon[2]_____

Wind speed[3]_____ Wind direction[4]_____

Rain[5]_____ Temperature Wet _____ Dry _____

Call played	**Species response**					
Call Species Name	**Sp. code**	**Species Name**	**Ob type[6]**	**No Ind**	**Dete-ction time[7]**	**Notes**

1 Cloud cover
In eighths of sky

2 Moon
0=none 1=1/4 moon 2=1/2 moon 3=3/4 moon 4=full moon

3 Wind speed
0=calm, 1= light (leaves rustle), 2= Moderate (branches move)

4 Wind direction
Nearest cardinal point

5 Rain
0=none 1=drizzle 2=drizzle - light rain

6 Observation type

O	Observed (sighted)	R	Road kill	F	Tracks, scratching
W	Heard call	D	Dog kill	Z	In raptor/owl pellet
X	In scat	C	Cat kill	M	Miscellaneous
P	Scat	V	Fox kill	E	Nest or roost
T	Caught (trapped or netted)	K	Dead	B	Burnt
H	Hair or feathers	S	Shot	Y	Bones or teeth
N	Not located				

7 Detection time
1=during initial 10min listening period 2=during final 10min

NOCTURNAL CALL PLAYBACK

Equipment Watch, binoculars, Walkman, Megaphone, Call tape, Spotlights (50w)

Method All sites should be separated by at least 2km. Additional surveys where possible, but a Site Attribute sheet is required for all sites. Surveysshould not be conducted on windy or rainy nights.

Preferably, 3 people should be involved; one to operate the cassette player and megaphone; the other two 200m from the megaphone, in opposite directions.

Listen at each site for 10min prior to call playback.

A standard survey consists of playing pre-recorded calls of the four species of large forest owl species individually for 3 minutes, followed by a 2 minute listening period. Other species can be added on discretion.

Listen at each site for 10min following call playback and search the immediate area with a spotlight.

Record all possible calls and sightings, including number of individuals. Do not record the same animal more than once.

NSW CRA SUMMER VERTEBRATE FAUNA SURVEYS

ANABAT CALL RECORDING

CRA Area:

Site No	Date	Start Time	Sens Level	Tape No	Duration	Temp °C	Wind[1]	Night Light[2]	Notes

Site No	Date	Start Time	Sens Level	Tape No	Duration	Temp °C	Wind[1]	Night Light[2]	Notes

1 Wind

0 = calm 1 = light, leaves rustle 2 = moderate, moves branches

2 Night Light

1 = very dark, no moon + cloud 2 = dark, 1/4 moon or moon with heavy cloud

3 = details visible, moon and clear sky 4 = bright, 1/2 moon or more with no cloud

Notes on Anabat:

Equipment

Watch, themometer, AA batteries, leads, Anabat detector, laptop or cassette recorder and tapes

Method

30 minute census.

Microphone is very sensitive to moisture; avoid windy or cold conditions (<12° C). Set detector microphone at 45% to ground. Record 40 kHz calibration tone at start of recording and again at end of recording. Replace recorder batteries every two to three censuses; weak batteries will distort call frequencies

Do not conduct during rain or drizzle; avoid the use of lights, cigarette smoke and areas of high insect activity.

Clearly label cassette or disk file and disk with site number and date. Record CRA Area, date, tape number and site on casette tape label.

NSW CRA SUMMER VERTEBRATE FAUNA SURVEYS **DIURNAL BIRD CENSUS**

CRA Area:

Complete one sheet for each census. Separate observations WITHIN and OUTSIDE site boundaries.

Site No ____________________________ Date _______________________________________

Start time (24 hr) ___________________ Finish time (24 hr) ____________________________

Cloud cover[1]_________________________ Rain[2]____

Wind speed[3]_________________________ Wind direction[4]________________________________

Temperature Wet ___________ Dry ____________

WITHIN SITE BOUNDARIES						OUTSIDE SITE BOUNDARIES					
Sp code	Species Name	No Ind	Ob type[5]	MH type[6]	Breed type[7]	Sp code	Species Name	No Ind	Ob type	MH type	Breed type

1 Cloud cover
In eighths of sky

2 Rain
0=none 1=drizzle - light 2=drizzle - heavy 3=heavy rain

3 Wind speed
0=calm 1= light (leaves rustle) 2= moderate (branches move)

4 Wind direction
Nearest cardinal point

5 Observation type

O	Observed (sighted)	R	Road kill	F	Tracks, scratching
W	Heard call	D	Dog kill	Z	In raptor/owl pellet
X	In scat	C	Cat kill	M	Miscellaneous
P	Scat	V	Fox kill	E	Nest or roost
T	Caught (trapped or netted)	K	Dead	B	Burnt
H	Hair or feathers	S	Shot	Y	Bones or teeth
N	Not located				

6 MH (microhabitat) type

AC	Flying above canopy	IB	In burrow	OB	On (beach) sand
BR	In/on bridge	IC	In cave	OL	On log
BU	In building	IG	In grss	OR	On rock
CK	Crevice in rock	IH	In tree hollow	OW	Over water
CL	Crevice in log	IL	In litter	RD	On road
DA	Farm/fire dam	IR	In reeds	TK	On trunk
DT	In dead tree (stag)	IS	In soil	UB	Under bark
EW	Edge of water	IT	In (live) tree	UC	Upper canopy
FC	In/on post or stump	IW	In water	UG	Undergrowth
FL	Flying within canopy	LC	Lower canopy	UL	Under log
GR	On ground	LS	Low shrub	UR	Under rock
HS	High shrub	MC	Mid canopy	UT	Under iron
				WH	Waterhole

7 Breeding type

-	not breeding	G	Gravid	M	Nestling
D	Distraction display	I	Immature	N	Nesting
E	Eggs	J	Juveniles	P	Pregnant
L	Lactating	Y	Yes, but no details		

Notes on bird census

One experienced ornithologist should record all birds seen or heard for 20min within 2 ha standard survey site. Also additional locations where possible, but a Site Attribute sheet is required for all sites.

Census should include stationary periods and slow searching. Particular attention should be paid to estimating numbers within site boundaries.

Censuses should be conducted from soon after sunrise to not more than 3 hours after sunrise. Late afternoon censuses are permissable when necessary.

NSW CRA SUMMER VERTEBRATE FAUNA SURVEYS **FOOT/VEHICLE BASED SPOTLIGHTING**

CRA Area:

Complete one sheet for each transect, even if no sightings or calls are recorded. Record unidentified calls and sightings.

On Foot or Vehicle?:_____

Start: **Finish:**

Time _____ **Time**_____

Easting _____ **Easting**_____

Northing _____ **Northing**_____

Cloud cover[1]_____ Moon[2]_____

Wind speed[3]_____ Wind direction[4]_____

Rain[5]_____ Temperature Wet _____ Dry _____

No. of surveyors[6] _____

Date, time (24h)	Easting	Northing	Odo.	On site /off site[7]	Sp code	Species Name	Ob. typ[8]	No Ind	Notes/field No/ 90° distance from transect (m)

Date, time (24h)	Easting	Northing	Odo.	On site /off site[7]	Sp code	Species Name	Ob. typ[8]	No Ind	Notes/field No/ 90° distance from transect (m)

Notes on nocturnal spotlighting

1 **Cloud cover** In eighths of sky

2 **Moon** 0=none 1=1/4 moon 2=1/2 moon 3=3/4 moon 4=full moon

3 **Wind speed** Speed: 0=calm, 1= light (leaves rustle), 2= Moderate (branches move)

4 **Wind direction** Direction: nearest cardinal point

5 **Rain** 0=none 1=drizzle 2=drizzle - light rain

6 **Number of surveyors** Record the number of people spotlighting (carrying spotlights)

7 **On site / off site** 1=on site 2=off site

8 **Observation type**

O	Observed (sighted)	R	Road kill	F	Tracks, scratching
W	Heard call	D	Dog kill	Z	In raptor/owl pellet
X	In scat	C	Cat kill	M	Miscellaneous
P	Scat V		Fox kill	E	Nest or roost
T	Caught (trapped or netted)	K	Dead	B	Burnt
H	Hair or feathers	S	Shot	Y	Bones or teeth
N	Not located				

Method Walked transects preferably 500m, 1km, 1.5km or 2km long and encompass a topographic sequence (gully, midslope and ridge). All fauna seen or heard within 50 m either side of transect line should be recorded as on-site and beyond 50 m as off-site. Surveys should not be conducted on windy or rainy nights. Where possible, 2 people should be used. Driven transects should be conducted at slow speed.

The exact route of every transect (walked or driven) must be drawn onto a 1:25,000 topographic map.

1997/8 CRA SURVEYS **HARP (BAT) TRAPPING**

CRA Region ..... Fauna Surveyor:.....

(This sheet also used for trip lining and mist netting in Sydney Basin). Complete one sheet for each survey. Record weather conditions for Night 1 (N1) and Night (N2).

Site No _____

Cloud cover[1] N1 _____ N2 _____ Moon[2] N1 _____ N2 _____

Wind speed[3] N1 _____ N2 _____ Wind direction[4] N1 _____ N2 _____

Rain[5] N1 _____ N2_____

Min. Temp. N1 _____ N2 _____ Max. Temp. N1 _____ N2 _____

Date	**Effort**	**Sp. Code**	**Species Name**	**Measurements[6]**				**Notes / Field No. / Tissues taken**
				Sex	**Age**	**F.arm (mm)**	**Wt (g)**	

Date	**Effort**	**Sp. Code**	**Species Name**	**Measurements[6]**				**Notes / Field No. / Tissues taken**
				Sex	**Age**	**F.arm (mm)**	**Wt (g)**	

1 **Cloud cover** In eighths of sky

2 **Moon** 0=none 1=1/4 moon 2=1/2 moon 3=3/4 moon 4=full moon

3 **Wind speed** 0=calm 1= light (leaves rustle) 2= moderate (branches move)

4 **Wind direction** Nearest cardinal point

5 **Rain** 0=none 1=drizzle 2=drizzle - light rain

6 **Measurements** Take measurements of any species of uncertain taxonomic status, and other species, where time permits.

Equipment Harp trap, sheets of hessian or other material to mask off open sides of trap, calico bags for holding specimens, keys for species identification, calipers for measurement, persola scales for weighing animals.

Method A Site Attribute sheet is required for all sites. Surveys should not be conducted on windy or rainy nights. Two nights per trap location where possible, but not essential. Use notes prepared by Harry Parnaby for NEFBS as a guide to minimum measurements required for each genus. Check traps in early morning. Hold animals individually in calico bags during day to avoid predation from birds, release at dusk.

1997/8 CRA **SURVEYS** **ELLIOTT**
TRAPPING

CRA Region ..... Fauna
Surveyor:.....

Complete one sheet for each survey.

Site No _____

Min. Temp. _____ Max. Temp. _____

Site	Easting	Northing	First morn	Last morn	No Traps	Capt. Date	Sp. Code	Species Name	Sex, Breed Type	MH type[2]	Notes/ Field No./ Tissues[3]

Notes on Elliott Trapping

Traps, bait (half meat, half peanut butter, oatmeal and pistachio nut oil), flagging tape, marking pens, plastic or calico bags.

Traps should be set at 20m intervals, in groups of 10, open for four nights, preferably at times of low moonlight.

Surveys should not be conducted on windy or rainy nights.

Place traps under shade of vegetation where possible, and on stable substrates.

Always mark the location of the trap with flagging tape and take field notes to aid relocation.

Always mark the location of traps on maps and record location information (AMG).

In cold conditions, supply nesting material inside trap.

Traps must be checked at or soon after dawn.

When checking, ensure bait or faeces is not lodged under treadle, and treadle and spring mechanism works.

1 Breeding type

-	not breeding	G	Gravid	M	Nestling
D	Distraction display	I	Immature	N	Nesting
E	Eggs	J	Juveniles	P	Pregnant
		L	Lactating	Y	Yes, but no details

2. MH (microhabitat) type

Use the following codes to indicate the location of the trap:

AC	Flying above canopy	IB	In burrow	OB	On (beach) sand
BR	In/on bridge	IC	In cave	OL	On log
BU	In building	IG	In grss	OR	On rock
CK	Crevice in rock	IH	In tree hollow	OW	Over water
CL	Crevice in log	IL	In litter	RD	On road
DA	Farm/fire dam	IR	In reeds	TK	On trunk
DT	In dead tree (stag)	IS	In soil	UB	Under bark
EW	Edge of water	IT	In (live) tree	UC	Upper canopy
FC	In/on post or stump	IW	In water	UG	Undergrowth
FL	Flying within canopy	LC	Lower canopy	UL	Under log
GR	On ground	LS	Low shrub	UR	Under rock
HS	High shrub	MC	Mid canopy	UT	Under iron
		WH	Waterhole		

3. Notes Include Field number, any tissues taken and adverse weather conditions (eg moonlight, heavy rain).

1997/8 CRA SURVEYS **SCAT**

COLLECTION

CRA Region ..... Fauna Surveyor:.....

Sheet and scats returned to NPWS Northern Zone by fauna surveyor on.....(date).

FOR USE BY SCAT ANALYST:

ANALYST'S NAME: .....

Date	**Collector**	**Site or** Site No.	**AMG:** Easting	**AMG:** Northing	**Scat species**	**Species recorded in scat**	**Accuracy** 1 = Definite 2 = Probable 3 = Possible

Please return this completed sheet or photocopy to: **Joanna Knight**
NPWS Northern Zone
PO Box 914
COFFS HARBOUR 2450

1997/8 CRA SURVEYS

SCAT COLLECTION

CRA Region ..... Fauna Surveyor:.....

1997/8 CRA SURVEYS **SITE ATTRIBUTES**

CRA Region ..... Fauna Surveyor:.....

Survey Area: __ __ __ __ **Site No.:** _____ Date: ___/___/___ page 1/2

Locality description:
.....
.....
.....

Map code: __ __ __ __ __ __ Map name:
.....

From 1:25,000 topo. map: AMG E: __ __ __ __ __ __ __ N: __ __ __ __ __ __ __ __

From GPS reading: AMG E: __ __ __ __ __ __ __ N: __ __ __ __ __ __ __ __

Land tenure (circle) Nat. Park Nature Res. Crown leasehold State Forest Flora Res. Vacant Crown Land
Private (freehold) Western Lands Lease SF compartment: _____

NPWS Estate, State Forest or Reserve Name:
.....

LGA name | NPWS District

Accuracy of location 100m 1km other.....

Physical details Altitude __ __ __ __ (m) __ __ degrees Slope Aspect __ __ __ degrees

Topographic Position (circle best morphology and element)

Morphology	Crest	Simple Sl.	Upper Sl.	Mid Slope	Lower Sl.	Flat	Open Depr.	Closed Depr.
Element	Hillcrest	Streambank	Cliff	Cliff	Cliff-foot	Plain	Gully	Lake
	Summit	Cliff	Hill slope	Hill slope	Hill slope	Valley	Drainage	Lagoon
		Hill slope	Scarp	Scarp	Scarp-foot	Fan	Depression	Swamp
		Scarp					Stream channel	
							Stream bed	

Disturbance History	Severity (0=no evid., 1=light, 2=mod., 3=severe)	Time since last event (estim.)	Accuracy (e.g. +/- 2 years)	Observation type 1=visual est, 2=written record, 3=informant
Fire				
Logging (inc. ringbarking)				
Grazing				
Weeds				

Soil Depth	Deep	Shallow	Skeletal	Type	Clay	Loam	Sand	Orga

Geology Mapped		Actual		....

Stand description

% of trees/shrubs with characteristic: (circle most appropriate class code)	100-75%	75-50%	50-25%	25-5%	<5%, many on each individual	<5%, few on each individual	none
Large tree hollows (trunk)	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Small tree hollows (branch)	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Mistletoe	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Epiphytes (stag- elk ferns)	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Fleshy fruit:	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Flowers:	**6**	**5**	**4**	**3**	**2**	**1**	**0**

% of trees/shrubs as follows: (circle most appropriate class code)	100-75%	75-50%	50-25%	25-5%	<5%, many individuals	<5%, few individuals	none
Tree or shrub Acacias	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Tree or shrub Banksias	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Tree or shrub Allocasuarinas	**6**	**5**	**4**	**3**	**2**	**1**	**0**

Large (>10cm dbh) stags	no. present on 20x20m plot:	>10	9 to 6	3 to 5	1 to 2	nor

Dominant shrub growth form	Mesic	Mixed	Heathy	Treefern	Grass Tree

Dominant ground layer growth form	Tussock grass	Hummock grass	Sod grass / Lichen	Fern / Liverwort	Moss / Sedge	Herb/ grass / Rush	Vine

Strata

(Top stratum is "emergent" if < or =5% crown cover, assuming opaque crowns)	Crown Type as McDonald et al.p.71	Height range *	Composition Non-RF-Mixed -RF	Age class senescent x-d-s-t-a **	Age class mature x-d-s-t-a **	Age class regeneration x-d-s-t-a **	Dominant Floristics (if known)
Emergent				-	-	-	
Tree 1							
Tree 2				-	-	-	
Shrub				-	-	-	

*Height Range: *1-3 m, 3-5 m, 5-12 m, 12-20 m, 20-35 m, >35 m*

** Age class:			
	x	*dominant age class type1*	*>70% of crowns*
	d	*dominant age class type 2*	*>30% of crowns*
	s	*sub-dominant age-class*	*11-30% of crowns*
	t	*trace only*	*1-10% of crowns*
	a	*absent*	*0% of crowns*

SFNSW Forest Type

Observed:	*Mapped:*

5. Ground layer (visible)

		% cover		% cover		% cover
Projective cover (%)	veg.		soil		litter	
(total % cover = 100%)	rock		log			

6. Litter

	>10cm	10-2 cm	2-0 cm	0 cm
Litter depth	Deep	Mod.	Shallow	Absent
Humus	Deep	Mod.	Shallow	Absent

Stream or water body characteristics (at gully sites and other frog survey sites)

(circle or tick)

Stream order (map-based)	**1**	**2**	**3**	**4**				
Stream width (between fringing vegetation)		m						
Stream substrate	gravel	rock	sand	soil				
Fringing vegetation / bank habitat	ferns	grass	sedges	floating	rocky	soil	sand	
Riparian Vegetation	RF	WSF	DSF	she-oak	swamp scler.	ferns	grass	sedge
Water movement	still	flowing		colour	clear	stained		

Water body	temporary (ephemeral soaks, ephemeral streams)	natural
	permanent (water present >80% of time)	human-made (e.g. dam)

APPENDIX 5

SURVEY LICENCES AND VOUCHER COLLECTION GUIDELINES

PART A - SURVEY LICENCES

The CRA vertebrate surveys were conducted under the following licences:

Type	Issuing authority	Licence numbers
Animal Research Authority	NSW NPWS Animal Care and Ethics Committee	46, 46a and 46b
Special Purpose Permit (for activities on land administered by SFNSW)	State Forests of NSW	05107, 05207, 05313
Scientific Investigation Licence (Section120 & 131 of the NPWS Act, 1974)	NSW NPWS	A2053, A2062, A2083.
Concessional Spirits Permit	Australian Customs Service	199806/005763/A

PART B - GUIDELINES FOR COLLECTION OF VOUCHER SPECIMENS

The following guidelines were issued to all survey team leaders.

Voucher specimens form a permenant record of the identity of a capture or sighting, and in some cases are the only form of record which is still useful after a taxonomic revision of a species. They should never be discarded.

Under the terms of the Animal Research Authority issued to fauna surveys, all research must be carried out according to the Australian code of practice for the care and use of animals for scientific purposes.

Voucher specimens must be lodged with the Australian Museum (Sydney). Complete documentation (proformas provided) must be recorded and kept with the specimen. Copies of the same information must be kept by NPWS.

Methods

Euthanasia

The NPWS Animal Care and Ethics Committee (ACEC) has authorised the use of intraperitoneal injection of Lethobarb for animal euthanasia in the CRA surveys. No other method should be used.

Preservation of voucher specimens

All road kill or predated remains should be identified, recorded and collected if regarded as being species of special interest. For large vertebrates, collection of the skull (if intact) and hair should be adequate.

Herpetology specimens should be slit carefully along the abdomen, and preserved initially in 10% formalin, followed by 75% ethanol.

The Australian Museum has requested that we preserve a sample of breast muscle from bat voucher specimens separately from the main body of the bat. The muscle sample should only be preserved in ethanol, so it can be used in genetic sampling. The bat body should be preserved initially in 10% formalin, followed by 75% ethanol.

Equipment

For muscle tissue sample: cryovials, 70-75% ethanol, scalpel, forceps, perminant marker pen.

For body: Vials, formalin (10% formaldehyde buffered with calcium carbonate), 75% ethanol, AM-issued field tags, syringe and needles or scalpel and forceps, plastic gloves.

