A BIBLIOGRAPHY FOR THE

World Heritage Central Eastern Rainforest Reserves of Australia

Researched and compiled by Terry Reis

Cover: Litter fall in Dorrigo National Park by Barbara Webster © NSW National Parks and Wildlife Service

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A Bibliography for the World Heritage Central Eastern Rainforest Reserves of Australia

Incorporating information assessment and
development of a research strategy

Terry Reis

Foreword

This bibliography is the necessary first step in the development of a research strategy for the World Heritage Central Eastern Rainforest Reserves of Australia (CERRA). This World Heritage property, situated between Newcastle and Brisbane, contains the major stands of rainforest in subtropical Australia. World Heritage listing has recognised its globally significant natural values. It is also an important global resource for research and science.

The project to create this bibliography was initiated on the recommendation of the inaugural CERRA Technical and Scientific Advisory Committee, who also lobbied for funding from the Australian Government and support from the State management agencies.

The results of Terry Reis' mammoth work will be an indispensable tool for the next CERRA Technical and Scientific Advisory Committee, to develop a research strategy for CERRA. It should also prove useful to researchers, exploring this fascinating part of the world.

It is hoped that the bibliography will be completed and updated into the future.

Professor Roger Kitching

Chair of Ecology, Griffith University
Chairperson of the first CERRA TSAC

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Acknowledgments

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- Lachlan Copeland of the University of New England.

1. Introduction

Over 50 reserves in south-east Queensland and north-east New South Wales comprise the World Heritage Central Eastern Rainforest Reserves of Australia, henceforth in this document referred to as CERRA. These reserves contain the major rainforest stands, as well as other habitats between the Main Range in Queensland south to Barrington Tops near Newcastle in NSW. The total area is in excess of 366 500 hectares and is a result of two World Heritage nominations and listings during the 1980s and 1990s (Hunter 2003). A list of the current reserves is included in Table 1.

Over the years a substantial amount of research has been conducted in the CERRA parks and reserves. The work has been conducted by a large number of state and non-government agencies, independent researchers and university students. Much of this work has not been coordinated and a considerable proportion has not been published, limiting its availability beyond the institution responsible for its completion.

This document, plus its associated web-based resources, serves as an overview of research projects and general information pertaining to CERRA parks and reserves, and will aid in the preparation of a research strategy by the CERRA Technical and Scientific Advisory Committee (TSAC). Relevant documents are identified, their contents are summarised and the location of unpublished documents is recorded, facilitating access by interested parties and possible compilation of a specialised library.

Table 1. Parks and reserves in CERRA – their current and former names

Current name of reserve	Previous name(s) by which the listed part of reserve has been known
In NSW, managed by the NSW National Parks & Wildlife Service	
Barrington Tops NP	Gloucester Tops NP Kerripit Beech FR (in Barrington Tops SF) Jerusalem Creek FR (in Chichester SF)
Border Ranges NP	Wiangaree (aka Wiangarie) SF, inc. Gradys Creek FR Roseberry SF, inc. Levers Plateau FP Mt Lindesay FR (in Mt Lindesay SF)
Captains Creek NR	Captains Creek FR (in Beaury SF)
Cunnawarra NP	Cunnawarra FR (in Styx River SF) Georges Creek FP
Dorrigo NP	Dorrigo State Park plus Killungoondie SF and part of Never Never SF
Gibraltar Range NP	Cangai SF Dandahra SF
Iluka NR	Bundjalung NP
Koreelah NP	Acacia Plateau FR and Wilsons Peak FR (both in Koreelah SF)
Limpinwood NR	The Limpinwood Faunal Reserve
Mallanganee NP	Mallanganee FR (in Cherry Tree North SF)
Mebbin NP	Mebbin Lagoons FR (in Mebbin SF)
Mt Clunie NP	Mt Clunie FR (in Koreelah SF)
Mt Hyland NR	Marengo SF
Mt Nothofagus NP	Mt Nothofagus FR (in Donaldson SF)
Mt Seaview NR	Part of Doyles River SF
Mt Warning NP	Mt Warning State Park

Table 1 (cont'd)