Method for muscle samples from bats

- clean scalpel and forceps prior to use with flame (cigarette lighter is OK) followed by ethanol
- remove muscle sample ASAP after death using scalpel and forceps; where a delay between death and preservation occurs, this should be noted on the voucher specimen data form.
- take sample from largest skeletal muscle mass: on micro-bats and birds - breast muscle;
- sample should be at least a match head in size (if possible; this may be difficult on micro-bats)
- preserve muscle sample immediately in 70-75% ethanol in sterile cryovial

Method for all specimens

- make slit through to abdominal cavity, making sure not to damage internal organs;
- preserve body in formalin for 48 hours for mammals and herpetofauna as small or smaller than house mice; up to 3 weeks for larger vertebrates
- transfer body to 70-75% ethanol after draining formalin from body
- label both cryovial and body vial with the same field number

- ensure the voucher specimen data form is completed, including the noting of any tissue samples taken.

Safety

Formalin and formaldehyde are extremely corrosive to living tissue, and will cause skin to peel; wear plastic gloves at all times when handling; do not breathe vapours; only use in a well-ventilated space; avoid all contact with eyes.

Transport formalin and formaldehyde only in clearly labled bottles with secure, leak-proof safety caps, and inside a second, sealed container that will protect the bottle from extremes of heat and breakage on rough roads.

Formalin and formaldehyde should never be kept in close proximity to food or cooking equipment.

Identification and accession of voucher specimens

Agreement has been made with the Australian Museum to identify vertebrate voucher specimens, and to lodge all vertebrate specimens with the Australian Museum.

Mammal specimens should be sent in separate packages from reptiles and frogs, and addressed as follows:

Mammal specimens should be marked: ATTENTION: SANDY INGLEBY, MAMMALOGY

Herpetology specimens should be marked: ATTENTION: ROSS SADLIER, HERPETOLOGY

Followed by: Australian Museum

6 College St

Sydney NSW 2000

The phone number of the Museum is: (02) 9320 6000

When sending voucher specimens to the Australian Museum, please do the following:

- ensure that specimens are preserved in alcohol, not formalin, and that all containers are tightly sealed and do not leak;
- ensure that every individual animal has a unique number on a tag attached firmly to the body, preferably to one of the limbs. Tags for snakes and legless lizards should pierce a fleshy part of the tail. Tissue samples taken from individuals should have the same number as the remainder of the body.

Tags for reptiles and frogs have been supplied by the Museum. Mammals may be tagged with either heavy paper and string tags (often available in newsagents) or preferably using a plastic tag made by punching the number into a ‘dynamo’ labeller.

Each individual sent to the Museum must be accompanied by a completed voucher specimen form. Forms should be filled out in dark pencil or ink which is indelible to alcohol. Drawing pen ink and some special felt-tipped marker are alcohol-proof, but most felt-tipped markers and ball-point ink will run badly.

Please keep photocopies of the completed voucher specimen forms in a safe place in the CRA Zone, along with a record of when you sent the material to the Museum.

Voucher specimens should be accompanied by a proforma which lists the specimens. The Museum should complete the sheet and return it to the CRA fauna coordinator or data manager, in order to verify the identification of the specimen. Do not forget to provide a return name, address and phone number at the bottom of the form. This is an important step in ensuring that any misidentifications are corrected in the CRA databases.

Ensure specimens vials are packaged with plenty of padding and in a crush-resistant box.

Send voucher specimens by road courier, not by Australia Post or air freight. Decompression in air travel may cause the vials to leak. Sending flammable liquids by Australia Post is illegal.

As a courtesy to the Museum, please phone or fax the relevant collection manager to inform them that you are sending the material:

For Herpetology specimens: Ross Sadlier Ph. (02) 9320 6000, Fax: 9320 6050

For Mammal specimens: Sandy Ingleby Ph. (02) 9320 6000, Fax: 9320 6073

APPENDIX 6

RECORDS FROM CRA VERTEBRATE FAUNA SURVEYS

Parts 1 - 5 detail fauna records available for data analysis in each CRA study area. Records from CRA surveys are allocated to the appropriate survey technique, collated records are pooled into a single column.

No data are given for the Southern study area because field surveys are still underway. It is anticipated that these results will be available in March 1999.

PART 1: UNE STUDY AREA

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Adelotus brevis	0	2	8	0	0	0	0	8	0	0	0	0	10143	10161	364	10525
	Assa darlingtoni	0	2	20	0	0	0	0	0	0	0	0	0	0	22	967	989
	Crinia tinnula	0	13	0	0	0	0	0	6	0	0	0	4	58	81	944	1025
	Heleioporus australiacus	0	0	0	0	0	0	0	4	0	0	0	0	0	4	0	4
	Lechriodus fletcheri	0	0	0	0	0	0	0	5	0	0	0	0	29	34	266	300
	Limnodynastes dumerilii	0	0	60	0	0	0	1	26	0	0	0	0	9	96	125	221
	Limnodynastes fletcheri	0	0	2	0	0	0	0	0	0	0	0	0	21	23	23	46
	Limnodynastes ornatus	0	0	22	0	0	0	0	13	0	0	0	1	26	62	238	300
	Limnodynastes peronii	0	6	97	0	0	0	0	35	0	0	0	16	292	446	1127	1573
	Limnodynastes salmini	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Limnodynastes tasmaniensis	0	27	37	0	0	0	1	15	0	0	0	4	156	240	184	424
	Limnodynastes terraereginae	0	0	3	0	0	0	0	0	0	0	0	0	21	24	359	383
	Mixophyes balbus	0	0	0	0	0	0	0	39	0	0	0	0	0	39	209	248
	Mixophyes fasciolatus	0	0	53	10	0	0	20	6	0	0	0	0	213	302	697	999
	Mixophyes fleayi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	31
T	*Mixophyes iteratus*	0	0	4	0	0	0	0	0	0	0	0	0	5	9	515	524
	Philoria kundagungan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28
	Philoria loveridgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	159
	Philoria sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	218	218
	Philoria sp. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15
	Philoria sp. 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Philoria sphagnicolus	0	0	0	0	0	0	0	0	0	0	0	0	1	1	37	38
	Pseudophryne australis	0	0	0	0	0	0	0	14	0	0	0	0	0	14	1	15
	Pseudophryne bibronii	0	0	24	0	0	0	0	27	0	0	0	0	0	51	85	136

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Pseudophryne coriacea	0	9	275	60	0	0	31	219	0	0	0	1	201	796	1837	2633
	Uperoleia fusca	0	2	100	0	0	0	0	21	0	0	0	1	151	275	130	405
	Uperoleia laevigata	0	1	146	0	0	0	0	0	0	0	0	0	327	474	110	584
	Uperoleia rugosa	0	0	0	0	0	0	0	0	0	0	0	0	37	37	0	37
	Litoria aurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	23
	Litoria barringtonensis	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	2
T	*Litoria booroolongensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	204	204
	Litoria brevipalmata	0	1	8	5	0	0	0	0	0	1	0	0	48	63	49	112
	Litoria caerulea	0	1	12	0	0	0	0	4	0	0	0	0	18	35	268	303
	Litoria castanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112
	Litoria chloris	0	0	1	0	0	0	0	1	0	0	0	0	104	106	567	673
	Litoria dentata	0	9	110	0	0	0	0	7	0	0	0	0	110	236	429	665
	Litoria fallax	0	1	223	0	0	0	0	81	0	0	0	0	780	1085	2210	3295
	Litoria freycineti	0	0	0	0	0	0	0	8	0	0	0	0	10	18	239	257
	Litoria gracilenta	0	0	147	4	0	0	2	0	0	0	0	0	117	270	309	579
	Litoria jervisiensis	0	0	0	0	0	0	0	5	0	0	0	0	0	5	22	27
	Litoria latopalmata	0	1	236	0	0	0	4	24	0	0	0	0	433	698	600	1298
	Litoria lesueuri	0	5	278	0	0	0	5	84	0	0	0	1	148	521	1668	2189
	Litoria nasuta	0	1	69	0	0	0	2	5	0	0	0	0	231	308	645	953
	Litoria olongburensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	252	252
	Litoria pearsoniana	0	0	16	0	0	0	0	0	0	0	0	0	157	173	381	554
	Litoria pearsoniana/phyllochroa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	595	595
	Litoria peronii	0	0	21	1	0	0	1	44	0	0	0	0	52	119	657	776
	Litoria phyllochroa	0	0	0	0	0	0	0	6	0	0	0	0	0	6	13	19
	Litoria piperata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	76
	Litoria revelata	0	0	1	0	0	0	0	0	0	0	0	0	273	274	74	348

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Litoria rubella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Litoria subglandulosa	0	0	0	0	0	0	0	3	0	0	0	0	0	3	87	90
	Litoria tyleri	0	0	1	0	0	0	0	17	0	0	0	0	92	110	312	422
	Litoria verreauxii	0	0	58	0	0	0	0	6	0	0	0	0	37	101	454	555
	Chelodina longicollis	0	0	2	0	0	0	0	0	0	0	0	0	10	12	163	175
	Elseya latisternum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	178	178
	Emydura signata	0	0	0	0	0	0	0	0	0	0	0	0	4	4	147	151
	Diplodactylus vittatus	0	5	1	0	0	0	0	4	0	0	0	0	1	11	7	18
	Heteronotia binoei	0	10	0	0	0	0	0	0	0	0	0	0	7	17	0	17
	Oedura lesueurii	0	44	0	0	0	0	0	5	0	0	0	0	64	113	22	135
	Oedura robusta	0	1	0	0	0	0	0	0	0	0	0	0	4	5	39	44
	Oedura tryoni	0	21	1	0	0	0	0	0	0	0	0	0	13	35	40	75
	Phyllurus platurus	0	0	0	0	0	0	0	11	0	0	0	0	0	11	6	17
	Saltuarius cornutus	0	0	0	0	0	0	1	0	0	0	0	0	0	1	65	66
	Saltuarius swaini	0	0	0	0	0	0	0	2	0	0	0	0	2	4	64	68
T	*Underwoodisaurus sphyrurus*	0	3	0	0	0	0	0	0	0	0	0	0	1	4	6	10
	Delma plebeia	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
	Delma tincta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Lialis burtonis	0	4	0	0	0	0	0	1	0	0	0	0	3	8	50	58
	Pygopus lepidopodus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	47
	Amphibolurus muricatus	0	10	4	0	0	0	0	1	0	0	0	2	26	43	70	113
	Amphibolurus nobbi	0	15	0	0	0	0	0	0	0	0	0	1	21	37	96	133
	Diporiphora australis	0	1	0	0	0	0	0	0	0	0	0	1	0	2	10	12
	Hypsilurus spinipes	0	0	0	0	0	0	0	1	0	0	0	0	1	2	193	195
	Physignathus lesueurii	0	3	21	0	0	0	0	6	0	0	0	0	32	62	646	708
	Pogona barbata	0	1	0	0	0	0	0	0	0	0	0	0	8	9	254	263

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Varanus gouldii	0	1	0	0	0	0	0	0	0	0	0	0	2	3	69	72
	Varanus varius	0	7	0	0	0	0	0	0	0	0	1	0	27	35	1003	1038
	Anomalopus leuckartii	0	11	0	0	0	0	0	0	0	0	0	1	4	16	0	16
	Anomalopus verreauxii	0	0	0	0	0	0	0	0	0	0	0	0	2	2	86	88
	Bassiana platynota	0	43	4	0	0	0	0	0	0	0	0	0	18	65	57	122
	Calyptotis ruficauda	0	2	0	0	0	0	0	0	0	0	0	0	15	17	467	484
	Calyptotis scutirostrum	0	62	0	0	0	0	0	0	0	0	0	0	67	129	3184	3313
	Calyptotis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30
	Carlia tetradactyla	0	2	0	0	0	0	0	0	0	0	0	0	0	2	7	9
	Carlia vivax	0	20	0	0	0	0	0	0	0	0	0	0	6	26	54	80
	Cautula zia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107	107
	Coeranoscincus reticulatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	137
	Cryptoblepharus virgatus	0	44	0	0	0	0	0	0	0	0	0	0	10	54	180	234
	Ctenotus eurydice	0	1	0	0	0	0	0	0	0	0	0	0	1	2	21	23
	Ctenotus robustus	0	5	0	0	0	0	0	0	0	0	0	0	12	17	185	202
	Ctenotus taeniolatus	0	60	1	0	0	0	0	0	0	0	0	1	21	83	125	208
	Egernia cunninghami	0	6	0	0	0	0	0	0	0	0	0	0	3	9	76	85
	Egernia frerei	0	0	0	0	0	0	0	0	0	0	1	0	1	2	89	91
	Egernia major	0	0	0	0	0	0	0	0	0	0	0	0	6	6	341	347
	Egernia mcpheei	0	12	0	0	0	0	0	0	0	0	0	0	6	18	202	220
	Egernia modesta	0	1	0	0	0	0	0	0	0	0	0	0	1	2	26	28
	Egernia saxatilis	0	9	0	0	0	0	0	0	0	0	0	0	0	9	63	72
	Egernia saxatilis intermedia	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
	Egernia striolata	0	8	0	0	0	0	0	0	0	0	0	0	7	15	30	45
	Egernia whitii	0	54	0	0	0	0	0	0	0	0	0	0	20	74	85	159
	Eulamprus brachysoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Eulamprus heatwolei	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	6
	Eulamprus kosciuskoi	0	29	1	0	0	0	0	0	0	0	0	0	16	46	79	125
	Eulamprus martini	0	98	0	0	0	0	0	0	0	0	0	0	160	258	409	667
	Eulamprus murrayi	0	16	0	0	0	0	0	0	0	0	0	3	4	23	1107	1130
	Eulamprus quoyii	0	56	0	0	0	0	1	1	0	0	1	0	40	99	966	1065
	Eulamprus tenuis	0	2	0	0	0	0	0	0	0	0	0	0	2	4	272	276
	Eulamprus tenuis\martini	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	51
	Eulamprus tympanum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Hemiergis decresiensis	0	5	0	0	0	0	0	0	0	0	0	0	3	8	7	15
	Hemisphaeriodon gerrardii	0	1	1	0	0	0	0	2	0	0	0	0	1	5	36	41
	Lampropholis amicula	0	2	0	0	0	0	0	0	0	0	0	0	1	3	105	108
	Lampropholis caligula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Lerista bougainvillii	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
	Lerista muelleri	0	2	0	0	0	0	0	0	0	0	0	0	2	4	0	4
	Lygisaurus foliorum	0	96	0	0	0	0	0	0	0	0	0	0	28	124	77	201
	Morethia boulengeri	0	15	0	0	0	0	0	0	0	0	0	0	7	22	38	60
	Ophioscincus truncatus	0	0	0	0	0	0	0	0	0	0	0	0	5	5	503	508
	Pseudemoia entrecasteauxii	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
	Saiphos equalis	0	88	0	0	0	0	1	0	0	0	0	0	57	146	1246	1392
	Saproscincus challengeri	0	2	0	0	0	0	0	0	0	0	0	2	5	9	857	866
	Saproscincus challengeri sensu stricto	0	0	0	0	0	0	0	0	0	0	0	0	5	5	52	57
	Saproscincus galli	0	0	0	0	0	0	0	0	0	0	0	0	7	7	77	84
	Saproscincus mustelinus	0	1	4	0	0	0	0	0	0	0	0	0	4	9	36	45
	Saproscincus rosei	0	0	0	0	0	0	0	0	0	0	0	0	1	1	194	195
	White-lined Weasel Skink	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Tiliqua scincoides	0	0	0	0	0	0	0	0	0	0	0	0	2	2	105	107
	Ramphotyphlops affinis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Ramphotyphlops proximus	0	1	0	0	0	0	0	0	0	0	0	0	0	1	15	16
	Ramphotyphlops wiedii	0	0	0	0	0	0	0	0	0	0	0	1	0	1	15	16
	Liasis childreni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Liasis maculosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Morelia spilota	0	0	1	0	0	0	1	1	0	0	0	0	1	4	287	291
	Morelia spilota variegata	0	1	0	0	0	0	0	0	0	0	0	0	10	11	96	107
	Boiga irregularis	0	0	0	0	0	0	0	0	0	0	0	0	2	2	69	71
	Dendrelaphis punctulata	0	0	0	0	0	0	0	0	0	0	0	0	9	9	93	102
	Tropidonophis mairii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19
	Acanthophis antarcticus	0	0	0	0	0	0	0	0	0	0	0	0	1	1	37	38
	Austrelaps ramsayi	0	0	0	0	0	0	0	0	0	0	0	0	1	1	74	75
	Austrelaps superbus	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
	Cacophis harriettae	0	0	0	0	0	0	0	0	0	0	0	0	1	1	28	29
	Cacophis krefftii	0	0	0	0	0	0	0	1	0	0	0	0	3	4	190	194
	Cacophis squamulosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	63
	Demansia psammophis	0	4	0	0	0	0	0	0	0	0	0	0	7	11	159	170
	Drysdalia coronoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Furina diadema	0	0	0	0	0	0	0	1	0	0	0	0	0	1	16	17
	Hemiaspis signata	0	1	0	0	0	0	0	1	0	0	0	0	4	6	138	144
	Hoplocephalus bitorquatus	0	0	0	0	0	0	0	0	0	0	0	0	1	1	27	28
	Hoplocephalus bungaroides	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
	Hoplocephalus stephensii	0	0	0	0	0	0	0	2	0	0	0	0	0	2	81	83
	Notechis scutatus	0	0	0	0	0	0	0	0	0	0	0	0	1	1	26	27
	Oxyuranus scutellatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Pseudechis guttatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Pseudechis porphyriacus	0	2	2	0	0	0	0	0	0	0	0	0	17	21	313	334
	Pseudonaja textilis	0	0	0	0	0	0	0	0	0	0	0	0	1	1	54	55
	Rhinoplocephalus nigrescens	0	14	2	0	0	0	0	4	0	0	0	0	26	46	127	173
	Simoselaps australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
	Suta spectabilis	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2
	Suta spectabilis dwyeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Tropidechis carinatus	0	0	2	0	0	0	0	0	0	0	0	0	1	3	127	130
	Vermicella annulata	0	0	0	0	0	0	0	1	0	0	0	0	0	1	50	51
	Australian Brush-turkey	0	0	0	0	0	0	0	0	0	0	0	0	3	3	503	506
	Australian Wood Duck	0	0	0	0	0	10	4	0	0	0	0	0	30	44	1301	1345
	Great Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1255	1255
	Cattle Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40924	40924
	Intermediate Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1879	1879
	White-necked Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	397	397
	Striated Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	193
	Little Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	462	462
	White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2276	2279
	Black Bittern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190	190
	Nankeen Night Heron	0	0	0	0	0	0	0	1	0	0	0	0	2	3	94	97
	Yellow-billed Spoonbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	265
	Royal Spoonbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1470	1470
	Glossy Ibis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1494	1494
	Australian White Ibis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3359	3359
	Straw-necked Ibis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6329	6329
	Black-necked Stork	0	0	0	0	0	0	0	0	0	0	0	0	0	0	719	719

PART 1:UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Collared Sparrowhawk	0	0	0	0	0	1	0	0	0	0	0	0	4	5	173	178
	Brown Goshawk	0	0	0	0	0	3	0	0	0	0	0	0	8	11	259	270
	Grey Goshawk	0	0	0	0	0	5	0	0	0	0	0	0	4	9	350	359
	Wedge-tailed Eagle	0	0	0	0	0	1	0	0	0	0	0	0	23	24	767	791
	Pacific Baza	0	0	0	0	0	1	0	0	0	0	0	0	8	9	1055	1064
	Spotted Harrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	61
	Black-shouldered Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	502	502
	Letter-winged Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	31
	Red Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	96
	White-bellied Sea-Eagle	0	0	0	0	0	0	0	0	0	0	0	0	1	1	521	522
	Brahminy Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	713	713
	Whistling Kite	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1171	1172
	Black-breasted Buzzard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Little Eagle	0	0	0	0	0	0	0	0	0	0	0	0	1	1	112	113
	Square-tailed Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	240	240
	Black Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	82
	Osprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	752	752
	Brown Falcon	0	0	0	0	0	1	0	0	0	0	0	0	1	2	191	193
	Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	330
	Grey Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	64
	Australian Hobby	0	0	0	0	0	0	0	0	0	0	0	0	1	1	131	132
	Peregrine Falcon	0	0	0	0	0	0	0	0	0	0	0	0	6	6	245	251
	Black Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
	Bush-hen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	417	417
	Lewin's Rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134	134
T	Black-breasted Button-quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	36

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Painted Button-quail	0	0	0	0	0	2	0	0	0	0	0	0	40	42	134	176
	Bush Stone-curlew	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	45
	Emerald Dove	0	0	0	0	0	4	0	0	0	0	0	0	10	14	777	791
	White-headed Pigeon	0	0	0	0	0	5	0	0	0	0	0	0	4	9	3603	3612
	Diamond Dove	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Bar-shouldered Dove	0	0	0	0	0	3	0	0	0	0	0	0	4	7	1324	1331
	Peaceful Dove	0	0	0	0	0	26	0	0	0	0	0	0	12	38	354	392
	Wonga Pigeon	0	0	0	0	0	17	0	0	0	0	0	0	11	28	1388	1416
	Topknot Pigeon	0	0	0	0	0	0	0	0	0	0	0	0	9	9	24418	24427
	Brown Cuckoo-Dove	0	0	0	0	0	16	0	2	0	0	0	0	17	35	3563	3598
	Crested Pigeon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2244	2244
	Common Bronzewing	0	0	0	0	0	10	0	0	0	0	0	0	17	27	170	197
	Brush Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21
	Wompoo Fruit-Dove	0	0	0	0	0	1	0	0	0	0	0	0	20	21	2505	2526
	Rose-crowned Fruit-Dove	0	0	0	0	0	2	0	0	0	0	0	0	16	18	1836	1854
	Superb Fruit-Dove	0	0	0	0	0	0	0	0	0	0	0	0	3	3	101	104
	Sulphur-crested Cockatoo	0	0	0	0	0	13	0	0	0	0	0	0	8	21	651	672
	Galah	0	0	0	0	0	5	0	3	0	0	0	0	6	14	1156	1170
	Little Corella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	60
	Long-billed Corella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	17
	Gang-gang Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Red-tailed Black-Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	82
	Yellow-tailed Black-Cockatoo	0	0	0	0	0	21	0	0	0	0	0	0	45	66	1809	1875
	Glossy Black-Cockatoo	0	0	0	0	0	21	0	0	0	0	0	0	89	110	2072	2182
	Cockatiel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Australian King-Parrot	0	0	0	0	0	34	0	0	0	0	0	0	46	80	2861	2941

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Red-winged Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Mallee Ringneck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
T	Double-eyed Fig-Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	52
	Musk Lorikeet	0	0	0	0	0	43	0	0	0	0	0	0	37	80	423	503
	Little Lorikeet	0	0	0	0	0	228	0	0	0	0	0	0	374	602	845	1447
	Swift Parrot	0	0	0	0	0	1	0	0	0	0	0	0	0	1	33	34
	Budgerigar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	152	152
	Turquoise Parrot	0	0	0	0	0	0	0	0	0	0	0	0	34	34	16	50
	Blue Bonnet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Pale-headed Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22
	Crimson Rosella	0	0	0	0	0	102	0	0	0	0	0	0	19	121	2976	3097
	Eastern Rosella	0	0	0	0	0	6	0	0	0	0	0	0	34	40	2193	2233
	Red-rumped Parrot	0	0	0	0	0	3	0	0	0	0	0	0	0	3	11	14
	Scaly-breasted Lorikeet	0	0	0	0	0	93	0	0	0	0	0	0	109	202	2636	2838
	Rainbow Lorikeet	0	0	0	0	0	238	0	0	0	0	0	0	96	334	4031	4365
	Fan-tailed Cuckoo	0	0	0	0	0	12	0	2	0	0	0	0	11	25	2101	2126
	Brush Cuckoo	0	0	0	0	0	14	0	0	0	0	0	0	7	21	612	633
	Horsfield's Bronze-Cuckoo	0	0	0	0	0	1	0	0	0	0	0	0	1	2	122	124
	Shining Bronze-Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1233	1236
	Little Bronze-Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	133	133
	Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	1	1	154	155
	Oriental Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	57
	Common Koel	0	0	0	1	0	22	0	5	0	0	0	0	17	45	1313	1358
	Channel-billed Cuckoo	0	0	0	0	0	4	0	1	0	0	0	0	5	10	609	619
	Barking Owl	0	0	0	5	0	0	0	1	0	0	0	0	2	8	44	52
	Southern Boobook	0	0	0	16	0	1	2	84	1	0	0	0	42	146	1512	1658

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Powerful Owl	0	0	0	22	0	1	0	3	0	0	0	0	8	34	604	638
	Barn Owl	0	0	0	0	0	0	0	0	0	0	0	0	3	3	64	67
	Masked Owl	0	0	0	5	0	0	0	13	0	0	0	0	12	30	336	366
	Sooty Owl	0	0	0	3	0	0	0	9	0	0	0	0	3	15	704	719
	Marbled Frogmouth	0	0	0	2	0	0	0	0	0	0	0	0	2	4	291	295
	Tawny Frogmouth	0	0	0	2	0	1	0	57	0	0	0	0	27	87	1113	1200
	Spotted Nightjar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	White-throated Nightjar	0	0	0	0	0	0	6	29	0	0	0	0	30	65	410	475
	Australian Owlet-nightjar	0	0	0	26	0	1	8	136	0	0	0	0	52	223	1201	1424
	Azure Kingfisher	0	0	0	0	0	1	0	0	0	0	0	0	5	6	372	378
	Laughing Kookaburra	0	0	0	0	0	100	0	6	0	0	0	0	19	125	4198	4323
	Collared Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	166	166
	Forest Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	418	418
	Red-backed Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15
	Sacred Kingfisher	0	0	0	0	0	9	0	1	0	0	0	0	8	18	1222	1240
	Dollarbird	0	0	0	0	0	8	1	1	0	0	0	0	10	20	733	753
	Noisy Pitta	0	0	0	1	0	0	0	2	0	0	0	0	10	13	880	893
	Albert's Lyrebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1605	1605
	Superb Lyrebird	0	0	0	0	0	13	0	2	0	0	0	0	9	24	1138	1162
	Rufous Scrub-bird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	184	184
	White-browed Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
	Red-browed Treecreeper	0	0	0	0	0	26	0	0	0	0	0	0	16	42	970	1012
	Brown Treecreeper	0	0	0	0	0	8	0	0	0	0	0	0	5	13	142	155
	White-throated Treecreeper	0	0	0	0	0	212	0	0	0	0	0	0	41	253	6390	6643
	Yellow-rumped Thornbill	0	0	0	0	0	5	0	0	0	0	0	0	5	10	418	428
	Striated Thornbill	0	0	0	0	0	213	0	2	0	0	0	0	33	248	4161	4409

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Yellow Thornbill	0	0	0	0	0	6	0	0	0	0	0	0	3	9	182	191
	Brown Thornbill	0	0	0	0	0	135	0	0	0	0	0	0	30	165	6594	6759
	Buff-rumped Thornbill	0	0	0	0	0	168	0	0	0	0	0	0	71	239	860	1099
	Southern Whiteface	0	0	0	0	0	1	0	0	0	0	0	0	0	1	4	5
	Speckled Warbler	0	0	0	0	0	7	0	0	0	0	0	0	6	13	65	78
	Eastern Bristlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	159
	Mangrove Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	287
	Brown Gerygone	0	0	0	0	0	32	0	0	0	0	0	0	21	53	5051	5104
	White-throated Gerygone	0	0	0	0	0	26	0	2	0	0	0	0	15	43	706	749
	Chestnut-rumped Heathwren	0	0	0	0	0	0	0	0	0	0	0	0	1	1	22	23
	Spotted Pardalote	0	0	0	0	0	207	0	0	0	0	0	0	33	240	3840	4080
	Striated Pardalote	0	0	0	0	0	72	0	0	0	0	0	0	26	98	1144	1242
	Yellow-throated Scrubwren	0	0	0	0	0	2	0	0	0	0	0	0	10	12	1161	1173
	White-browed Scrubwren	0	0	0	0	0	73	0	0	0	0	0	0	15	88	4910	4998
	Large-billed Scrubwren	0	0	0	0	0	2	0	0	0	0	0	0	8	10	2025	2035
	Weebill	0	0	0	0	0	1	0	0	0	0	0	0	2	3	89	92
	Spiny-cheeked Honeyeater	0	0	0	0	0	1	0	0	0	0	0	0	0	1	4	5
	Eastern Spinebill	0	0	0	0	0	93	0	0	0	0	0	0	18	111	3352	3463
	Red Wattlebird	0	0	0	0	0	46	0	0	0	0	0	0	16	62	603	665
	Little Wattlebird	0	0	0	0	0	5	0	0	0	0	0	0	5	10	882	892
	Blue-faced Honeyeater	0	0	0	0	0	9	0	0	0	0	0	0	7	16	679	695
	Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Yellow-faced Honeyeater	0	0	0	0	0	233	0	1	0	0	0	0	26	260	4935	5195
	Mangrove Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	142	142
	Fuscous Honeyeater	0	0	0	0	0	89	0	0	0	0	0	0	71	160	469	629
	White-eared Honeyeater	0	0	0	0	0	48	0	0	0	0	0	0	10	58	150	208

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Yellow-tufted Honeyeater	0	0	0	0	0	27	0	0	0	0	0	0	15	42	114	156
	White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Brown Honeyeater	0	0	0	0	0	2	0	0	0	0	0	0	2	4	831	835
	Yellow-throated Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Noisy Miner	0	0	0	0	0	49	0	0	0	0	0	0	17	66	2099	2165
	Bell Miner	0	0	0	0	0	48	0	0	0	0	0	0	20	68	1534	1602
	Lewin's Honeyeater	0	0	0	0	0	81	0	0	0	0	0	0	116	197	8711	8908
	White-throated Honeyeater	0	0	0	0	0	48	0	0	0	0	0	0	20	68	525	593
	Brown-headed Honeyeater	0	0	0	0	0	3	0	0	0	0	0	0	2	5	71	76
	Black-chinned Honeyeater	0	0	0	0	0	7	0	0	0	0	0	0	7	14	119	133
	White-naped Honeyeater	0	0	0	0	0	150	0	0	0	0	0	0	41	191	1478	1669
	Scarlet Honeyeater	0	0	0	0	0	70	0	0	0	0	0	0	18	88	3261	3349
	Little Friarbird	0	0	0	0	0	2	0	0	0	0	0	0	18	20	318	338
	Noisy Friarbird	0	0	0	0	0	200	0	0	0	0	0	0	91	291	3120	3411
	White-fronted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Tawny-crowned Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	62
	White-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2036	2040
	New Holland Honeyeater	0	0	0	0	0	25	0	0	0	0	0	0	12	37	223	260
	Striped Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	76
	Regent Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
	Eastern Yellow Robin	0	0	0	0	0	65	0	0	0	0	0	0	35	100	4233	4333
	Hooded Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15
	Jacky Winter	0	0	0	0	0	12	0	0	0	0	0	0	15	27	385	412
	Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Scarlet Robin	0	0	0	0	0	17	0	0	0	0	0	0	15	32	204	236
	Flame Robin	0	0	0	0	0	2	0	0	0	0	0	0	3	5	75	80

PART 1:UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Rose Robin	0	0	0	0	0	1	0	0	0	0	0	0	1	2	877	879
	Pale-yellow Robin	0	0	0	0	0	2	0	0	0	0	0	0	7	9	1291	1300
	Logrunner	0	0	0	0	0	7	0	0	0	0	0	0	16	23	2023	2046
	White-browed Babbler	0	0	0	0	0	6	0	0	0	0	0	0	2	8	2	10
	Grey-crowned Babbler	0	0	0	0	0	16	0	0	0	0	0	0	15	31	350	381
	Spotted Quail-thrush	0	0	0	0	0	2	0	0	0	0	0	0	26	28	208	236
	Eastern Whipbird	0	0	0	0	0	25	0	0	0	0	0	0	5	30	5583	5613
T	Varied Sittella	0	0	0	0	0	55	0	0	0	0	0	0	58	113	866	979
	Grey Shrike-thrush	0	0	0	0	0	115	0	0	0	0	0	0	26	141	5956	6097
	Little Shrike-thrush	0	0	0	0	0	2	0	0	0	0	0	0	0	2	1374	1376
	Crested Shrike-tit	0	0	0	0	0	6	0	0	0	0	0	0	11	17	533	550
	Crested Bellbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Gilbert's Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Olive Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
	Golden Whistler	0	0	0	0	0	26	0	1	0	0	0	0	10	37	5645	5682
	Rufous Whistler	0	0	0	0	0	84	0	0	0	0	0	0	23	107	2334	2441
	Spangled Drongo	0	0	0	0	0	23	0	0	0	0	0	0	6	29	2253	2282
	White-eared Monarch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	685	685
	Black-faced Monarch	0	0	0	0	0	10	0	0	0	0	0	0	4	14	2443	2457
	Spectacled Monarch	0	0	0	0	0	4	0	0	0	0	0	0	7	11	1115	1126
	Shining Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Satin Flycatcher	0	0	0	0	0	8	0	0	0	0	0	0	5	13	164	177
	Restless Flycatcher	0	0	0	0	0	4	0	0	0	0	0	0	7	11	435	446
	Leaden Flycatcher	0	0	0	0	0	49	0	1	0	0	0	0	20	70	1549	1619
	Grey Fantail	0	0	0	0	0	117	0	0	0	0	0	0	35	152	6093	6245
	Willie Wagtail	0	0	0	0	0	12	0	1	0	0	0	0	15	28	1864	1892

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Rufous Fantail	0	0	0	0	0	6	0	1	0	0	0	0	5	12	2551	2563
	Barred Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	1	1	325	326
	Ground Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Black-faced Cuckoo-shrike	0	0	0	0	0	44	0	0	0	0	0	0	21	65	2977	3042
	White-bellied Cuckoo-shrike	0	0	0	0	0	13	0	0	0	0	0	0	21	34	381	415
	Cicadabird	0	0	0	0	0	59	0	0	0	0	0	0	26	85	1744	1829
	Varied Triller	0	0	0	0	0	2	0	0	0	0	0	0	3	5	1058	1063
	White-winged Triller	0	0	0	0	0	2	0	0	0	0	0	0	1	3	81	84
	Olive-backed Oriole	0	0	0	0	0	29	0	0	0	0	0	0	20	49	2160	2209
	Figbird	0	0	0	0	0	4	0	0	0	0	0	0	11	15	5760	5775
	Dusky Woodswallow	0	0	0	0	0	8	0	0	0	0	0	0	40	48	274	322
	White-breasted Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860	860
	Little Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Masked Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243	243
	White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	2	2	474	476
	Pied Butcherbird	0	0	0	0	0	16	0	2	0	0	0	0	5	23	1876	1899
	Grey Butcherbird	0	0	0	0	0	85	0	0	0	0	0	0	20	105	2028	2133
	Australian Magpie	0	0	0	0	0	83	0	0	0	0	0	0	20	103	3518	3621
	Pied Currawong	0	0	0	0	0	104	0	1	0	0	0	0	26	131	6517	6648
	Grey Currawong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
	Paradise Riflebird	0	0	0	0	0	3	0	0	0	0	0	0	10	13	1131	1144
	Little Crow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Australian Raven	0	0	0	0	0	14	0	0	0	0	0	0	10	24	263	287
	Little Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Torresian Crow	0	0	0	0	0	11	0	1	0	0	0	0	12	24	3499	3523
	Forest Raven	0	0	0	0	0	8	0	0	0	0	0	0	5	13	233	246

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	White-winged Chough	0	0	0	0	0	25	0	0	0	0	0	0	91	116	234	350
	Green Catbird	0	0	0	0	0	5	0	0	0	0	0	0	7	12	1394	1406
	Satin Bowerbird	0	0	0	0	0	19	0	0	0	0	0	0	12	31	2568	2599
	Regent Bowerbird	0	0	0	0	0	1	0	0	0	0	0	0	10	11	932	943
	Red-browed Finch	0	0	0	0	0	140	0	0	0	0	0	0	31	171	3838	4009
	Diamond Firetail	0	0	0	0	0	0	0	0	0	0	0	0	14	14	32	46
	Mistletoebird	0	0	0	0	0	92	0	0	0	0	0	0	22	114	2577	2691
	Tree Martin	0	0	0	0	0	5	0	0	0	0	0	0	43	48	603	651
	Red-whiskered Bulbul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	37
	Silvereye	0	0	0	0	0	51	0	0	0	0	0	0	33	84	4977	5061
	White's Thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	108
	Russet-tailed Thrush	0	0	0	0	0	0	0	0	0	0	0	0	5	5	90	95
	Bassian Thrush	0	0	0	0	0	0	0	0	0	0	0	0	1	1	44	45
	Platypus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197	197
	Short-beaked Echidna	0	1	0	0	0	0	0	1	0	0	0	0	8	10	586	596
	Yellow-footed Antechinus	0	0	0	0	0	0	0	0	0	0	33	0	5	47	586	633
	Brown Antechinus	1	0	0	0	0	0	0	0	0	0	22	0	0	24	2819	2843
	Dusky Antechinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	128
	Tiger Quoll	0	0	0	0	0	0	0	0	4	0	0	0	2	6	398	404
	Eastern Quoll	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Brush-tailed Phascogale	0	0	0	0	0	0	0	0	0	0	1	0	2	3	240	243
	Common Planigale	0	0	0	0	0	0	0	0	0	0	1	1	0	2	85	87
	Common Dunnart	1	0	0	0	0	0	0	0	0	0	1	1	2	5	89	94
	Dunnart	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Northern Brown Bandicoot	0	0	0	0	0	0	0	0	1	0	0	0	2	4	556	560
	Long-nosed Bandicoot	0	0	0	0	0	0	0	57	0	0	0	0	7	65	511	576

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Koala	0	0	0	0	0	0	0	44	0	0	0	0	11	55	2054	2109
	Common Wombat	0	0	0	0	0	0	0	16	0	0	0	0	3	19	32	51
	Mountain Brushtail Possum	0	0	0	0	0	0	0	31	0	0	0	0	3	34	685	719
	Common Brushtail Possum	1	0	0	0	0	0	1	104	0	0	2	0	40	150	655	805
	Feathertail Glider	0	0	0	0	0	0	0	26	2	0	0	0	6	34	140	174
	Eastern Pigmy-possum	0	0	0	0	0	0	0	0	1	0	0	0	0	1	19	20
	Greater Glider	0	0	0	0	0	0	2	360	0	0	0	0	22	384	5831	6215
	Yellow-bellied Glider	0	0	0	8	0	0	2	48	0	0	0	0	15	73	1238	1311
	Sugar Glider	0	0	0	24	0	0	4	160	0	0	0	0	29	217	819	1036
	Squirrel Glider	0	0	0	1	0	0	0	23	0	0	0	0	6	30	176	206
	Common Ringtail Possum	0	0	0	0	0	0	12	83	3	0	0	0	12	111	1196	1307
	Rufous Bettong	0	0	0	0	0	0	0	0	1	0	0	0	22	23	520	543
	Long-nosed Potoroo	0	0	0	0	0	0	0	0	0	0	0	0	1	1	110	111
	Black-striped Wallaby	0	0	0	0	0	0	0	0	0	0	0	0	17	17	51	68
	Parma Wallaby	0	0	0	0	0	0	0	3	0	0	0	0	2	5	229	234
	Whiptail Wallaby	0	0	0	0	0	0	0	0	0	0	0	0	38	38	533	571
	Common Wallaroo	0	0	0	0	0	0	1	21	1	0	0	0	18	41	99	140
	Red-necked Wallaby	0	0	0	0	0	0	3	11	0	0	0	0	53	67	1081	1148
	Brush-tailed Rock-wallaby	0	0	0	0	0	0	0	3	0	0	0	0	8	11	210	221
	Red-legged Pademelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151	151
	Red-necked Pademelon	0	0	0	0	0	0	0	21	4	0	0	0	16	41	462	503
	Swamp Wallaby	1	0	0	0	0	0	2	40	18	0	0	0	35	100	1021	1121
	Grassland Melomys	0	0	0	0	0	0	0	0	0	0	0	0	1	1	264	265
	Fawn-footed Melomys	0	0	0	0	0	0	0	1	0	0	2	0	0	3	851	854
	Eastern Chestnut Mouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	29
	New Holland Mouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	93

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Hastings River Mouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	164
	Bush Rat	0	0	0	0	0	0	0	3	2	0	19	0	0	29	3473	3502
	Swamp Rat	0	0	0	0	0	0	0	0	0	0	1	0	0	1	714	715
	Pale Field-rat	1	0	0	0	0	0	0	0	0	0	0	0	0	1	673	674
	Dingo or Dog (feral)	1	0	0	0	0	0	0	9	39	0	0	0	8	58	1882	1940
	Nyctimene robinsoni	0	0	0	0	0	0	0	0	0	0	0	0	1	1	57	58
	Pteropus alecto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	386	386
	Pteropus poliocephalus	0	0	0	14	0	0	66	153	0	0	0	0	89	322	10677	10999
	Pteropus scapulatus	0	0	0	0	0	0	95	0	0	0	0	0	80	175	60486	60661
	Syconycteris australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	281	281
	Saccolaimus flaviventris	0	0	0	0	10	0	0	0	0	0	0	0	0	10	48	58
T	*Mormopterus beccarii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	119
	Mormopterus norfolkensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	23
	Mormopterus norfolkensis/planiceps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Mormopterus planiceps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	38
	Mormopterus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	26
T	*Mormopterus* sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	67
	Nyctinomus australis	0	0	0	0	48	0	0	38	0	0	0	0	4	90	395	485
	Rhinolophus megaphyllus	0	0	0	0	17	0	0	0	0	11	0	0	0	28	1326	1354
	Chalinolobus dwyeri	0	0	0	0	0	0	0	0	0	1	0	0	0	1	28	29
	Chalinolobus gouldii	0	0	0	0	0	0	0	0	0	16	0	0	1	17	604	621
	Chalinolobus morio	0	0	0	0	0	0	0	0	0	68	0	0	1	69	1272	1341
T	*Chalinolobus nigrogriseus*	0	0	0	0	20	0	0	0	0	3	0	0	0	23	86	109
T	*Chalinolobus picatus*														0	0	0
	Falsistrellus tasmaniensis	0	0	0	0	2	0	0	0	0	27	0	0	0	29	1292	1321

PART 1: UNE cont.