Current name of reserve	Previous name(s) by which the listed part of reserve has been known
Mt Royal NP	Fal Brook section of Barrington Tops NP
New England NP	Black Scrub (in Bellinger River SF)
Nightcap NP	Nightcap National Forest Part of Whian Whian SF Goonimbar SF Terania Creek, Mt Nardi
Numinbah NR	
Oxley Wild Rivers NP	Apsley Gorge NP Rowleys Creek NR Hole Creek NR Yarrowitch Gorge NP Kunderang Brook part of Werrikimbe NP Macleay Gorges, Kunderang East, Blue Hole, Gara Gorge, Wollomombi Falls and Dangars Falls
Richmond Range NP	Bungdoozle FR Cambridge Plateau FR (both in Richmond Range SF)
The Castles NR	The Castles FR (in Carrai SF)
Tooloom NP	Tooloom Scrub FR (in Beaury SF)
Toonumbar NP	Dome Mountain FR (in Richmond Range SF) Murray Scrub FR (in Toonumbar SF)
Washpool NP	Washpool SF, Viper Scrub, Willowie Scrub
Werrikimbe NP	Fenwicks Scrub FR (in Doyles River SF) Part of Mt Boss SF
Willi Willi NP	Banda Banda FR (in Mt Boss SF)
Wollumbin NP	Amaroo FR (in Wollumbin SF)

Current name of reserve	Previous name(s) by which the listed part of reserve has been known
In Qld, managed by the Queensland Parks & Wildlife Service	
Burnett Creek FoR	Burnett Creek SF
Emu Vale FoR	Emu Vale SF
Gambubal FoR	Gambubal SF
Gilbert FoR	Gilbert SF
Goomburra FoR	Goomburra SF
Lamington NP	Turtle Rock EP
Main Range NP	Mt Mistake NP, Cunningham's Gap, Killarney SF
Mt Barney NP	Part of Palen Creek SF Cronan Creek SF
Mt Chinghee NP	Telemon EP
Spicers Gap FoR	Spicers Gap SF
Spicers Gap Road CP	
Springbrook NP	Natural Bridge NP Warrie NP (aka Warree), Gwongorella NP Mt Cougal NP Natural Arch
Teviot FoR	Teviot SF
Other reserves in Qld	
5 Rabbit Board paddocks	
A small part of the Palen Creek Prison Farm	
Plus various road reserve adjacent to the areas listed here	

Key to abbreviations

CP = Conservation Park
EP = Environmental Park
FP = Forest Preserve (NSW)
FR = Flora Reserve (NSW)
FoR = Forest Reserve (Qld)
NP = National Park
NR = Nature Reserve (NSW)
SF = State Forest

2. Methods

This document identifies relevant works of research as well as documents of a more general nature concerned wholly or partly with CERRA properties and adjacent land of appropriate vegetation communities. 'Adjacent' in this instance refers not solely to contiguous properties but also to more isolated land considered of ecological similarity.

Adjacent properties were included in this document due to the possible future extension of CERRA, and the ecological influence that processes and activities on contiguous or nearby land may exert directly on CERRA parks and reserves. Changes to both land tenure and names in the past have resulted in the inclusion within this bibliography of documents which, at first inspection, do not appear to relate to CERRA properties. Table 1 lists current CERRA reserves and any relevant previous names.

Despite their inclusion, documents that relate solely to adjacent land were not sought with any real intent. Rather they are the consequence of searches for documents relating specifically to CERRA properties, and hence form a small proportion of the total bibliography. The necessity for perusal of the content of many documents beyond simply their title meant that degree of relevance to this project could often not be ascertained quickly. It was decided that having spent time in identification of a document pertaining to an adjacent property that the document would be included in the bibliography.

Compilation of the bibliography was undertaken via access to government agencies in Queensland and NSW; through use of university libraries, both public access and faculty/department collections; and by searching selected journals, both electronic and hard copy. Government agencies provided access to major departmental libraries, collections held by regional offices, and to relevant documents of varying origin held by individual staff members.

The organisations visited, and their locations, are as follows.

Government agencies:

- Environmental Protection Agency (EPA) – central office library, Brisbane.
- Queensland Parks and Wildlife Service (QPWS) – southern region office, Moggill.
- NSW National Parks and Wildlife Service (NPWS) offices at Alstonville, Armidale, Coffs Harbour, Glen Innes and Kyogle.
- Department of Environment and Conservation – the former NPWS head office library, Hurstville, Sydney.
- Forests NSW Research Division, West Pennant Hills, Sydney.

Universities

- Griffith University, Nathan, Brisbane.
- Southern Cross University, Lismore.
- University of New England, Armidale.
- University of Queensland, St. Lucia.

Some documents from the NPWS offices at Grafton and Walcha were also made available.

While particular fields of research were not given priority, certain disciplines undoubtedly are more comprehensively represented. More broad-based work such as overviews of rainforest within the region or documents presenting the aesthetic features of CERRA, are included as they may hold

future relevance to studies of culture or ecotourism and other social issues. Any perceived limitations of this document and the associated web-based resources in regards to representation of various disciplines are identified within the Discussion (below).

Following consultation with TSAC, it was decided that certain information should be collated from each document to expand the usefulness of the bibliography. This information is presented in an Excel file for ease of access. The headings used and an explanation of any possibly ambiguous fields are given in Table 2.

In addition to the Excel file, a specialised bibliographic database (compiled in EndNote v. 7) was also produced. This database allows searches by keywords, facilitates easy creation of a formatted bibliography within word documents, and simplifies web access to electronic journal articles via URL links.

Database keywords

The choice of keywords used in the bibliographic databases evolved as the project progressed. Initially, the terminology of the relevant document was used, especially in the case of disciplines beyond the experience of the author of this bibliography. Conformity, however, was subsequently sought to facilitate accurate searches by future users. Nonetheless, some keywords may be present only in documents that were accessed early in the process and not revisited. In addition, the details, including abstracts, of many journal articles were down-loaded from the Web of Science (http://portal01.isiknowledge.com) and such records will contain keywords chosen by the controllers of that website and not used otherwise. Terms used in abstracts will also figure in any searches depending on the criteria set by the searcher.

Hence in many, if not most, instances more than one term should be used to search the database. ‘Beetle’, for example, should return the same search result as ‘Coleoptera’ but a search for ‘beetle’ or ‘Coleoptera’ will be a safer option. This is especially the case for invertebrate orders that are less easily identified by a single common name. As an activity rather than taxon-based example, ‘apiculture’ and ‘bee keeping’ have both been used as keywords, though ‘bee keeping’ should return all relevant documents. A list, under various headings, of more frequently used keywords is provided in Table 3. It is advisable to search ‘any field’ rather than a specific field, as information contained in a title may not be replicated by a keyword.

Priority in the allocation of keywords was given to the names of CERRA properties and land ‘adjacent’ to CERRA properties that are not clearly identified within the title of the document. Locations that encompass a CERRA park or reserve are also listed, e.g. Barrington Tops. A search for ‘Barrington Tops’ will, however, include documents relating to Barrington Tops State Forest not simply the CERRA park or reserve, i.e. the national park.