Target	Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Kerivoula papuensis	0	0	0	0	0	0	0	0	0	4	0	0	0	4	233	237
	Miniopterus australis	0	0	0	0	54	0	0	0	0	84	0	0	0	138	16838	16976
	Miniopterus schreibersii	0	0	0	0	4	0	0	0	0	5	0	0	6	15	2245	2260
	Myotis adversus	0	0	0	0	1	0	0	0	0	1	0	0	0	2	2476	2478
	Nyctophilus bifax	0	0	0	0	0	0	0	0	0	3	0	0	0	3	933	936
	Nyctophilus geoffroyi	0	0	0	0	0	0	0	0	0	19	0	0	1	20	89	109
	Nyctophilus gouldi	0	0	0	0	0	0	0	0	0	114	0	0	0	114	4790	4904
	Nyctophilus timoriensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
T	*Scoteanax rueppellii*	0	0	0	0	9	0	0	0	0	8	0	0	0	17	245	262
	Scotorepens balstoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Scotorepens greyii	0	0	0	0	0	0	0	0	0	8	0	0	0	8	22	30
	Scotorepens orion	0	0	0	0	8	0	0	0	0	5	0	0	0	13	547	560
	Scotorepens sp. 1	0	0	0	0	0	0	0	0	0	23	0	0	0	23	406	429
	Vespadelus cf regulus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2068	2068
	Vespadelus darlingtoni	0	0	0	0	0	0	0	0	0	72	0	0	0	72	2765	2837
	Vespadelus pumilus	0	0	0	0	44	0	0	0	0	282	0	0	0	326	3207	3533
	Vespadelus regulus	0	0	0	0	0	0	0	0	0	71	0	0	0	71	1434	1505
	Vespadelus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	223	223
	Vespadelus troughtoni	0	0	0	0	0	0	0	0	0	1	0	0	2	3	32	35
	Vespadelus vulturnus	0	0	0	0	0	0	0	0	0	13	0	0	0	13	271	284
TOTALS		**6**	**987**	**2079**	**210**	**217**	**5035**	**280**	**2408**	**77**	**840**	**85**	**42**	**18 965**	**31 256**	**522 512**	**553 768**

PART 4: SOUTHERN STUDY AREA

Surveys in this study area have not been completed and will be incorporated into the report once finalised.

PART 5: EDEN STUDY AREA

Note: only the Koala and Smoky Mouse were selected as target species for the Eden study area.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Food-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Crinia signifera		31	143								63	237		237
Geocrinia victoriana		2									1	3		3
Limnodynastes dumerilii			2								4	6		6
Limnodynastes peronii		1	33								39	73		73
Limnodynastes tasmaniensis											1	1		1
Pseudophryne bibronii		12									5	17		17
Pseudophryne dendyi		2	9								51	62		62
Uperoleia tyleri											30	30		30
Litoria citropa		7	2								11	20		20
Litoria lesueuri		8	52								11	71		71
Litoria peronii		1	1								3	5		5
Litoria phyllochroa			1								2	3		3
Litoria verreauxii		1	10								8	19		19
Chelodina longicollis		1									1	2		2
Amphibolurus muricatus		15	2								8	25		25
Physignathus lesueurii		6									6	12		12
Physignathus lesueurii howittii		10	2								3	15		15
Varanus varius		7	1					1			20	29		26
Egernia saxatilis		5									1	6		6
Egernia saxatilis intermedia		5									1	6		6
Egernia whitii		9									1	10		10
Eulamprus heatwolei		246	28								72	346		346

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Eulamprus tympanum		85									4	89		89
Lampropholis delicata		178	12								63	253		253
Lampropholis guichenoti		394	50								55	499		499
Nannoscincus maccoyi		5										5		5
Niveoscincus coventryi		1										1		1
Pseudemoia entrecasteauxii		2									1	3		3
Pseudemoia spenceri		22										22		22
Saproscincus mustelinus		29	5								23	57		57
Tiliqua nigrolutea											1	1		1
Tiliqua scincoides											2	2		2
Morelia spilota		1										1		1
Austrelaps ramsayi		1										1		1
Austrelaps superbus											1	1		1
Drysdalia coronoides			1								1	2		2
Drysdalia rhodogaster											1	1		1
Notechis scutatus		15									1	16		16
Pseudechis porphyriacus		5									12	17		17
Pseudonaja textilis											1	1		1
Rhinoplocephalus nigrescens		13	1								1	15		15
Brown Quail						3						3		3
Chestnut Teal											20	20		20
Pacific Black Duck						6					11	17	2	19
Australian Wood Duck											2	2		2
Black Swan											5	5		5
Wedge-tailed Shearwater											10	10		10
Short-tailed Shearwater											10	10		10
Australasian Gannet											2	2		2
Great Cormorant											2	2	1	3

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Little Pied Cormorant						1					11	12	2	14
Little Black Cormorant											1	1		1
Australian Pelican													2	2
White-necked Heron						1						1		1
White-faced Heron											7	7	3	10
Straw-necked Ibis											4	4		4
Collared Sparrowhawk						10					1	11	5	16
Brown Goshawk						1					3	4	18	22
Grey Goshawk						1						1	2	3
Wedge-tailed Eagle						1					12	13	14	27
Swamp Harrier													1	1
White-bellied Sea-Eagle											7	7	1	8
Whistling Kite						1					3	4	11	15
Little Eagle											2	2	4	6
Square-tailed Kite													2	2
Brown Falcon											2	2	4	6
Nankeen Kestrel											3	3	6	9
Australian Hobby											2	2	3	5
Peregrine Falcon											1	1		1
Painted Button-quail											1	1		1
Latham's Snipe											1	1		1
Bush Stone-curlew													1	1
Pied Oystercatcher											2	2		2
Lesser Golden Plover											1	1		1
Hooded Plover													1	1
Masked Lapwing											10	10	3	13
Spur-winged Plover													1	1
Silver Gull											2	2	3	5

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Pacific Gull											1	1		1
Crested Tern											2	2	1	3
Caspian Tern											1	1		1
Peaceful Dove													7	7
Wonga Pigeon						14					11	25	25	50
Brown Cuckoo-Dove											2	2	3	5
Common Bronzewing						1					8	9	3	12
Brush Bronzewing						1					12	13	1	14
Sulphur-crested Cockatoo						43					1	44	13	57
Galah						6					20	26	4	30
Gang-gang Cockatoo						68					57	125	71	196
Yellow-tailed Black-Cockatoo						50					41	91	29	120
Glossy Black-Cockatoo						8					9	17	11	28
Australian King-Parrot						46					12	58	50	108
Musk Lorikeet						42					48	90	22	112
Little Lorikeet						18					5	23	16	39
Crimson Rosella						211					42	253	284	537
Eastern Rosella						3					1	4	7	11
Rainbow Lorikeet						192					9	201	81	282
Fan-tailed Cuckoo						13					4	17	152	169
Brush Cuckoo													29	29
Horsfield's Bronze-Cuckoo													22	22
Shining Bronze-Cuckoo											2	2	98	100
Pallid Cuckoo													25	25
Barking Owl													6	6
Southern Boobook				11		4	43				43	101	296	397
Powerful Owl				11			3				8	22	260	282
Barn Owl											1	1		1

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Masked Owl				7			3				5	15	49	64
Sooty Owl				12			3				7	22	167	189
Tawny Frogmouth							5				12	17	30	47
White-throated Nightjar				3		1	13				14	31	51	82
Australian Owlet-nightjar				8		2	37				45	92	294	386
Fork-tailed Swift						2						2	2	4
White-throated Needletail						49					47	96	17	113
Azure Kingfisher											2	2	1	3
Laughing Kookaburra						52					32	84	88	172
Sacred Kingfisher						1					3	4	29	33
Dollarbird											1	1		1
Superb Lyrebird						84					24	108	39	147
Red-browed Treecreeper						21					23	44	75	119
Brown Treecreeper						12						12		12
White-throated Treecreeper						231					35	266	394	660
Superb Fairy-wren						65					60	125	360	485
Variegated Fairy-wren						7					5	12		12
Southern Emu-wren													14	14
Yellow-rumped Thornbill											3	3	5	8
Striated Thornbill						276					64	340	809	1149
Yellow Thornbill						6					4	10	2	12
Brown Thornbill						318					33	351	690	1041
Buff-rumped Thornbill						7					4	11	19	30
Striated Fieldwren											1	1		1
Brown Gerygone						3					1	4	38	42
White-throated Gerygone						3					2	5	1	6
Chestnut-rumped Heathwren													7	7
Spotted Pardalote						88					17	105	246	351

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Striated Pardalote						45					1	46	56	102
Pilotbird						35					12	47	19	66
Yellow-throated Scrubwren													1	1
White-browed Scrubwren						173					22	195	450	645
Large-billed Scrubwren						3						3	18	21
Weebill						1						1		1
Eastern Spinebill						132					19	151	402	553
Red Wattlebird						80					19	99	100	199
Little Wattlebird						15					4	19	34	53
Yellow-faced Honeyeater						233					18	251	480	731
Fuscous Honeyeater													20	20
White-eared Honeyeater						69					14	83	112	195
Yellow-tufted Honeyeater						38					33	71	168	239
Noisy Miner						6					1	7		7
Bell Miner						163					45	208	176	384
Lewin's Honeyeater						21					1	22	70	92
Brown-headed Honeyeater						23					24	47	74	121
White-naped Honeyeater						167					43	210	324	534
Scarlet Honeyeater													1	1
Noisy Friarbird						8					7	15	14	29
Tawny-crowned Honeyeater						5						5		5
White-cheeked Honeyeater													1	1
New Holland Honeyeater						101					12	113	76	189
Crescent Honeyeater						77					9	86	90	176
Eastern Yellow Robin						170					24	194	173	367
Jacky Winter											5	5	24	29
Scarlet Robin						16					5	21	59	80
Flame Robin						15					5	20	40	60

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Pink Robin													2	2
Rose Robin						25					3	28	33	61
Spotted Quail-thrush						7					27	34	12	46
Eastern Whipbird						71					16	87	151	238
Varied Sittella						17					6	23	38	61
Grey Shrike-thrush						105					20	126	233	359
Crested Shrike-tit						16					4	20	46	66
Olive Whistler						1					1	2	10	12
Golden Whistler						84					19	103	239	342
Rufous Whistler						40					13	53	178	231
Magpie-lark						2					50	52	16	68
Black-faced Monarch						13					7	20	63	83
Satin Flycatcher						10					12	22	20	42
Restless Flycatcher						3					3	6	5	11
Leaden Flycatcher						3					1	4	42	46
Grey Fantail						203					29	232	455	687
Willie Wagtail						3					2	5	7	12
Rufous Fantail						25					19	44	43	87
Black-faced Cuckoo-shrike						16					9	25	90	115
White-bellied Cuckoo-shrike						8					5	13	14	27
Cicadabird						9					15	24	18	42
Olive-backed Oriole						3						3	82	85
Dusky Woodswallow						29					25	54	37	91
Grey Butcherbird						57					22	79	23	102
Australian Magpie						24					11	35	29	64
Pied Currawong						79					18	97	145	242
Grey Currawong						27					11	38	21	59
Australian Raven						23					14	37	77	114

PART 5: Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Little Raven						6						6		6
White-winged Chough											26	26	12	38
Satin Bowerbird						23					7	30	47	77
Red-browed Finch						42					25	67	104	171
Beautiful Firetail											1	1	2	3
European Goldfinch													4	4
Mistletoebird						25					13	38	45	83
Fairy Martin													29	29
Welcome Swallow						17					34	51	23	74
Tree Martin						22						22	17	39
Silvereye						98					11	109	265	374
Common Blackbird													2	2
Bassian Thrush											7	7	11	18
Short-beaked Echidna	1										3	4		4
Brown Antechinus	91									15	1	107	478	585
Dusky Antechinus	2											2	61	63
White-footed Dunnart													135	135
Long-nosed Bandicoot	1						3				3	7	7	14
Common Wombat	10										67	77		77
Mountain Brushtail Possum							7				3	10	37	47
Common Brushtail Possum	1			3			42				12	58	68	126
Feathertail Glider							8				5	13	15	28
Eastern Pigmy-possum							1					1	5	6
Greater Glider							37				12	49	123	172
Yellow-bellied Glider				45			47				71	163	309	472
Sugar Glider				27			91			1	47	166	331	497

PART 5" Eden cont.

Species (Report name)	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Foot-based spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
Common Ringtail Possum							118				21	139	135	274
Long-nosed Potoroo											1	1	8	9
Eastern Grey Kangaroo							1				39	40		40
Red-necked Wallaby											14	14		14
Swamp Wallaby	50						6				39	96		96
Bush Rat	29									6	2	37	321	358
Swamp Rat	2											2	25	27
Nyctinomus australis					39		2				1	42	4	46
Rhinolophus megaphyllus					9				12		5	26	3	29
Chalinolobus gouldii					23				17			40	16	56
Chalinolobus morio					149				274			423	38	461
Falsistrellus tasmaniensis									81			81	58	139
Kerivoula papuensis													2	2
Miniopterus schreibersii					22				80			102	24	126
Myotis adversus							12		20			32	2	34
Nyctophilus geoffroyi									126			126	83	209
Nyctophilus gouldi									68			68	176	244
Scoteanax rueppellii					12				5			17	20	37
Scotorepens orion					154				22			176	4	180
Vespadelus darlingtoni					52				113			165	42	207
Vespadelus regulus					215				175			390	2	392
Vespadelus troughtoni					22							22		22
Vespadelus vulturnus					95				228			323	301	624
TOTALS	**189**	**1120**	**355**	**127**	**792**	**4705**	**482**	**1**	**1221**	**22**	**2587**	**11 603**	**13 546**	**25 149**

PART 2: LNE STUDY AREA

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Adelotus brevis	0	24	74	0	0	0	9	8	0	0	0	0	52	167	303	470
	Assa darlingtoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	17
	Crinia tinnula	0	2	2	0	0	0	0	6	0	0	0	1	80	91	181	272
	Heleioporus australiacus	0	0	2	0	0	0	0	5	0	0	0	0	5	12	198	210
	Lechriodus fletcheri	0	0	0	0	0	0	0	5	0	0	0	0	205	210	207	417
	Limnodynastes dumerilii	0	4	14	0	0	0	1	26	0	0	0	5	37	87	240	327
	Limnodynastes fletcheri	0	0	0	0	0	0	0	0	0	0	0	0	12	12	127	139
	Limnodynastes ornatus	0	0	2	0	0	0	0	13	0	0	0	2	90	107	133	240
	Limnodynastes peronii	0	5	83	3	0	0	1	37	0	0	0	6	293	428	2967	3395
	Limnodynastes salmini	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Limnodynastes tasmaniensis	0	3	72	0	0	0	0	15	0	0	0	2	60	152	2250	2402
	Limnodynastes terraereginae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Mixophyes balbus	0	0	18	0	0	0	0	39	0	0	0	0	14	71	224	295
	Mixophyes fasciolatus	0	0	20	1	0	0	0	6	0	0	0	0	28	55	310	365
T	*Mixophyes iteratus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	97
	Neobatrachus pictus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Notaden bennettii	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3
	Paracrinia haswelli	0	0	0	0	0	0	0	0	0	0	0	0	45	45	1114	1159
	Philoria sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	531	531
T	*Philoria sp 0*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Philoria sphagnicolus	0	0	0	0	0	0	0	0	0	0	0	0	2	2	119	121
	Pseudophryne australis	0	62	176	5	0	0	0	20	0	0	0	0	270	533	464	997
	Pseudophryne bibronii	0	1	56	2	0	0	0	27	0	0	0	0	44	130	472	602
	Pseudophryne coriacea	0	26	162	9	0	0	86	219	0	0	0	3	302	807	1873	2680

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Uperoleia laevigata	0	16	139	3	0	0	0	1	0	0	0	1	93	253	723	976
	Uperoleia rugosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Uperoleia tyleri	0	0	0	0	0	0	0	0	0	0	0	0	5	5	2	7
	Litoria aurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	183	183
	Litoria barringtonensis	0	0	33	0	0	0	0	2	0	0	0	0	59	94	2	96
T	*Litoria booroolongensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	378	378
	Litoria brevipalmata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	200
	Litoria caerulea	0	1	2	1	0	0	0	4	0	0	0	0	32	40	204	244
	Litoria castanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14
	Litoria chloris	0	0	38	3	0	0	0	1	0	0	0	0	22	64	578	642
	Litoria citropa	0	1	1	0	0	0	0	0	0	0	0	0	0	2	31	33
	Litoria dentata	0	6	35	1	0	0	0	7	0	0	0	0	85	134	565	699
	Litoria ewingii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Litoria fallax	0	47	219	3	0	0	0	81	0	0	0	0	538	888	2901	3789
	Litoria freycineti	0	6	27	0	0	0	0	9	0	0	0	0	124	166	260	426
	Litoria gracilenta	0	0	1	4	0	0	0	0	0	0	0	0	8	13	5	18
	Litoria jervisiensis	0	0	5	4	0	0	0	5	0	0	0	0	2	16	186	202
	Litoria latopalmata	0	7	88	0	0	0	3	24	0	0	0	0	109	231	707	938
	Litoria lesueuri	0	15	557	17	0	0	0	84	0	0	0	0	81	754	886	1640
	Litoria littlejohni	0	0	0	0	0	0	0	0	0	0	0	0	1	1	59	60
	Litoria nasuta	0	0	2	0	0	0	0	5	0	0	0	0	37	44	21	65
	Litoria pearsoniana	0	0	16	0	0	0	0	0	0	0	0	0	0	16	66	82
	Litoria pearsoniana/ phyllochroa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	426	426
	Litoria peronii	0	5	103	5	0	0	0	44	0	0	0	0	178	335	1944	2279
	Litoria phyllochroa	0	11	243	5	0	0	0	6	0	0	0	0	123	388	368	756

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Litoria piperata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Litoria revelata	0	0	5	0	0	0	0	0	0	0	0	0	12	17	139	156
	Litoria rubella	0	1	0	0	0	0	0	0	0	0	0	0	14	15	1	16
	Litoria subglandulosa	0	5	19	10	0	0	0	3	0	0	0	0	19	56	214	270
	Litoria tyleri	0	0	104	0	0	0	0	17	0	0	0	0	114	235	334	569
	Litoria verreauxii	0	0	102	6	0	0	0	11	0	0	0	0	51	170	338	508
	Lotus angustissimus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Chelodina longicollis	0	3	1	0	0	0	0	0	0	0	0	0	22	26	111	137
	Emydura signata	0	0	0	0	0	0	0	0	0	0	0	0	3	3	10	13
	Diplodactylus byrnei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Diplodactylus vittatus	0	4	2	0	0	0	0	4	0	0	0	0	7	17	64	81
	Gehyra dubia	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
	Gehyra variegata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Nephrurus levis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Oedura coggeri	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
	Oedura lesueurii	0	144	0	0	0	0	0	5	0	0	0	0	52	201	87	288
	Oedura robusta	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7	8
	Oedura tryoni	0	8	0	0	0	0	0	0	0	0	0	0	1	9	63	72
	Phyllurus platurus	0	50	22	0	0	0	0	14	0	0	0	0	28	114	58	172
	Saltuarius cornutus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13
	Saltuarius swaini	0	14	4	0	0	0	0	2	0	0	0	0	4	24	36	60
T	*Underwoodisaurus sphyrurus*	0	3	0	0	0	0	0	0	0	0	0	1	1	5	10	15
	Delma fraseri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Delma plebeia	0	2	0	0	0	0	0	0	0	0	0	0	0	2	13	15
	Delma tincta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Lialis burtonis	0	3	0	0	0	0	0	1	0	0	0	0	1	5	62	67