Table 2. Information collated in Excel spreadsheet

Heading	Clarification of content
Author(s)/ editor(s)	
Year	Of publication or original availability (if unpublished).
Title	
Document type	e.g., journal article, unpublished report, book chapter, thesis, management plan, species lists.
Journal/ magazine name	
Journal volume	
Pages	Relevant page numbers of journal articles and book chapters.
Edited book title	Title containing relevant book chapter.
Editor(s)	Edited books only.
Publisher	
City published	
ISBN	Or ISSN where appropriate.
University (theses only)	University attended by author at time of research. Theses include undergraduate reports.
Access location (grey literature)	One or more locations from where an unpublished document may be accessed. Typically government departments, libraries or university facilities. Some documents may be available from many sources but usually not more than two are listed for any one document.
Geographic extent of study: CERRA park	Specific CERRA properties known to be relevant to the document.
Geographic extent of study: (possibly) encompassing CERRA park	Locations that probably or possibly refer to CERRA properties without naming them specifically, e.g., Barrington Tops, Nightcap Range, Main Range.
Geographic extent of study: adjacent to CERRA	Rainforest properties within the CERRA region including national parks, state forests and remnants under a variety of tenures. Not necessarily contiguous with CERRA.
Geographic extent of study: beyond CERRA region	Broad locations, often state or country, also covered by a document that is relevant to at least one CERRA park or 'adjacent' reserve.
Primary category of research/ commentary	Documents are listed under eight categories: ecological, planning/management, taxonomic, social, cultural, earth sciences, genetics, chemistry. Each document is listed under the category considered most appropriate. Other categories may be identified by keyword searches of the EndNote database.
Taxa category	Documents with a primary or major focus on a taxon or taxa are listed under broad headings: mammals, birds, reptiles, frogs, terrestrial vertebrates, fish, invertebrates, vascular plants, non-vascular plants, fungi and algae. Combinations of these categories are used only where the relevance of more than one category are comparable.
Taxa	A much more specific listing of taxon or taxa relevant to a document. Taxa may be listed by order, family, genus or species. Species are typically listed only where less than six are the focus.
Topics	A brief description of the general content of the document.
Plot/ transect details	Details (where available) of number of study locations and dimension and number of plots/transects or other sampling units.
Methods	Brief description of methods used in any research.
Dates of study	Dates of field study
Cross references (related work within this document)	Cross references are based primarily on location rather than taxa, process or other topic. Cross-referenced documents typically share researchers, institutions or goals, e.g. an environmental impact assessment or long-term monitoring. Not all possible cross references are included for any one document but the most relevant have been targeted.
Funding source(s)	Funding sources acknowledged in a document are listed.
Current contact (most recent available)	Where it is known that the first author or listed contact have changed institutions since the document was published or made available the new contact details are provided.
Institution(s) of authors/ researchers at time of research/ publication	Details as provided within a document.

Table 3. Frequently used EndNote keywords

Taxa (broadest terms)	Fauna; flora; terrestrial vertebrates; invertebrate; arthropod; mammal; bird; reptile; frog; fish; crustacean; aquatic macroinvertebrate; vascular plant; fungi; moss; algae; weed; exotic species; rare and threatened; endangered; vulnerable; ROTAP; Schedule 12; endemic species.
Taxa	Invertebrate orders, e.g., Coleoptera, Hymenoptera, Diptera; Vertebrates, e.g., dasyurid, rodent, macropod, pigeon.
Taxa (specific)	Specific taxa are typically only listed if 6 or less species are of reasonable relevance in the document or if they are of State or National conservation significance, e.g., rufous scrub-bird, *Uromyrtus australis.*
Vegetation	Broad vegetation types and classifications, e.g., subtropical rainforest, warm temperate rainforest, complex notophyll vine forest, woodland, wet sclerophyll forest, heath.
Management	Community involvement; conservation plan; conservation status; employment; feral animal control; fire history; fire management; fire regime; monitoring; fuel load; fuel management; impact mitigation; management strategies; pest management; policy; public access; rare and threatened; recreation; ROTAP; Schedule 12; socio-economic; unemployment; walking tracks; weed control.
Human activities	Agriculture; bee-keeping; bushwalking; camping; clearing; ecotourism; EIS; environmental impact assessment; fishing; forestry; grazing; habitat assessment; harvesting; horse-riding; logging; mining; pastoralism; plantation; recreation; road construction; silviculture; tourism; vehicle traffic.
Cultural heritage	Artefacts; bora ground; conservation works; Indigenous cultural heritage; Indigenous history; Indigenous site; non-indigenous cultural heritage; non-indigenous history; massacre site; rockshelter.
Survey techniques	Cage trap; dip net; Elliott trap; fauna survey; flora survey; floristics; hair tube; harp trap; flight intercept; light trap; malaise trap; mist net; pitfall; pollen analysis; questionnaire; radio-collar; radio-telemetry; sediment sampling; seine net; structural assessment; structure; yellow pan.
Earth sciences/ climate	Aspect; climate; caldera; geology; geomorphology; landform; lava flow; microclimate; rainfall; slope; soil chemistry; soils; topography; volcano.
Taxonomy/ genetics	Classification; description; electrophoresis; genetic; holotype; identification key; mitochondrial DNA; morphology; mtDNA; new species; phylogeny; systematics; taxonomy.
Processes	Climate change; competition; decomposition; dieback; disease; dispersal; disturbance; edge effects; erosion; fragmentation; greenhouse effects; invasion; nutrient cycling; pollution; predation; recruitment; regeneration; succession; threat; threatening process.
Other	Abundance; annotated species list; behaviour; biogeography; biomass; breeding biology; diet; distribution; ecotone; foraging behaviour; leaf litter; life history; local distribution; map; old growth; parasite; regrowth; roosting biology; species list; species richness; streamflow; tree hollow; visitation patterns; visitor demographics; water quality; wilderness.