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Pygopus lepidopodus	0	7	0	0	0	0	0	0	0	0	0	0	6	13	32	45
	Amphibolurus muricatus	0	45	0	0	0	0	0	1	0	0	0	3	113	162	152	314
	Amphibolurus nobbi	0	13	0	0	0	0	0	0	0	0	0	0	5	18	22	40
	Ctenophorus femoralis	0	0	6	0	0	0	0	0	0	0	0	0	0	6	1	7
	Hypsilurus spinipes	0	2	0	0	0	0	0	1	0	0	0	0	3	6	151	157
	Lophognathus gilberti	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
	Physignathus lesueurii	0	45	27	0	0	0	0	6	0	0	0	0	34	112	274	386
	Pogona barbata	0	4	0	0	0	0	0	0	0	0	0	0	20	24	62	86
	Tympanocryptis diemensis	0	22	0	0	0	0	0	0	0	0	0	0	45	67	60	127
	Tympanocryptis lineata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Varanus gouldii	0	0	0	0	0	0	0	0	0	0	0	0	3	3	12	15
	Varanus rosenbergi	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2	6
	Varanus sp.	0	2	0	0	0	0	0	0	0	0	0	0	0	2	1	3
	Varanus varius	0	46	0	1	0	0	0	0	0	0	1	0	93	141	410	551
	Anomalopus leuckartii	0	7	0	0	0	0	0	0	0	0	0	4	7	18	1	19
	Anomalopus swansoni	0	4	0	0	0	0	0	0	0	0	0	0	0	4	70	74
	Anomalopus verreauxii	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4	6
	Bassiana duperreyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Bassiana platynota	0	60	0	0	0	0	0	0	0	0	0	0	28	88	71	159
	Calyptotis ruficauda	0	137	0	0	0	0	0	0	0	0	0	0	4	141	473	614
	Calyptotis scutirostrum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Calyptotis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
	Carlia tetradactyla	0	0	0	0	0	0	0	0	0	0	0	0	5	5	13	18
	Carlia vivax	0	1	0	0	0	0	0	0	0	0	0	0	2	3	3	6
	Cautula zia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	61
	Coeranoscincus reticulatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Cryptoblepharus carnabyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Cryptoblepharus virgatus	0	43	0	0	0	0	0	0	0	0	0	0	17	60	21	81
	Ctenotus allotropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Ctenotus eurydice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Ctenotus regius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Ctenotus robustus	0	23	0	0	0	0	0	0	0	0	0	1	25	49	307	356
	Ctenotus taeniolatus	0	157	0	0	0	0	0	0	0	0	0	0	12660	12817	134	12951
	Cyclodomorphus casuarinae	0	0	0	0	0	0	0	0	0	0	0	0	1	1	13	14
	Cyclodomorphus michaeli	0	2	0	0	0	0	0	0	0	0	0	0	0	2	3	5
	Egernia cunninghami	0	15	0	0	0	0	0	0	0	0	0	0	13	28	58	86
	Egernia frerei	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2
	Egernia major	0	3	0	0	0	0	0	0	0	0	0	0	12	15	250	265
	Egernia mcpheei	0	12	0	0	0	0	0	0	0	0	0	0	6	18	40	58
	Egernia modesta	0	23	0	0	0	0	0	0	0	0	0	0	30	53	67	120
	Egernia saxatilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Egernia striolata	0	7	0	0	0	0	0	0	0	0	0	0	5	12	105	117
	Egernia whitii	0	111	0	0	0	0	0	0	0	0	0	1	59	171	83	254
	Eremiascincus richardsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Eulamprus heatwolei	0	309	0	0	0	0	0	0	0	0	0	4	16	329	786	1115
	Eulamprus kosciuskoi	0	24	0	0	0	0	0	0	0	0	0	0	25	49	539	588
	Eulamprus martini	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2
	Eulamprus murrayi	0	67	2	0	0	0	0	0	0	0	0	0	5	74	469	543
	Eulamprus quoyii	0	217	4	0	0	0	0	1	0	0	1	1	66	290	385	675
	Eulamprus tenuis	0	8	0	0	0	0	0	0	0	0	0	0	7	15	44	59
	Eulamprus tenuis\martini	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Eulamprus tympanum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	17

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Glaphyromorphus fuscicaudis	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
	Hemiergis decresiensis	0	2	0	0	0	0	0	0	0	0	0	0	6	8	11	19
	Hemisphaeriodon gerrardii	0	2	0	0	0	0	0	2	0	0	0	0	2	6	11	17
	Lampropholis amicula	0	10	0	0	0	0	0	0	0	0	0	0	2	12	51	63
	Lampropholis caligula	0	1	0	0	0	0	0	0	0	0	0	1	0	2	72	74
	Lerista bougainvillii	0	10	0	0	0	0	0	0	0	0	0	0	5	15	4	19
	Lerista muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Lygisaurus foliorum	0	27	0	0	0	0	0	0	0	0	0	0	17	44	17	61
	Menetia greyii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Morethia boulengeri	0	8	0	0	0	0	0	0	0	0	0	0	6	14	81	95
	Niveoscincus coventryi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Ophioscincus truncatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19
	Pseudemoia entrecasteauxii	0	9	0	0	0	0	0	0	0	0	0	0	0	9	152	161
	Pseudemoia pagenstecheri	0	15	0	0	0	0	0	0	0	0	0	0	0	15	1	16
	Saiphos equalis	0	206	0	0	0	0	0	0	0	0	0	0	26	232	352	584
	Saproscincus challengeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	160
	Saproscincus galli	0	3	0	0	0	0	0	0	0	0	0	0	0	3	21	24
	Saproscincus mustelinus	0	86	1	0	0	0	0	0	0	0	0	0	17	104	191	295
	Saproscincus rosei	0	9	0	0	0	0	0	0	0	0	0	0	2	11	257	268
	White-lined Weasel Skink	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Tiliqua scincoides	0	1	0	0	0	0	0	0	0	0	0	0	15	16	120	136
	Ramphotyphlops bituberculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Ramphotyphlops proximus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18
	Ramphotyphlops wiedii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	51
	Morelia spilota	0	2	1	0	0	0	0	1	0	0	0	0	11	15	76	91

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Morelia spilota spilota	0	1	0	0	0	0	0	1	0	0	0	0	2	4	37	41
	Morelia spilota variegata	0	1	0	0	0	0	0	0	0	0	0	0	0	1	8	9
	Boiga irregularis	0	1	0	0	0	0	0	0	0	0	0	0	2	3	13	16
	Dendrelaphis punctulata	0	2	0	0	0	0	0	0	0	0	0	0	4	6	39	45
	Acanthophis antarcticus	0	0	0	0	0	0	0	0	0	0	0	0	2	2	33	35
	Austrelaps ramsayi	0	0	0	0	0	0	0	0	0	0	0	0	1	1	53	54
	Austrelaps superbus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	25
	Cacophis harriettae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Cacophis krefftii	0	0	0	0	0	0	1	1	0	0	0	0	1	3	59	62
	Cacophis squamulosus	0	2	0	0	0	0	0	0	0	0	0	0	4	6	55	61
	Demansia psammophis	0	8	0	0	0	0	0	0	0	0	0	0	6	14	55	69
	Demansia torquata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Drysdalia coronoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	29
	Furina diadema	0	2	0	0	0	0	0	1	0	0	0	1	1	5	41	46
	Hemiaspis signata	0	6	0	0	0	0	0	1	0	0	0	0	6	13	75	88
	Hoplocephalus bitorquatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
	Hoplocephalus bungaroides	0	0	0	0	0	0	0	1	0	0	0	0	1	2	8	10
	Hoplocephalus stephensii	0	0	1	0	0	0	0	2	0	0	0	0	1	4	59	63
	Notechis scutatus	0	4	0	0	0	0	0	0	0	0	0	0	10	14	41	55
	Pseudechis australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Pseudechis guttatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Pseudechis porphyriacus	0	12	0	0	0	0	0	0	0	0	0	0	36	48	250	298
	Pseudonaja textilis	0	3	0	0	0	0	0	0	0	0	0	0	4	7	49	56
	Rhinoplocephalus nigrescens	0	28	0	0	0	0	0	4	0	0	0	0	12	44	66	110
	Simoselaps australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Suta spectabilis dwyeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92	92

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Tropidechis carinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	32
	Vermicella annulata	0	1	0	0	0	0	0	1	0	0	0	0	2	4	36	40
	Astrotia stokesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Australian Brush-turkey	0	0	0	0	0	2	0	0	0	0	0	0	42	44	806	850
	Red Junglefowl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	California Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	26
	Garganey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Australian Wood Duck	0	0	0	1	0	6	0	0	0	0	0	0	43	50	1293	1343
	Great Egret	0	0	0	0	0	2	0	0	0	0	0	0	1	3	665	668
	Cattle Egret	0	0	0	0	0	0	0	0	0	0	0	0	7	7	11179	11186
	Intermediate Egret	0	0	0	0	0	0	0	0	0	0	0	0	1	1	692	693
	White-necked Heron	0	0	0	0	0	0	0	0	0	0	0	0	3	3	116	119
	Striated Heron	0	0	0	0	0	0	0	0	0	0	0	0	3	3	75	78
	Little Egret	0	0	0	0	0	0	0	0	0	0	0	0	2	2	756	758
	White-faced Heron	0	0	0	0	0	16	0	0	0	0	0	0	22	38	1298	1336
	Black Bittern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	70
	Nankeen Night Heron	0	0	0	1	0	0	0	1	0	0	0	0	9	11	49	60
	Yellow-billed Spoonbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
	Royal Spoonbill	0	0	0	0	0	0	0	0	0	0	0	0	8	8	811	819
	Glossy Ibis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	359	359
	Australian White Ibis	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1044	1045
	Straw-necked Ibis	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1003	1005
	Black-necked Stork	0	0	0	0	0	1	0	0	0	0	0	0	0	1	131	132
	Collared Sparrowhawk	0	0	0	0	0	0	0	0	0	0	0	0	7	7	128	135
	Brown Goshawk	0	0	0	0	0	3	0	0	0	0	0	0	13	16	144	160
	Grey Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	5	5	146	151

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Wedge-tailed Eagle	0	0	0	0	0	16	0	0	1	0	0	0	39	56	390	446
	Pacific Baza	0	0	0	0	0	3	0	0	0	0	0	0	4	7	296	303
	Spotted Harrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	26
	Black-shouldered Kite	0	0	0	0	0	0	0	0	0	0	0	0	11	11	166	177
	Red Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
	White-bellied Sea-Eagle	0	0	0	0	0	6	0	0	0	0	0	0	20	26	870	896
	Brahminy Kite	0	0	0	0	0	1	0	0	0	0	0	0	1	2	72	74
	Whistling Kite	0	0	0	0	0	2	0	0	0	0	0	0	20	22	439	461
	Black-breasted Buzzard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Little Eagle	0	0	0	0	0	0	0	0	0	0	0	0	5	5	91	96
	Square-tailed Kite	0	0	0	0	0	0	0	0	0	0	0	0	1	1	64	65
	Black Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20
	Osprey	0	0	0	0	0	0	0	0	0	0	0	0	2	2	166	168
	Brown Falcon	0	0	0	0	0	2	0	0	0	0	0	0	11	13	78	91
	Nankeen Kestrel	0	0	0	0	0	1	0	0	0	0	0	0	18	19	152	171
	Grey Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Australian Hobby	0	0	0	0	0	0	0	0	0	0	0	0	1	1	56	57
	Peregrine Falcon	0	0	0	0	0	0	0	0	0	0	0	0	6	6	91	97
	Black Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13
	Brolga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Black-tailed Native-hen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Lewin's Rail	0	0	0	0	0	0	0	0	0	0	0	0	1	1	57	58
T	Black-breasted Button-quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Painted Button-quail	0	0	0	0	0	8	0	0	0	0	0	0	28	36	59	95
	Bush Stone-curlew	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58
	Emerald Dove	0	0	0	0	0	6	0	0	0	0	0	0	5	11	76	87

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	White-headed Pigeon	0	0	0	0	0	10	0	0	0	0	0	0	19	29	722	751
	Diamond Dove	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Bar-shouldered Dove	0	0	0	0	0	19	0	0	0	0	0	0	7	26	277	303
	Peaceful Dove	0	0	0	0	0	23	0	0	0	0	0	0	27	50	92	142
	Wonga Pigeon	0	0	0	1	0	83	0	0	0	0	0	0	72	156	1353	1509
	Topknot Pigeon	0	0	0	0	0	80	0	0	0	0	0	0	31	111	1934	2045
	Brown Cuckoo-Dove	0	0	0	0	0	108	0	2	0	0	0	0	32	142	1815	1957
	Crested Pigeon	0	0	0	0	0	2	0	0	0	0	0	0	22	24	698	722
	Common Bronzewing	0	0	0	0	0	17	0	0	0	0	0	0	27	44	32	76
	Brush Bronzewing	0	0	0	0	0	4	0	0	0	0	0	0	2	6	85	91
	Flock Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Wompoo Fruit-Dove	0	0	0	0	0	2	0	0	0	0	0	0	2	4	218	222
	Rose-crowned Fruit-Dove	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
	Superb Fruit-Dove	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	25
	Sulphur-crested Cockatoo	0	0	0	1	0	86	0	0	0	0	0	0	56	143	2751	2894
	Major Mitchell's Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Galah	0	0	0	0	0	46	0	3	0	0	0	0	35	84	851	935
	Little Corella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	402	402
	Long-billed Corella	0	0	0	0	0	10	0	0	0	0	0	0	0	10	1127	1137
	Gang-gang Cockatoo	0	0	0	0	0	51	0	0	0	0	0	0	78	129	320	449
	Red-tailed Black-Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	31
	Yellow-tailed Black-Cockatoo	0	0	0	0	0	108	0	0	0	0	0	0	136	244	2011	2255
	Glossy Black-Cockatoo	0	1	0	0	0	30	0	0	0	0	0	0	145	176	2475	2651
	Cockatiel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58
	Australian King-Parrot	0	0	0	0	0	158	0	0	0	0	0	0	103	261	1765	2026
	Red-winged Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4

PART 2: LNE cont.

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	Australian Ringneck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Musk Lorikeet	0	0	0	0	0	32	0	0	0	0	0	0	20	52	373	425
	Little Lorikeet	0	0	0	0	0	98	0	0	0	0	0	0	74	172	384	556
	Swift Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	48
	Budgerigar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Orange-bellied Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Turquoise Parrot	0	0	0	0	0	17	0	0	0	0	0	0	57	74	147	221
	Crimson Rosella	0	0	0	0	0	324	0	0	0	0	0	0	109	433	2275	2708
	Eastern Rosella	0	0	0	0	0	68	0	0	0	0	0	0	139	207	1002	1209
	Western Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Red-rumped Parrot	0	0	0	0	0	2	0	0	0	0	0	0	1220	1222	54	1276
	Scaly-breasted Lorikeet	0	0	0	0	0	76	0	0	0	0	0	0	4	80	478	558
	Rainbow Lorikeet	0	0	0	0	0	92	0	0	0	0	0	0	25	117	1782	1899
	Fan-tailed Cuckoo	0	0	0	0	0	99	0	2	0	0	0	0	54	155	1959	2114
	Brush Cuckoo	0	0	0	0	0	38	0	0	0	0	0	0	23	61	297	358
	Horsfield's Bronze-Cuckoo	0	0	0	0	0	4	0	0	0	0	0	0	4	8	58	66
	Shining Bronze-Cuckoo	0	0	0	1	0	42	0	0	0	0	0	0	34	77	1535	1612
	Little Bronze-Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107	107
	Black-eared Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6	7
	Pallid Cuckoo	0	0	0	0	0	4	0	0	0	0	0	0	5	9	77	86
	Oriental Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	32
	Common Koel	0	0	0	3	0	29	1	5	0	0	0	0	15	53	280	333
	Channel-billed Cuckoo	0	0	0	1	0	27	0	1	0	0	0	0	22	51	254	305
	Barking Owl	0	0	0	15	0	0	0	1	0	0	0	0	2	18	33	51
	Southern Boobook	0	0	0	97	0	1	12	89	1	0	0	0	114	314	926	1240
	Powerful Owl	0	0	0	23	0	0	0	3	0	0	0	0	10	36	473	509

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Barn Owl	0	0	0	1	0	0	0	0	0	0	0	0	8	9	54	63
	Masked Owl	0	0	0	23	0	0	0	13	0	0	0	0	15	51	264	315
	Sooty Owl	0	0	0	24	0	0	0	9	0	0	0	0	16	49	418	467
	Marbled Frogmouth	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	10
	Tawny Frogmouth	0	0	0	5	0	1	1	65	0	0	0	0	72	144	442	586
	White-throated Nightjar	0	0	1	15	0	1	3	29	0	0	0	0	53	102	182	284
	Australian Owlet-nightjar	0	0	3	111	0	22	4	136	0	0	0	0	121	397	765	1162
	Azure Kingfisher	0	0	0	0	0	10	0	0	0	0	0	0	18	28	84	112
	Laughing Kookaburra	0	0	0	8	0	200	0	12	0	0	0	0	70	290	2521	2811
	Forest Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	1	1	82	83
	Red-backed Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Sacred Kingfisher	0	0	0	2	0	47	0	1	0	0	0	0	27	77	767	844
	Dollarbird	0	0	0	0	0	25	0	1	0	0	0	0	24	50	409	459
	Noisy Pitta	0	0	0	0	0	1	0	2	0	0	0	0	7	10	104	114
	Superb Lyrebird	0	0	0	4	0	172	0	2	0	0	0	0	101	279	2566	2845
	Rufous Scrub-bird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136	136
	White-browed Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3
	Red-browed Treecreeper	0	0	0	0	0	117	0	0	0	0	0	0	35	152	780	932
	Brown Treecreeper	0	0	0	0	0	18	0	0	0	0	0	0	14	32	58	90
	White-throated Treecreeper	0	0	0	0	0	608	0	0	0	0	0	0	128	736	3570	4306
	White-winged Fairy-wren	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	3
	Mallee Emu-wren	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	3
	Inland Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Yellow-rumped Thornbill	0	0	0	0	0	8	0	0	0	0	0	0	20	28	290	318
	Striated Thornbill	0	0	0	0	0	965	0	2	0	0	0	0	238	1205	3536	4741
	Yellow Thornbill	0	0	0	0	0	117	0	0	0	0	0	0	25	142	1176	1318

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Brown Thornbill	0	0	0	0	0	776	0	0	0	0	0	0	103	879	3979	4858
	Buff-rumped Thornbill	0	1	0	0	0	188	0	0	0	0	0	0	87	276	654	930
	Chestnut-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6	9
	Speckled Warbler	0	0	0	0	0	22	0	0	0	0	0	0	3	25	78	103
	Eastern Bristlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Western Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12	13
	Mangrove Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	73
	Brown Gerygone	0	0	0	0	0	489	0	0	0	0	0	0	53	542	2320	2862
	White-throated Gerygone	0	0	0	0	0	52	0	2	0	0	0	0	28	82	283	365
	Chestnut-rumped Heathwren	0	0	0	0	0	20	0	0	0	0	0	0	21	41	68	109
	Rockwarbler	0	1	0	0	0	22	0	0	0	0	0	0	33	56	55	111
	Spotted Pardalote	0	0	0	0	0	583	0	0	0	0	0	0	152	735	2714	3449
	Yellow-rumped Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Red-browed Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Striated Pardalote	0	0	0	0	0	67	0	0	0	0	0	0	26	93	573	666
	Pilotbird	0	0	0	0	0	10	0	0	0	0	0	0	17	27	10	37
	Yellow-throated Scrubwren	0	0	0	0	0	117	0	0	0	0	0	0	26	143	1423	1566
	White-browed Scrubwren	0	0	0	0	0	548	0	0	0	0	0	0	113	661	3143	3804
	Large-billed Scrubwren	0	0	0	0	0	69	0	0	0	0	0	0	21	90	575	665
	Weebill	0	0	0	0	0	42	0	0	0	0	0	0	12	54	45	99
	Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	2	2	13	15
	Eastern Spinebill	0	0	0	0	0	589	0	0	0	0	0	0	110	699	3115	3814
	Red Wattlebird	0	0	0	0	0	133	0	0	0	0	0	0	20	153	946	1099
	Little Wattlebird	0	0	0	0	0	310	0	0	0	0	0	0	48	358	1273	1631
	Banded Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Blue-faced Honeyeater	0	0	0	0	0	1	0	0	0	0	0	0	14	15	76	91
	White-fronted Chat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	90
	Crimson Chat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	55
	Yellow-faced Honeyeater	0	0	0	0	0	1155	0	1	0	0	0	0	173	1329	7576	8905
	Fuscous Honeyeater	0	0	0	0	0	56	0	0	0	0	0	0	6	62	88	150
	White-eared Honeyeater	0	0	0	0	0	229	0	0	0	0	0	0	69	298	323	621
	Yellow-tufted Honeyeater	0	0	0	0	0	158	0	0	0	0	0	0	56	214	448	662
	Yellow-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	White-plumed Honeyeater	0	0	0	0	0	13	0	0	0	0	0	0	13	26	48	74
	Singing Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Brown Honeyeater	0	0	0	0	0	4	0	0	0	0	0	0	0	4	58	62
	Yellow-throated Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Noisy Miner	0	0	0	0	0	79	0	0	0	0	0	0	96	175	1844	2019
	Bell Miner	0	0	0	0	0	712	0	0	0	0	0	0	290	1002	1807	2809
	Lewin's Honeyeater	0	0	0	0	0	450	0	0	0	0	0	0	102	552	3560	4112
	White-throated Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Brown-headed Honeyeater	0	0	0	0	0	62	0	0	0	0	0	0	35	97	152	249
	Black-chinned Honeyeater	0	0	0	0	0	2	0	0	0	0	0	0	7	9	16	25
	White-naped Honeyeater	0	4	0	0	0	572	1	0	0	0	0	0	100	677	1931	2608
	Scarlet Honeyeater	0	0	0	0	0	322	0	0	0	0	0	0	46	368	1185	1553
	Helmeted Friarbird	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
	Little Friarbird	0	0	0	0	0	13	0	0	0	0	0	0	6	19	27	46
	Noisy Friarbird	0	0	0	0	0	449	2	0	0	0	0	0	108	559	1625	2184
	Tawny-crowned Honeyeater	0	0	0	0	0	14	0	0	0	0	0	0	5	19	128	147
	White-cheeked Honeyeater	0	0	0	0	0	438	0	0	0	0	0	0	64	502	1200	1702

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	New Holland Honeyeater	0	0	0	0	0	142	0	0	0	0	0	0	49	191	569	760
	Crescent Honeyeater	0	0	0	0	0	34	0	0	0	0	0	0	10	44	105	149
	Striped Honeyeater	0	0	0	0	0	19	0	0	0	0	0	0	19	38	157	195
	Regent Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1046	1047
	Macleay's Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	12	12	1	13
	Eastern Yellow Robin	0	0	0	3	0	337	0	0	0	0	0	0	136	476	2482	2958
	Hooded Robin	0	0	0	0	0	0	0	0	0	0	0	0	3	3	34	37
	Jacky Winter	0	0	0	0	0	24	0	0	0	0	0	0	26	50	173	223
	Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	2	2	12	14
	Scarlet Robin	0	0	0	0	0	29	0	0	0	0	0	0	26	55	472	527
	Flame Robin	0	0	0	0	0	18	0	0	0	0	0	0	20	38	243	281
	Rose Robin	0	0	0	0	0	49	0	0	0	0	0	0	25	74	1110	1184
	Pale-yellow Robin	0	0	0	0	0	3	0	0	0	0	0	0	1	4	188	192
	Logrunner	0	0	0	0	0	24	0	0	0	0	0	0	12	36	684	720
	White-browed Babbler	0	0	0	0	0	8	0	0	0	0	0	0	9	17	4	21
	Grey-crowned Babbler	0	0	0	0	0	0	0	0	0	0	0	0	9	9	93	102
	Spotted Quail-thrush	0	1	0	0	0	28	0	0	0	0	0	0	87	116	275	391
	Eastern Whipbird	0	0	0	0	0	406	0	0	0	0	0	0	66	472	3822	4294
	Varied Sittella	0	0	0	0	0	135	0	0	0	0	0	0	105	240	933	1173
	Grey Shrike-thrush	0	0	0	0	0	409	0	0	0	0	0	0	59	468	3203	3671
	Little Shrike-thrush	0	0	0	0	0	1	0	0	0	0	0	0	0	1	12	13
	Crested Shrike-tit	0	0	0	0	0	51	0	0	0	0	0	0	29	80	836	916
	Crested Bellbird	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12	13
	Gilbert's Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Mangrove Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Olive Whistler	0	0	0	0	0	0	0	0	0	0	0	0	3	3	124	127

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Golden Whistler	0	0	0	0	0	378	0	1	0	0	0	0	94	473	2960	3433
	Rufous Whistler	0	0	0	0	0	259	0	0	0	0	0	0	64	323	1450	1773
	Spangled Drongo	0	0	0	0	0	2	0	0	0	0	0	0	6	8	278	286
	Black-faced Monarch	0	0	0	0	0	142	0	0	0	0	0	0	42	184	1853	2037
	Spectacled Monarch	0	0	0	0	0	20	0	0	0	0	0	0	7	27	284	311
	Shining Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Satin Flycatcher	0	0	0	0	0	6	0	0	0	0	0	0	12	18	151	169
	Restless Flycatcher	0	0	0	0	0	6	0	0	0	0	0	0	14	20	55	75
	Leaden Flycatcher	0	0	0	0	0	100	0	1	0	0	0	0	43	144	1291	1435
	Grey Fantail	0	0	0	0	0	482	0	0	0	0	0	0	116	598	3917	4515
	Willie Wagtail	0	0	0	2	0	29	0	1	0	0	0	0	31	63	530	593
	Rufous Fantail	0	0	0	0	0	130	0	1	0	0	0	0	52	183	1207	1390
	Barred Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	84
	Ground Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	24
	Black-faced Cuckoo-shrike	0	0	0	0	0	97	0	0	0	0	0	0	64	161	2099	2260
	White-bellied Cuckoo-shrike	0	0	0	0	0	18	0	0	0	0	0	0	16	34	380	414
	Cicadabird	0	0	0	0	0	125	0	0	0	0	0	0	52	177	883	1060
	Varied Triller	0	0	0	0	0	3	0	0	0	0	0	0	0	3	37	40
	White-winged Triller	0	0	0	0	0	5	0	0	0	0	0	0	2	7	59	66
	Olive-backed Oriole	0	0	0	0	0	92	0	0	0	0	0	0	23	115	547	662
	Figbird	0	0	0	0	0	4	0	0	0	0	0	0	2	6	284	290
	Black-faced Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Dusky Woodswallow	0	0	0	0	0	51	0	0	0	0	0	0	42	93	445	538
	White-breasted Woodswallow	0	0	0	0	0	15	0	0	0	0	0	0	43	58	386	444
	Masked Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	126
	White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3804	3804

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Pied Butcherbird	0	0	0	0	0	15	0	2	0	0	0	0	17	34	169	203
	Grey Butcherbird	0	0	0	0	0	160	0	0	0	0	0	0	54	214	1493	1707
	Australian Magpie	0	0	0	0	0	174	0	0	0	0	0	0	68	242	2182	2424
	Pied Currawong	0	0	0	1	0	390	0	1	0	0	0	0	102	494	3838	4332
	Grey Currawong	0	0	0	0	0	1	0	0	0	0	0	0	5	6	11	17
	Paradise Riflebird	0	0	0	0	0	0	0	0	0	0	0	0	1	1	644	645
	Australian Raven	0	0	0	0	0	141	0	0	0	0	0	0	87	228	1180	1408
	Little Raven	0	0	0	0	0	0	0	0	0	0	0	0	27	27	111	138
	Torresian Crow	0	0	0	0	0	17	0	1	0	0	0	0	3	21	264	285
	Forest Raven	0	0	0	0	0	40	0	0	0	0	0	0	108	148	698	846
	White-winged Chough	0	0	0	0	0	87	0	0	0	0	0	0	177	264	535	799
	Apostlebird	0	0	0	0	0	1	0	0	0	0	0	0	1	2	1	3
	Green Catbird	0	0	0	0	0	35	0	0	0	0	0	0	20	55	862	917
	Spotted Bowerbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Satin Bowerbird	0	0	0	0	0	121	0	0	0	0	0	0	56	177	2194	2371
	Regent Bowerbird	0	0	0	0	0	1	0	0	0	0	0	0	7	8	538	546
	Skylark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Red-browed Finch	0	0	0	0	0	501	0	0	0	0	0	0	226	727	3223	3950
	Beautiful Firetail	0	0	0	0	0	2	0	0	0	0	0	0	0	2	1	3
	Diamond Firetail	0	0	0	0	0	0	0	0	0	0	0	0	12	12	25	37
	Mistletoebird	0	0	0	0	0	181	0	0	0	0	0	0	57	238	1264	1502
	Tree Martin	0	0	0	0	0	16	0	0	0	0	0	0	29	45	173	218
	Red-whiskered Bulbul	0	0	0	0	0	4	0	0	0	0	0	0	0	4	80	84
	Yellow-bellied Sunbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Silvereye	0	0	0	0	0	647	0	0	0	0	0	0	118	765	3873	4638
	Common Blackbird	0	0	0	0	0	4	0	0	0	0	0	0	0	4	20	24

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	White's Thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	174	174
	Russet-tailed Thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Bassian Thrush	0	0	0	0	0	15	0	0	0	0	0	0	19	34	12	46
	Platypus	0	0	0	0	0	0	0	0	0	0	0	0	6	6	175	181
	Short-beaked Echidna	0	0	0	0	0	0	0	2	3	0	0	0	34	39	207	246
	Yellow-footed Antechinus	3	0	0	0	0	0	0	0	0	0	33	0	1	40	82	122
	Brown Antechinus	14	0	1	0	0	0	0	1	6	0	43	0	8	87	2756	2843
	Dusky Antechinus	0	0	0	0	0	0	0	0	0	0	0	0	1	1	181	182
	Unidentified marsupial mouse	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4
	Tiger Quoll	1	0	0	0	0	0	0	0	3	0	0	0	9	13	535	548
	Eastern Quoll	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18
T	Brush-tailed Phascogale	0	0	0	0	0	0	0	0	0	0	1	0	0	1	233	234
T	Common Planigale	0	0	0	0	0	0	0	0	0	0	1	0	0	1	21	22
	Common Dunnart	0	0	0	0	0	0	0	0	0	0	1	1	6	8	83	91
	Dunnart	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Numbat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Northern Brown Bandicoot	0	0	0	0	0	0	0	0	6	0	0	0	4	10	203	213
	Southern Brown Bandicoot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Long-nosed Bandicoot	2	0	2	7	0	0	1	57	6	0	0	0	50	127	339	466
	Koala	0	1	0	2	0	0	0	44	0	0	0	0	68	115	8081	8196
	Common Wombat	0	1	0	8	0	1	0	17	7	0	0	0	137	171	430	601
	Northern Brushtail Possum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Mountain Brushtail Possum	0	0	0	2	0	0	0	33	0	0	0	0	22	57	380	437
	Common Brushtail Possum	2	0	0	15	0	0	1	107	4	0	2	0	49	182	912	1094
	Feathertail Glider	0	0	0	0	0	0	0	29	1	0	0	0	13	43	140	183
	Eastern Pigmy-possum	0	0	0	0	0	0	0	0	1	0	0	0	2	3	36	39

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	Greater Glider	0	0	0	13	0	0	4	388	0	0	0	0	103	508	2753	3261
	Yellow-bellied Glider	0	0	0	42	0	0	0	49	0	0	0	0	64	155	762	917
	Sugar Glider	0	0	2	96	0	0	9	173	2	0	1	0	88	371	735	1106
	Squirrel Glider	0	0	0	2	0	0	0	25	0	0	0	0	5	32	417	449
	Common Ringtail Possum	1	0	4	0	0	0	5	116	4	0	0	0	35	166	858	1024
	Pseudocheirus peregrinus occidentalis	1	0	0	0	0	0	0	0	1	0	0	0	0	3	1	4
	Rufous Bettong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	38
	Long-footed Potoroo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Long-nosed Potoroo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	69
	Black-striped Wallaby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Western Grey Kangaroo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Parma Wallaby	1	0	0	0	0	0	0	3	0	0	0	0	6	11	3467	3478
	Whiptail Wallaby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Common Wallaroo	0	0	0	0	0	0	0	21	0	0	0	0	57	78	116	194
	Red-necked Wallaby	0	0	0	0	0	0	0	11	3	0	0	0	80	94	914	1008
	Brush-tailed Rock-wallaby	0	0	0	0	0	0	0	3	0	0	0	0	23	26	149	175
	Red-legged Pademelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	74
	Red-necked Pademelon	0	0	0	1	0	0	0	21	0	0	0	0	30	52	1608	1660
	Swamp Wallaby	3	0	0	3	0	0	3	44	78	0	0	0	148	282	958	1240
	Water Rat	0	0	0	0	0	0	0	0	0	0	0	0	3	3	25	28
	Broad-toothed Rat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28
	Grassland Melomys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Fawn-footed Melomys	0	0	0	0	0	0	0	1	0	0	2	0	5	8	280	288
	Short-tailed Hopping-mouse	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	3
T	Eastern Chestnut Mouse	0	0	0	0	0	0	0	0	0	0	0	0	1	1	130	131

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
	New Holland Mouse	0	0	0	0	0	0	0	0	0	0	0	0	2	2	426	428
	Hastings River Mouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	75
	Bush Rat	7	0	0	0	0	0	0	3	8	0	32	0	15	72	2795	2867
	Swamp Rat	7	0	0	0	0	0	0	0	3	0	1	0	3	21	344	365
	Dingo or Dog (feral)	0	0	0	17	0	0	0	9	144	0	0	0	39	209	515	724
	Pteropus poliocephalus	0	0	0	12	0	0	0	155	0	0	0	0	171	338	57678	58016
	Pteropus scapulatus	0	0	0	0	0	0	0	0	0	0	0	0	6	6	80085	80091
	Syconycteris australis	0	0	0	0	0	0	0	0	0	4	0	0	4	8	72	80
T	*Saccolaimus flaviventris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	27
T	*Mormopterus beccarii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mormopterus loriae	0	0	0	0	0	0	0	0	0	0	0	0	1	1	41	42
T	*Mormopterus norfolkensis*	0	0	0	0	44	0	0	0	0	1	0	0	11	56	84	140
	Mormopterus planiceps	0	0	0	0	6	0	0	0	0	2	0	0	0	8	6	14
	Mormopterus sp.	0	0	0	0	7	0	0	0	0	0	0	0	0	7	11	18
	Mormopterus sp. 1	0	0	0	0	51	0	0	0	0	5	0	0	1	57	63	120
	Mormopterus sp. (big penis)	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	3
	Mormopterus sp. (little penis)	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	3
	Nyctinomus australis	0	0	0	33	65	0	0	38	0	0	0	0	29	165	406	571
	Rhinolophus megaphyllus	0	0	0	0	34	0	0	0	0	42	0	0	9	85	251	336
T	*Chalinolobus dwyeri*	0	0	0	0	12	0	0	0	0	8	0	0	0	20	29	49
	Chalinolobus gouldii	0	0	0	0	94	0	0	0	0	52	0	0	1	147	374	521
	Chalinolobus morio	0	0	0	0	158	0	0	0	0	263	0	0	1	422	3213	3635
T	*Chalinolobus nigrogriseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
T	*Chalinolobus picatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T	*Falsistrellus tasmaniensis*	0	0	0	0	41	0	0	0	0	107	0	0	0	148	3136	3284
T	*Kerivoula papuensis*	0	0	0	0	0	0	0	0	0	9	0	0	0	9	35	44

PART 2: LNE cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Pitfall trapping	Incidental records	Total CRA records	Collated records	Grand total
T	*Miniopterus australis*	0	0	0	0	59	0	0	0	0	43	0	0	688	790	1636	2426
T	*Miniopterus schreibersii*	0	0	0	0	69	0	0	0	0	52	0	0	51	172	1685	1857
T	*Myotis adversus*	0	0	0	0	2	0	0	0	0	32	0	0	33	67	172	239
T	*Nyctophilus bifax*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Nyctophilus geoffroyi	0	0	0	0	0	0	0	0	0	104	0	0	0	104	484	588
	Nyctophilus gouldi	0	0	0	0	0	0	0	0	0	490	0	0	5	495	2507	3002
T	*Nyctophilus timoriensis*	0	0	0	0	0	0	0	0	0	7	0	0	0	7	5	12
T	*Scoteanax rueppellii*	0	0	0	0	14	0	0	0	0	12	0	0	4	30	357	387
	Scotorepens balstoni	0	0	0	0	9	0	0	0	0	11	0	0	0	20	3	23
	Scotorepens greyii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Scotorepens orion	0	0	0	0	35	0	0	0	0	44	0	0	5	84	1096	1180
	Scotorepens sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	3	3	26	29
	Vespadelus darlingtoni	0	0	0	0	260	0	0	0	0	317	0	0	14	591	7046	7637
T	*Vespadelus pumilus*	0	0	0	0	367	0	0	0	0	71	0	0	1	439	2820	3259
	Vespadelus regulus	0	0	0	0	82	0	0	0	0	52	0	0	0	134	3428	3562
	Vespadelus sp.	0	0	0	0	0	0	0	0	0	1	0	0	0	1	365	366
T	*Vespadelus troughtoni*	0	0	0	0	2	0	0	0	0	8	0	0	0	10	17	27
	Vespadelus vulturnus	0	0	0	0	268	0	0	0	0	1098	0	0	20	1386	3196	4582
TOTALS		**43**	**2376**	**2580**	**683**	**1681**	**19 179**	**149**	**2541**	**282**	**2835**	**120**	**40**	**28 002**	**60 553**	**416 110**	**476 663**

PART 3: SYDNEY BASIN STUDY AREA

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Adelotus brevis	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3
	Crinia tinnula	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**17**
	Heleioporus australiacus	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**80**	**82**
	Lechriodus fletcheri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Limnodynastes dumerilii	0	1	10	4	0	0	1	14	0	0	0	63	93	88	181
	Limnodynastes fletcheri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Limnodynastes ornatus	0	0	0	0	0	0	0	1	0	0	0	1	2	7	9
	Limnodynastes peronii	0	3	16	4	0	0	0	22	0	0	0	104	149	149	298
	Limnodynastes salmini	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Limnodynastes tasmaniensis	0	0	6	0	0	0	0	4	0	0	0	12	22	34	56
	Mixophyes balbus	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Mixophyes fasciolatus	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Mixophyes iteratus	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Paracrinia haswelli	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**30**	**30**	**17**	**47**
	Philoria sp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Philoria sphagnicolus	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Pseudophryne australis	**0**	**7**	**4**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**117**	**131**	**215**	**346**
	Pseudophryne bibronii	**0**	**11**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**43**	**74**	**19**	**93**
	Pseudophryne coriacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Uperoleia fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Uperoleia laevigata	0	0	3	0	0	0	0	0	0	0	0	256	259	42	301
	Uperoleia rugosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Uperoleia tyleri	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**2**
	Litoria aurea	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**85**	**89**
	Litoria booroolongensis	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**50**	**0**	**50**
	Litoria brevipalmata	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Litoria caerulea	0	0	0	0	0	0	1	1	0	0	0	1	3	13	16
	Litoria chloris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Litoria citropa	**0**	**4**	**10**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**29**	**28**	**57**
	Litoria dentata	0	1	1	0	0	0	0	1	0	0	0	148	151	44	195
	Litoria ewingii	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Litoria fallax	0	1	0	0	0	0	0	0	0	0	0	128	129	34	163
	Litoria freycineti	0	0	0	0	0	0	0	0	0	0	0	7	7	23	30
	Litoria gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Litoria jervisiensis	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**4**	**13**	**17**
	Litoria latopalmata	0	0	1	0	0	0	0	0	0	0	0	28	29	25	54
	Litoria lesueuri	0	5	29	0	0	0	0	12	0	0	0	66	112	37	149
	Litoria littlejohni	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**1**	**3**
	Litoria nasuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Litoria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Litoria peronii	0	1	21	15	0	0	0	11	0	0	0	377	425	81	506
	Litoria phyllochroa	0	2	36	1	0	0	0	5	0	0	0	51	95	49	144
	Litoria subglandulosa	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Litoria tyleri	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
	Litoria verreauxii	0	0	1	1	0	0	0	4	0	0	0	48	54	80	134
	Chelodina longicollis	0	1	0	0	0	0	0	0	0	0	0	14	15	45	60
	Emydura signata	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Diplodactylus vittatus	0	1	0	0	0	0	0	2	0	0	0	4	7	106	113
	Gehyra dubia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gehyra variegata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oedura coggeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oedura lesueurii	**0**	**103**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**35**	**139**	**66**	**205**
	Oedura robusta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oedura tryoni	0	2	0	0	0	0	0	0	0	0	0	0	2	0	2
	Phyllurus platurus	**0**	**26**	**4**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**18**	**49**	**40**	**89**
	Saltuarius cornutus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Delma fraseri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Delma plebeia	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Lialis burtonis	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46
	Pygopus lepidopodus	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**133**	**135**
	Amphibolurus muricatus	0	21	0	0	0	0	0	0	0	0	0	39	60	54	114

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Amphibolurus nobbi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lophognathus gilberti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Physignathus lesueurii	0	19	1	0	0	0	0	1	0	0	0	69	90	87	177
	Pogona barbata	0	2	0	0	0	0	0	0	0	0	0	3	5	30	35
	Tympanocryptis diemensis	0	40	0	0	0	0	0	0	0	0	0	47	87	44	131
	Varanus gouldii	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Varanus varius	0	2	0	0	0	0	0	0	0	0	0	27	29	94	123
	Anomalopus leuckartii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bassiana duperreyi	0	5	0	0	0	0	0	0	0	0	0	0	5	1	6
	Bassiana platynota	0	73	0	0	0	0	0	0	0	0	0	60	133	32	165
	Calyptotis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Carlia tetradactyla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Carlia vivax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cryptoblepharus carnabyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cryptoblepharus virgatus	0	18	0	0	0	0	0	0	0	0	0	10	28	36	64
	Ctenotus allotropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ctenotus robustus	0	6	0	0	0	0	0	0	0	0	0	17	23	115	138
	Ctenotus taeniolatus	0	177	0	0	0	0	0	0	0	0	1	76	254	111	365
	Cyclodomorphus casuarinae	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**
	Egernia cunninghami	0	8	0	0	0	0	0	0	0	0	1	13	22	15	37
	Egernia saxatilis	0	16	0	0	0	0	0	0	0	0	0	0	16	7	23

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Egernia striolata	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
	Egernia whitii	0	52	0	0	0	0	0	0	0	0	0	63	115	33	148
	Eulamprus heatwolei	0	36	0	0	0	0	0	0	0	0	1	11	48	14	62
	Eulamprus kosciuskoi	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Eulamprus quoyii	0	108	0	0	0	0	0	0	0	0	0	121	229	121	350
	Eulamprus tenuis	0	5	0	0	0	0	0	0	0	0	0	6	11	20	31
	Eulamprus tenuis\martini	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Eulamprus tympanum	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Hemiergis decresiensis	0	26	0	0	0	0	0	0	0	0	0	5	31	10	41
	Hemisphaeriodon gerrardii	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Lampropholis caligula	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Lerista bougainvillii	0	2	0	0	0	0	0	0	0	0	0	6	8	5	13
	Lerista muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lygisaurus foliorum	0	4	0	0	0	0	0	0	0	0	0	0	4	5	9
	Menetia greyii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Morethia boulengeri	0	2	0	0	0	0	0	0	0	0	0	2	4	1	5
	Niveoscincus coventryi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pseudemoia entrecasteauxii	0	33	0	0	0	0	0	0	0	0	0	7	40	14	54
	Pseudemoia pagenstecheri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Saiphos equalis	0	18	0	0	0	0	0	0	0	0	0	42	60	24	84
	Saproscincus challengeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Saproscincus mustelinus	0	34	0	0	0	0	0	0	0	0	0	17	51	46	97
	White-lined Weasel Skink	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Saproscincus rosei	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Tiliqua scincoides	0	1	0	0	0	0	0	0	0	0	0	7	8	209	217
	Ramphotyphlops	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Ramphotyphlops proximus	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Ramphotyphlops wiedii	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Morelia spilota	0	3	0	0	0	0	0	0	0	0	0	1	4	50	54
	Morelia spilota spilota	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**12**	**14**
	Morelia spilota variegata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Boiga irregularis	0	1	0	0	0	0	0	0	0	0	0	0	1	4	5
	Dendrelaphis punctulata	0	2	0	0	0	0	0	0	0	0	0	0	2	26	28
	Acanthophis antarcticus	0	0	0	0	0	0	0	0	0	0	0	2	2	23	25
	Austrelaps ramsayi	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
	Austrelaps superbus	0	0	0	0	0	0	0	0	0	0	0	3	3	8	11
	Cacophis squamulosus	0	1	0	0	0	0	0	0	0	0	0	3	4	33	37
	Demansia psammophis	0	1	0	0	0	0	0	0	0	0	0	0	1	29	30
	Demansia torquata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Drysdalia coronoides	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
	Furina diadema	0	0	0	0	0	0	0	0	0	0	0	0	0	111	111
	Hemiaspis signata	0	0	0	0	0	0	0	0	0	0	0	3	3	17	20

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Hoplocephalus bitorquatus	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Hoplocephalus bungaroides	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**19**	**20**
	Hoplocephalus stephensii	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Notechis scutatus	0	0	0	0	0	0	0	0	0	0	0	1	1	24	25
	Pseudechis australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pseudechis guttatus	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
	Pseudechis porphyriacus	0	8	0	0	0	0	0	0	0	0	0	43	51	104	155
	Pseudonaja textilis	0	2	0	0	0	0	0	0	0	0	0	1	3	43	46
	Rhinoplocephalus nigrescens	0	3	0	0	0	0	0	0	0	0	0	4	7	18	25
	Suta spectabilis dwyeri	0	0	0	0	0	0	0	0	0	0	0	1	1	10	11
	Vermicella annulata	0	0	0	0	0	0	0	0	0	0	0	0	0	70	70
	Australian Brush-turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15
	Australian Wood Duck	0	0	0	6	0	1	0	0	0	0	0	507	514	142	656
	Blue-billed Duck	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**12**
	Radjah Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darter	0	0	0	0	0	0	0	0	0	0	0	2	2	47	49
	Great Cormorant	0	0	0	0	0	0	0	0	0	0	0	17	17	86	103
	Little Pied Cormorant	0	0	0	0	0	0	0	0	0	0	0	66	66	147	213
	Little Black Cormorant	0	0	0	0	0	0	0	0	0	0	0	75	75	93	168
	Great Egret	0	0	0	0	0	0	0	0	0	0	0	8	8	70	78
	Cattle Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Intermediate Egret	0	0	0	0	0	0	0	0	0	0	0	3	3	23	26
	White-necked Heron	0	0	0	0	0	0	0	0	0	0	0	6	6	39	45
	Striated Heron	0	0	0	0	0	0	0	0	0	0	0	1	1	36	37
	Little Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	35	35
	White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	28	28	155	183
	Black Bittern	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30
	Nankeen Night Heron	0	0	0	0	0	0	0	0	0	0	0	3	3	39	42
	Yellow-billed Spoonbill	0	0	0	0	0	0	0	0	0	0	0	1	1	32	33
	Royal Spoonbill	0	0	0	0	0	0	0	0	0	0	0	16	16	60	76
	Glossy Ibis	0	0	0	0	0	0	0	0	0	0	0	0	0	41	41
	Australian White Ibis	0	0	0	0	0	0	0	0	0	0	0	18	18	108	126
	Straw-necked Ibis	0	0	0	0	0	0	0	0	0	0	0	54	54	45	99
	Black-necked Stork	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
	Collared Sparrowhawk	0	0	0	0	0	3	0	0	0	0	0	9	12	38	50
	Brown Goshawk	0	0	0	0	0	3	0	0	0	0	0	6	9	67	76
	Grey Goshawk	0	0	0	0	0	0	0	0	0	0	0	8	8	56	64
	Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	40	40	70	110
	Pacific Baza	0	0	0	0	0	0	0	0	0	0	0	1	1	60	61
	Spotted Harrier	0	0	0	0	0	0	0	0	0	0	0	0	0	19	19
	Black-shouldered Kite	0	0	0	0	0	0	0	0	0	0	0	5	5	56	61
	Red Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	White-bellied Sea-Eagle	0	0	0	0	0	2	0	0	0	0	0	13	15	86	101
	Brahminy Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Whistling Kite	0	0	0	0	0	0	0	0	0	0	0	6	6	63	69
	Black-breasted Buzzard	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Little Eagle	0	0	0	0	0	1	0	0	0	0	0	4	5	38	43
	Square-tailed Kite	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**16**
	Black Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15
	Osprey	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**17**
	Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	8	8	39	47
	Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	12	12	72	84
	Grey Falcon	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
	Australian Hobby	0	0	0	0	0	0	0	0	0	0	0	4	4	34	38
	Peregrine Falcon	0	0	0	0	0	3	0	0	0	0	0	13	16	95	111
	Black Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18
	Lewin's Rail	0	0	0	0	0	0	0	0	0	0	0	0	0	42	42
	Black-breasted Button-quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Painted Button-quail	0	0	0	0	0	0	0	0	0	0	0	21	21	42	63
	Painted Snipe	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**
	Bush Stone-curlew	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**20**
	Emerald Dove	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14
	White-headed Pigeon	0	0	0	0	0	1	0	0	0	0	0	10	11	83	94

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Diamond Dove	0	0	0	0	0	0	0	0	0	0	0	6	6	7	13
	Bar-shouldered Dove	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
	Peaceful Dove	0	0	0	0	0	0	0	0	0	0	0	15	15	87	102
	Wonga Pigeon	0	0	0	0	0	29	0	0	0	0	0	49	78	47	125
	Topknot Pigeon	0	0	0	0	0	0	0	0	0	0	0	46	46	35	81
	Brown Cuckoo-Dove	0	0	0	0	0	16	0	0	0	0	0	8	24	58	82
	Crested Pigeon	0	0	0	0	0	0	0	0	0	0	0	10	10	131	141
	Common Bronzewing	0	0	0	0	0	6	0	0	0	0	0	45	51	47	98
	Brush Bronzewing	0	0	0	0	0	0	0	0	0	0	0	6	6	27	33
	Wompoo Fruit-Dove	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
	Rose-crowned Fruit-Dove	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**6**
	Superb Fruit-Dove	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38**	**38**
	Sulphur-crested Cockatoo	0	0	0	0	0	28	0	0	0	0	0	28	56	303	359
	Major Mitchell's Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Galah	0	0	0	0	0	0	0	0	0	0	0	26	26	150	176
	Little Corella	0	0	0	0	0	0	0	0	0	0	0	1	1	79	80
	Long-billed Corella	0	0	0	0	0	0	0	0	0	0	0	6	6	40	46
	Gang-gang Cockatoo	0	0	0	0	0	31	0	0	0	0	0	110	141	118	259
	Red-tailed Black-Cockatoo	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
	Yellow-tailed Black-Cockatoo	0	0	0	0	0	22	0	0	0	0	0	83	105	175	280
	Glossy Black-Cockatoo	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**87**	**92**	**148**	**240**

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Cockatiel	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Australian King-Parrot	0	0	0	0	0	29	0	0	0	0	0	68	97	122	219
	Red-winged Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Musk Lorikeet	0	0	0	0	0	0	0	0	0	0	0	14	14	27	41
	Little Lorikeet	0	0	0	0	0	24	0	0	0	0	0	368	392	38	430
	Swift Parrot	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**7**	**45**	**52**
	Budgerigar	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Orange-bellied Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Turquoise Parrot	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**28**	**28**	**26**	**54**
	Crimson Rosella	0	0	0	0	0	135	0	0	0	0	0	121	256	300	556
	Eastern Rosella	0	0	0	0	0	3	0	0	0	0	0	88	91	297	388
	Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	9	9	79	88
	Scaly-breasted Lorikeet	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
	Rainbow Lorikeet	0	0	0	0	0	3	0	0	0	0	0	13	16	161	177
	Fan-tailed Cuckoo	0	0	0	1	0	30	0	0	0	0	0	34	65	174	239
	Brush Cuckoo	0	0	0	1	0	11	0	0	0	0	0	15	27	34	61
	Horsfield's Bronze-Cuckoo	0	0	0	0	0	0	0	0	0	0	0	1	1	49	50
	Shining Bronze-Cuckoo	0	0	0	0	0	12	0	0	0	0	0	16	28	91	119
	Little Bronze-Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Black-eared Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
	Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	1	1	61	62

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Oriental Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13
	Common Koel	0	0	0	0	0	1	0	0	0	0	0	2	3	143	146
	Channel-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	4	4	98	102
T	**Barking Owl**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**26**	**28**
	Southern Boobook	0	0	0	121	0	0	3	51	0	0	0	78	253	190	443
T	**Powerful Owl**	**0**	**0**	**0**	**32**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**9**	**43**	**220**	**263**
	Barn Owl	0	0	0	1	0	0	0	0	0	0	0	3	4	34	38
T	**Masked Owl**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**32**	**36**
T	**Sooty Owl**	**0**	**0**	**0**	**23**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**2**	**30**	**78**	**108**
	Marbled Frogmouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tawny Frogmouth	0	0	0	9	0	0	1	21	0	0	0	65	96	183	279
	White-throated Nightjar	0	0	0	4	0	1	0	9	0	0	0	20	34	27	61
	Australian Owlet-nightjar	0	0	0	42	0	12	1	31	0	0	0	69	155	69	224
	Azure Kingfisher	0	0	0	0	0	1	0	0	0	0	0	14	15	50	65
	Laughing Kookaburra	0	0	0	10	0	47	0	0	0	0	0	43	100	347	447
	Forest Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
	Red-backed Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Sacred Kingfisher	0	0	0	0	0	10	0	0	0	0	0	16	26	146	172
	Dollarbird	0	0	0	0	0	0	0	0	0	0	0	5	5	98	103
	Noisy Pitta	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
	Superb Lyrebird	0	0	0	3	0	73	0	0	0	0	0	88	164	175	339

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Rufous Scrub-bird	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	White-browed Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red-browed Treecreeper	0	0	0	0	0	19	0	0	0	0	0	35	54	12	66
	Brown Treecreeper	0	0	0	0	0	5	0	0	0	0	0	37	42	21	63
	White-throated Treecreeper	0	0	0	0	0	271	0	0	0	0	0	94	365	303	668
	Inland Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yellow-rumped Thornbill	0	0	0	0	0	1	0	0	0	0	0	68	69	53	122
	Striated Thornbill	0	0	0	0	0	101	0	0	0	0	0	134	235	172	407
	Yellow Thornbill	0	0	0	0	0	4	0	0	0	0	0	32	36	179	215
	Brown Thornbill	0	0	0	0	0	153	0	0	0	0	0	127	280	231	511
	Buff-rumped Thornbill	0	0	0	0	0	29	0	0	0	0	0	134	163	75	238
	Chestnut-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	1	1	5	6
	Speckled Warbler	0	0	0	0	0	1	0	0	0	0	0	59	60	22	82
	Eastern Bristlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14
	Mangrove Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Brown Gerygone	0	0	0	0	0	54	0	0	0	0	0	34	88	89	177
	White-throated Gerygone	0	0	0	0	0	10	0	0	0	0	0	14	24	87	111
	Chestnut-rumped Heathwren	0	0	0	0	0	1	0	0	0	0	0	14	15	31	46
	Rockwarbler	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**46**	**58**	**56**	**114**
	Spotted Pardalote	0	0	0	0	0	217	0	0	0	0	0	226	443	458	901

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Striated Pardalote	0	0	0	0	0	53	0	0	0	0	0	65	118	120	238
	Pilotbird	0	0	0	0	0	30	0	0	0	0	0	15	45	36	81
	Yellow-throated Scrubwren	0	0	0	0	0	10	0	0	0	0	0	14	24	25	49
	White-browed Scrubwren	0	0	0	0	0	102	0	0	0	0	0	99	201	205	406
	Large-billed Scrubwren	0	0	0	0	0	8	0	0	0	0	0	7	15	15	30
	Weebill	0	0	0	0	0	10	0	0	0	0	0	27	37	101	138
	Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Eastern Spinebill	0	0	0	0	0	166	0	0	0	0	0	92	258	340	598
	Red Wattlebird	0	0	0	0	0	40	0	0	0	0	0	24	64	147	211
	Little Wattlebird	0	0	0	0	0	21	0	0	0	0	0	25	46	189	235
	Banded Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue-faced Honeyeater	0	0	0	0	0	3	0	0	0	0	0	1	4	6	10
	Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Yellow-faced Honeyeater	0	0	0	0	0	159	0	0	0	0	0	180	339	352	691
	Fuscous Honeyeater	0	0	0	0	0	5	0	0	0	0	0	413	418	60	478
	White-eared Honeyeater	0	0	0	0	0	112	0	0	0	0	0	73	185	166	351
	Yellow-tufted Honeyeater	0	0	0	0	0	19	0	0	0	0	0	50	69	80	149
	White-plumed Honeyeater	0	0	0	0	0	1	0	0	0	0	0	25	26	54	80
	Brown Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Yellow-throated Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Noisy Miner	0	0	0	3	0	3	0	0	0	0	0	54	60	347	407

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Bell Miner	0	0	0	0	0	7	0	0	0	0	0	69	76	76	152
	Lewin's Honeyeater	0	0	0	0	0	83	0	0	0	0	0	33	116	204	320
	White-throated Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Brown-headed Honeyeater	0	0	0	0	0	29	0	0	0	0	0	149	178	52	230
	Black-chinned Honeyeater	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**6**	**7**	**18**	**25**
	White-naped Honeyeater	0	0	0	0	0	66	0	0	0	0	0	300	366	100	466
	Scarlet Honeyeater	0	0	0	0	0	1	0	0	0	0	0	9	10	66	76
	Little Friarbird	0	0	0	0	0	0	0	0	0	0	0	2	2	7	9
	Noisy Friarbird	0	0	0	0	0	77	0	0	0	0	0	264	341	137	478
	Tawny-crowned Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28
	White-cheeked Honeyeater	0	0	0	0	0	4	0	0	0	0	0	4	8	85	93
	New Holland Honeyeater	0	0	0	0	0	60	0	0	0	0	0	112	172	276	448
	Striped Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Regent Honeyeater	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**192**	**193**	**60**	**253**
	Eastern Yellow Robin	0	0	0	0	0	125	0	0	0	0	0	92	217	331	548
	Hooded Robin	0	0	0	0	0	0	0	0	0	0	0	24	24	13	37
	Jacky Winter	0	0	0	0	0	4	0	0	0	0	0	74	78	54	132
	Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	1	1	19	20
	Scarlet Robin	0	0	0	0	0	17	0	0	0	0	0	34	51	41	92
	Flame Robin	0	0	0	0	0	2	0	0	0	0	0	6	8	24	32
	Rose Robin	0	0	0	0	0	21	0	0	0	0	0	19	40	106	146

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Pale-yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Logrunner	0	0	0	0	0	5	0	0	0	0	0	29	34	13	47
	White-browed Babbler	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
	Grey-crowned Babbler	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Spotted Quail-thrush	0	0	0	0	0	12	0	0	0	0	0	78	90	32	122
	Eastern Whipbird	0	0	0	0	0	80	0	0	0	0	0	26	106	247	353
	Varied Sittella	0	0	0	0	0	6	0	0	0	0	0	57	63	86	149
	Grey Shrike-thrush	0	0	0	0	0	146	0	0	0	0	0	76	222	324	546
	Little Shrike-thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Crested Shrike-tit	0	0	0	0	0	11	0	0	0	0	0	23	34	79	113
	Crested Bellbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gilbert's Whistler	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Olive Whistler	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**9**
	Golden Whistler	0	0	0	0	0	91	0	0	0	0	0	70	161	283	444
	Rufous Whistler	0	0	0	0	0	59	0	0	0	0	0	52	111	179	290
	Spangled Drongo	0	0	0	0	0	0	0	0	0	0	0	1	1	63	64
	Black-faced Monarch	0	0	0	0	0	28	0	0	0	0	0	18	46	70	116
	Spectacled Monarch	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
	Shining Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	1	1	30	31
	Restless Flycatcher	0	0	0	0	0	3	0	0	0	0	0	31	34	45	79

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Leaden Flycatcher	0	0	0	0	0	19	0	0	0	0	0	24	43	84	127
	Grey Fantail	0	0	0	1	0	142	0	0	0	0	0	83	226	388	614
	Willie Wagtail	0	0	0	0	0	3	0	0	0	0	0	20	23	228	251
	Rufous Fantail	0	0	0	0	0	38	0	0	0	0	0	26	64	76	140
	Barred Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ground Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Black-faced Cuckoo-shrike	0	0	0	0	0	34	0	0	0	0	0	46	80	274	354
	White-bellied Cuckoo-shrike	0	0	0	0	0	2	0	0	0	0	0	4	6	30	36
	Cicadabird	0	0	0	0	0	19	0	0	0	0	0	17	36	42	78
	Varied Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	White-winged Triller	0	0	0	0	0	1	0	0	0	0	0	1	2	32	34
	Olive-backed Oriole	0	0	0	0	0	6	0	0	0	0	0	10	16	111	127
	Figbird	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28
	Dusky Woodswallow	0	0	0	0	0	9	0	0	0	0	0	52	61	81	142
	White-breasted Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Masked Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14
	White-browed Woodswallow	0	0	0	0	0	1	0	0	0	0	0	0	1	30	31
	Pied Butcherbird	0	0	0	0	0	0	0	0	0	0	0	1	1	27	28
	Grey Butcherbird	0	0	0	0	0	59	0	0	0	0	0	32	91	287	378
	Australian Magpie	0	0	0	0	0	38	0	0	0	0	0	42	80	383	463
	Pied Currawong	0	0	0	0	0	122	0	0	0	0	0	73	195	406	601

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Grey Currawong	0	0	0	0	0	10	0	0	0	0	0	22	32	33	65
	Paradise Riflebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Australian Raven	0	0	0	0	0	47	0	0	0	0	0	39	86	443	529
	Little Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
	Torresian Crow	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Forest Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	White-winged Chough	0	0	0	1	0	3	0	0	0	0	0	206	210	74	284
	Apostlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Green Catbird	0	0	0	0	0	5	0	1	0	0	0	7	13	12	25
	Spotted Bowerbird	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Satin Bowerbird	0	0	0	0	0	44	0	0	0	0	0	34	78	92	170
	Regent Bowerbird	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Red-browed Finch	0	0	0	0	0	48	0	0	0	0	0	165	213	299	512
	Beautiful Firetail	0	0	0	0	0	2	0	0	0	0	0	12	14	45	59
	Diamond Firetail	0	0	0	0	0	2	0	0	0	0	0	92	94	19	113
	Mistletoebird	0	0	0	0	0	34	0	0	0	0	0	56	90	89	179
	Tree Martin	0	0	0	0	0	0	0	0	0	0	0	60	60	50	110
	Red-whiskered Bulbul	0	0	0	0	0	7	0	0	0	0	0	6	13	122	135
	Silvereye	0	0	0	0	0	79	0	0	0	0	0	104	183	334	517
	Unindentified Ground Thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	24	24
	Russet-tailed Thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Bassian Thrush	0	0	0	0	0	4	0	0	0	0	0	11	15	16	31
	Platypus	0	0	0	1	0	0	0	0	0	0	0	7	8	55	63
	Short-beaked Echidna	1	0	0	0	0	0	0	0	2	0	0	25	28	101	129
	Yellow-footed Antechinus	2	0	0	0	0	0	0	0	0	0	1	0	3	1	4
	Brown Antechinus	29	6	0	0	0	0	0	0	1	0	98	6	140	315	455
	Dusky Antechinus	0	0	0	0	0	0	0	0	0	0	0	1	1	19	20
T	**Tiger Quoll**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**121**	**123**
	Eastern Quoll	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**
	Brush-tailed Phascogale	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Common Planigale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Common Dunnart	3	0	0	0	0	0	0	0	0	0	0	3	6	6	12
	Dunnart	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northern Brown Bandicoot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Southern Brown Bandicoot	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**37**	**37**
	Long-nosed Bandicoot	5	0	0	0	0	0	0	1	4	0	0	0	10	122	132
	Koala	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**6**	**13**	**223**	**236**
	Common Wombat	0	1	0	2	0	0	1	6	4	0	0	127	141	80	221
	Mountain Brushtail Possum	5	0	0	1	0	0	0	6	0	0	0	3	15	34	49
	Common Brushtail Possum	5	0	0	13	0	0	0	63	0	0	0	36	117	337	454
	Feathertail Glider	0	0	0	0	0	0	1	2	0	0	0	3	6	25	31
	Eastern Pigmy-possum	0	0	0	0	0	0	0	0	2	0	0	3	5	68	73

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Greater Glider	**0**	**0**	**0**	**28**	**0**	**0**	**5**	**275**	**20**	**0**	**0**	**85**	**413**	**106**	**519**
	Yellow-bellied Glider	**0**	**0**	**0**	**23**	**0**	**0**	**0**	**29**	**0**	**0**	**0**	**26**	**78**	**97**	**175**
	Sugar Glider	**0**	**0**	**0**	**90**	**0**	**0**	**4**	**75**	**16**	**0**	**0**	**85**	**270**	**197**	**467**
	Squirrel Glider	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**9**	**12**	**21**
	Common Ringtail Possum	7	0	0	10	0	0	6	149	14	0	0	61	247	295	542
	Rufous Bettong	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
T	**Long-nosed Potoroo**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**8**
	Black-striped Wallaby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Parma Wallaby	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Whiptail Wallaby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Common Wallaroo	0	0	0	0	0	0	0	3	0	0	0	46	49	16	65
	Red-necked Wallaby	0	0	0	0	0	0	0	3	1	0	0	116	120	20	140
	Brush-tailed Rock-wallaby	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**23**	**25**
	Red-legged Pademelon	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Red-necked Pademelon	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3
	Swamp Wallaby	23	0	0	1	0	0	0	9	72	0	0	152	257	316	573
	Water Rat	0	0	0	0	0	0	0	0	0	0	0	10	10	15	25
	Broad-toothed Rat	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Grassland Melomys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fawn-footed Melomys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eastern Chestnut Mouse	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	New Holland Mouse	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46
	Hastings River Mouse	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Bush Rat	15	0	0	0	0	0	0	2	10	0	220	2	249	328	577
	Swamp Rat	5	0	0	0	0	0	0	0	0	0	6	0	11	41	52
	Dingo and Dog (feral)	1	0	0	8	0	0	0	2	79	0	0	9	99	93	192
	Pteropus poliocephalus	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**58**	**60**	**109**	**169**
	Pteropus scapulatus	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Syconycteris australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Saccolaimus flaviventris	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**3**
	Mormopterus loriae	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Mormopterus norfolkensis	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**2**	**11**
	Mormopterus planiceps	0	0	0	0	2	0	0	0	0	0	0	0	2	1	3
	Mormopterus sp	0	0	0	0	5	0	0	0	0	0	0	0	5	0	5
	Mormopterus sp 1	0	0	0	0	38	0	0	0	0	2	0	0	40	7	47
	Nyctinomus australis	**0**	**0**	**0**	**17**	**35**	**0**	**1**	**7**	**0**	**0**	**0**	**6**	**66**	**26**	**92**
	Rhinolophus megaphyllus	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**12**	**0**	**20**	**52**	**21**	**73**
	Chalinolobus dwyeri	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**0**	**0**	**32**	**0**	**0**	**63**	**10**	**73**
	Chalinolobus gouldii	0	0	0	0	119	0	0	0	0	16	0	0	135	48	183
	Chalinolobus morio	0	0	0	0	248	0	0	0	0	163	0	0	411	26	437
	Chalinolobus nigrogriseus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Falsistrellus tasmaniensis	**0**	**0**	**0**	**0**	**45**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**49**	**1**	**50**

PART 3: Sydney Basin cont.

Target	Report name	Hair-sampling funnels	Diurnal herpetofauna search	Nocturnal streamside search	Nocturnal call playback	'Anabat' call recording	Diurnal bird census	Site-based spotlighting	Transect spotlighting	Scat searches	Harp trapping	Elliott trapping	Incidental records	Total CRA records	Collated records	Grand total
	Kerivoula papuensis	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Miniopterus australis	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**3**
	Miniopterus schreibersii	**0**	**0**	**0**	**0**	**89**	**0**	**0**	**0**	**0**	**37**	**0**	**0**	**126**	**25**	**151**
	Myotis adversus	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**34**	**0**	**0**	**35**	**22**	**57**
	Nyctophilus bifax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nyctophilus geoffroyi	0	0	0	0	0	0	0	0	0	19	0	0	19	14	33
	Nyctophilus gouldi	0	0	0	0	0	0	0	0	0	91	0	0	91	47	138
	Nyctophilus timoriensis	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Scoteanax rueppellii	**0**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**17**	**10**	**27**
	Scotorepens balstoni	0	0	0	0	1	0	0	0	0	0	0	0	1	1	2
	Scotorepens greyii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Scotorepens orion	0	0	0	0	19	0	0	0	0	2	0	0	21	10	31
	Scotorepens sp 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vespadelus darlingtoni	0	0	0	0	226	0	0	0	0	159	0	0	385	3	388
	Vespadelus pumilus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Vespadelus regulus	**0**	**0**	**0**	**0**	**63**	**0**	**0**	**0**	**0**	**33**	**0**	**0**	**96**	**11**	**107**
	Vespadelus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vespadelus troughtoni	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
	Vespadelus vulturnus	0	0	0	0	325	0	0	0	0	412	0	2	739	112	851
TOTALS		**101**	**907**	**184**	**490**	**1291**	**3880**	**25**	**844**	**227**	**1022**	**328**	**11 238**	**20537**	**25 942**	**46 479**

APPENDIX 7

VOUCHER SPECIMENS COLLECTED DURING CRA FAUNA SURVEYS

Voucher specimens were collected during all CRA fauna surveys and lodged with the Australian Museum. Most specimens were collected because of taxonomic uncertainty, particularly for small skinks and bats. Parts A to E list the confirmed identity of specimens lodged with the Australian Museum.

*Note that 'No.' includes specimens collected by euthanasia, trap deaths and road-kill. Not all specimens were allocated registration or field numbers prior to delivery to the Australian Museum.

Specimen	No.*	Australian Museum Reg. No.	Field No.
Mammals - bats			
Chalinolobus gouldii	1		GND01
Chalinolobus morio	4	M33406	GND07, GND12, MNC04, DM90
Falsistrellus tasmaniensis	9	M33417, M33418, M33419, M33186, M33179, M33177	DM66, DM67, DM68, KAC09, KAC18, KAC19, GND02, MNC11, MNC12
Kerivoula papuensis	1		GND10
Miniopterus australis	5	M33410, M33425, M33443, M33429	DM53, DM54, DM61, DM62, MNC14
Miniopterus schreibersii	2		JNR02, JNR04
Mormopterus loriae	1	M33427	DM79
Mormopterus planiceps	2	M33175	KAC22,
Mormopterus sp. 1	1		B2/2
Myotis adversus	1	M33435	DM89
Myotis af. *adversus*	1	M33199	MS01
Nyctophilus darlingtoni	1	M33172	KAC26
Nyctophilus geoffroyi	4	M33165	GND09, MNC05, MNC06, DJS002
Nyctophilus gouldi	4	M33360, M33386	KAC04, KRK01, JNR03, MNC07
Nyctophilus timoriensis	1	M33176	KAC23
Nyctophilus sp.	2		
Rhinolophus megaphyllus	4	M33170	KAC27, 6B/1, GND08, GND11
Scoteanax ruepellii	3	M33359, M33163	KAC03, KAC08, MNC13
Scotorepens balstoni	1	M33173	KAC24
Scotorepens greyii	3	M33164, M33388, M33405	DJS001, KRK02, DM48
Scotorepens orion	8	M33361, M33392, M33411, M33436, M33416, M33362	KAC05, KRK006, DM82, DM83, DM58, KAC06, MNC03, 21041
Scotorepens sp.	7	M33414, M33166, M33441, M33415, M33201	DM47, DJS003
Vespadelus darlingtoni	33	M33440, M33431, M33399, M33402, M33171, M33408, M33903, M33901, M33904, M33189, M33190, M33185, M33182, M33192, M33395, M33393, M33413, M33433, M33421, M33184, 46597	DM73, DM74, KRK13, KRK16, KAC29, DM87, L019-12, L021-1, L022-2, KAC01, KAC02, KAC12, KAC13, KAC17, KRK09, KRK07, DM64, DM71, DM72, KAC11, CHB3A3, CHB3A4, B2/1, 46597, B4/1, GND05, GND06, DGM03, DGM04

Specimen	No.*	Australian Museum Reg. No.	Field No.
Mammals - bats cont.			
Vespadelus pumilus	15	M33389, M33426, M33397, M33902, M33420, M33423, M33442, M33448, M33439, M33432, M33444, M33445, M33446, M33447, M33430	KRK003, DM76, KRK11, L020-1, DM49, DM50, DM51, DM52, DM55, DM56, DM57, DM59, DM60, DM91, DM63
Vespadelus regulus	18	M33428, M33183, M33180, M33409, M33900, M33187, M33181, M33394, M33398, M33400, M33401, M33188	DM84, KAC14, KAC15, DM86, L021-2, KAC10, KAC16, KRK08, KRK12, KRK14, KRK15, KAC07, GND03, GND04, DGM01, DGM02, JNR01, 21044
Vespadelus troughtoni	1	M33387	DM46
Vespadelus vulturnus	34	M33422, M33198, M33391, M33390, M33412, M33434, M33407, M33424, M33432, M33178, M33191, M33403, M33404, M33438, M33908, M33909, M33899, M33897, M33898, M33174, M33168	GND13, GND14, GND15, MNC01, MNC02, DM65, MS07, KRK005, KRK004, DM69, DM70, DM75, DM77, DM78, KAC2:, KAC28, KRK17, KRK18, DM85, L018-B, L019-11, L020-2, L022-1, L022-3, KAC25, DJS005, 9B/1, C9/3, 46598, B2/3, B3/1, 46598
Vespadelus sp.	4		GND16, MNC09
Mammals - other			
Acrobates pygmaeus	1		7B/1
Antechinus stuartii	10	M33200, M33169	MS02, DJS006, A/1, C/4, 14B/3, 14B/4, 14B/1, 14B/2, RB01
Antechinus af. *stuartii*	4		GD9802, GD9804, GD9803, GD9805
Antechinus swainsonii	2		
Planigale maculata	2	M33449, M33167	DM45, DJS004
Pseudomys novaehollandiae	2	M33615	L018-A
Rattus lutreolus	2	M33476, M33475	45651, 171
Rodent unknown sp.	1		
Mammal unknown sp.	1		21043
BIRDS			
Corvus mellori?	1		
Gallinula tenebrosa	1		
Pomatostomus temporalis	1		
Puffinus tenuirostris?	1		L023-1
Sericornis frontalis	1		
Tyto alba	1		
REPTILES			
Amphibolurus muricatus	1	R151470	21457
Amphibolurus nobbi	2	R151304, R151313	45488, 45497
Anamalopus verreauxii	1	R151967	45809
Anomalopus leukartii	1	R151303	45487
Anomalopus swansoni	2		46646, 46649
Bassiana duperryi?	1		46413
Bassiana playnota	1	R151312	45496
Boiga irregularis	1		
Cacophis squamulosus	2	R155075	45631,C12/1/46415
Calyptotis ruficauda	11	R155078, R151948, R151946, R151482, R151896, R151898, R151899, R151900, R151901, R151974, R151974	45634, 45655, 45660, 41150, 45797, 45799, 45800, 45801, 45802, 45804, 45804

Specimen	No.*	Australian Museum Reg. No.	Field No.
REPTILES cont.			
Calyptotis scutirostrum	6	R151299, R151486, R151318, R151893, R151894	45481, 45599, 45502, 45794, 45795, 45816
Ctenotus taeniolatus	4	R151279, R151284, R151472, R151319	45461, 45466, 41146, 45504
Cyclodomorphos casuarinae	1	R155081	45680
Dendralephis punctulata	1	R155074	21498
Diporiphora australis	3	R150483, R150484	AMR150483, AMR150484, 45680
Egernia cunninghami	1	R155073	21494
Egernia frerei	1	R151471	41149
Egernia mcpheei	1	R151292	45477
Egernia modesta	1	R151302	45486
Egernia striolata	4	R151283, R151301, R151306, R151320	45465, 45485, 45490, 45503
Egernia whitii	2	R151468, R151295	41159, 45472
Egernia sp.	1		45875
Eulamprus heatwolei	9	R150085, R150086, R150087, R150088, R150089, R150624, R150625	45667, 45668, 45669, 45670, 45671, 45862
Eulamprus kosciuskoi	5	R45633, R150091, R150092, ,	45633, 45673, 45674, 45871
Eulamprus martini	6	R151316, R151321, R151763, R151966, R151970,	45500, 45505, 45790, 45808, 45812, 45817
Eulamprus murrayi	1	R151289	45473
Eulamprus quoyii	5	R151293, R151467, R151466, R151758, R151759	45478, 41153, 21453, 45785, 45786
Eulamprus tenuis	4	R151286, R151322, R151323, R151971	45468, 45506, 45508, 45813
Eulamprus af. *tenuis*	1		AM150629
Eulamprus sp.	2		45867, 45868
Eulepis platynota	1	R151294	45471
Furina diadema	1	R151310	45494
Gehyra dubia	1	R151311	45495
Hemiaspis signata	2	R155079, R151290	45635, 45474
Hemiergis decresiensis	1	R151309	45493
Hoplocephalus bungarioides	1		151978
Lampropholis amicula	2	R150980, R151485	45639, 41148
Lampropholis caligula	3	R151944, R151945	45658, 45659, 46416
Lampropholis delicata	26	R151488, R150093, R150094, R151307, R151326, R150981, R151983, , R151973, R151280, R151297, R151298, R151487, R151478, R151484, R151479, R151308, R151481, R151477, R151760, R151895, R151897, R151976, R151968	41151, 45675, 45676, 45491, 45511, 45640, 45648, 45661, 45664, 45462, 45479, 45480, 45598, 41155, 41156, 41158, 45492, 41147, 41152, 45787, 45796, 45798, 45806, 45810, 45869, 45870
Lampropholis guichenoti	9	R151324, R151325, R151480, R150095, R150096, R150996, R151291, R151483, R151764	45509, 45510, 41154, 45677, 45678, 45637, 45475, 45597, 45793
Lerista muelleri	1	R151288	45470
Lygisaurus foliorum	6	R151287, R151317, R151314, R151267, R151266, R151757	45469, 45501, 45498,45784
Morethia boulengeri	5	R151305, R150875, R150876, R151315, R151268	45489, 21500, 21499, 45499
Oedura lesueurii	1	R150084	45666
Oedura tryoni	1	R150083	45665
Ophioscincus truncatus	2	R151269, R151975	45805

Specimen	No.*	Australian Museum Reg. No.	Field No.
REPTILES cont.			
Pogona barbata	2	R155076	45632
Pseudemoia entrecasteauxii	4	R150628, R150626, R150627, 46503	B1H002
Pseudonaja textilis	1		
Pseudechis porphyriacus	1		46411
Pygopus lepidipodus	1		46647
Ramphotyphlops nigrescens	4	R151469, R151285, R151892, 46502	21454, 45467, 45755, B1H002
Rhinoplocephalus nigrescens	1		KM01/52251
Saiphos equalis	10	R151972, R151270, R151761, R151762, R151902, R151969	45663, , 45788, 45789, 45803, 45811, 46408, 46408, 45814, 45815
Saltuarius swaini	3	R150911, R150912, R151753	21460, 21461, 45653
Saproscincus challengeri	2	R150097, R150098	
Saproscincus galli	1	R151942	45654
Saproscincus mustelina	3	R151489, R151941, R151943	41157, 45653, 45756
Saproscincus rosei	7	R151300, R155072, R151984, R151755, R151756, R151264, R151265	45484, 21492, 45649, 45753, 45754
Saproscincus af. *rosei*	1	R151947	45662
Tiliqua nigrolutea	1		46407
Tympanocryptis diemensis	1		B1H001/46504
Varanus varius	1		46412
Scincidae unknown	14		46409, 45863, 45864, 45865, 45866, 46030, 46025, 46028, 46029, 46027, 46026, 46024, 46023, 46031
FROGS			
Adelotus brevis	1		46638
Crinia parinsignifera	6		21478, 21479, 21486, 21487, 21488, 21489
Crinia signifera	4	R151278	21490, 45679, 45791, 45792
Crinia tinnula	4	R151476	21456, 21477, 21480, 21481
Heleioporus australiacus	1		
Lechriodus fletcheri	2		49337, 49338
Limnodynastes dumerilli	2	R151281, R151282	45463, 45464
Limnodynastes ornatus	1		
Limnodynastes peronii	3	R151258, R151259, R151260	21482, 21484, 21485
Limnodynastes tasmaniensis	2	R151473, R151257	41161, 21483
Litoria barringtonensis	1		21463
Litoria brevipalmata	7	R151474	41145, 49319, 49320, 49321, 49322, 49323
Litoria jervisiensis	1		21474
Litoria lesueuri	19		49324, 49325, 49326, 49349, 49350, 49351
Litoria af. lesueurii	1		
Litoria littlejohni	1		46410
Litoria pearsoniana	1		49334
Litoria peronii	1		46644

Specimen	No.*	Australian Museum Reg. No.	Field No.
FROGS cont.			
Litoria revelata	16		21464, 21465, 21466, 21467, 21468, 21469, 21470, 21471, 21472, 21473, 49315, 49316, 49317, 49339, 49340, 49341
Litoria subglandulosa	1	R150090	45672
Mixophyes iteratus	2		49335, 49336
Neobatrachus sudelli	1		46642
Pseudophryne australis	1		46643
Pseudophryne bibronii	7	R150648, R150649, R155080	45636, 46505
Pseudophryne coriacea	5	R151296	45476, 49329, 49330, 49331, 49332
Uperoleia laevigata	7	R151475	41160, 49318, 49342, 49343, 49344, 49345, 49346
Uperoleia af. laevigata	1		456657
Uperoleia tyleri	1		46406
Uperoleia sp.	1		46645
Unknown metamorph frog	1		
FISH			
Galaxus sp.	1		