3. Results

More than 1500 documents that held some relevance to the project were examined. Some 1050 of these refer specifically to at least one CERRA park or reserve, with another 220 documents being concerned with areas encompassing CERRA property. Some documents are not necessarily exact in identifying the location of the research, many stating a location simply as Nightcap Range, or indeed simply Nightcap, for example.

Although the taxa discussed often indicate that the work does refer to a CERRA park or reserve, no presumptions have been made about location in the web-based resources associated with this bibliography. In this instance, therefore, 'encompassing' indicates likelihood, or at least a reasonable possibility, that the work pertains to a CERRA property rather than, for example, a document that covers all of NSW without any particular relevance to CERRA properties or habitats. However, those documents included in the bibliography that relate only to adjacent properties are excluded from the results presented hereunder, unless otherwise noted.

The amount of research conducted within a particular property appears to reflect time since dedication, proximity to centres of population and hence universities, and general accessibility to researchers. Lamington National Park, the oldest national park in Queensland and situated close to the major cities of Brisbane and the Gold Coast with multiple universities, is referred to in more than 300 documents. This is half again as many as the second most referenced property, Barrington Tops National Park, which is the part of CERRA located closest to the major population centres of Sydney and Newcastle. Other properties referred to in more than 100 documents are Nightcap, Border Ranges, New England and Dorrigo National Parks. Not surprisingly the properties of least reference are small in area and often comparatively inaccessible, namely the rabbit board reserves, prison reserves, and Gilbert and Teviot Forest Reserves.

Documents comprised many forms. A summary of document type is provided in Table 4.

Table 4. Number of each document type

Document type	Number
Journal article	506
Reports (total)	406
Reports (unpublished)	318
Reports (published)	88
Book chapter	63
Undergraduate thesis/report	56
Book	41
Honours thesis	40
Management plan (including drafts)	33
PhD thesis	23
Recovery plan	23
Species list (including annotated)	21
Masters thesis	11
Newsletter	11
Proceedings (conference, workshop)	9
Pamphlet	8
Leaflet	5
Leaflet	6
Other	21

A list of the journals containing relevant articles is provided in the Appendix.

The primary category of research or commentary of each document was identified. The number of documents primarily concerned with each of the seven categories used is listed in Table 5. Many documents cover a variety of topics and the categorisation was somewhat arbitrary, there

being a fine line between some Social and Cultural documents in particular. This process sought only to provide a very broad overview of the work conducted in CERRA properties. A very small number of documents, less than one percent, were not adequately designated to any of these categories and have been excluded from the numbers given in Table 5.

Table 5. Number of documents by primary research focus or commentary

Primary category of research/ commentary	Number	Percent
Ecological	613	48
Planning/ management	235	18
Taxonomic	228	18
Social	103	8
Genetics	33	3
Cultural	30	2
Earth Sciences	30	2

A majority of the documents related, at least in part, to taxa. This focus may be by way of general fauna or flora survey, by the study of the biology or ecology of one or more taxa, by taxonomic description, or by the study of the genetics of one or more organisms. A summary of the documents concerned with taxa is given in Table 6. Taxa are listed in broad categories. Documents listed under 'single taxon' may nonetheless make reference to more than one taxon, though to a much lesser degree. However, the major focus is a single category of taxa as matches the categories listed. Given the very broad nature of some of these categories, particularly 'invertebrates' and 'vascular plants', the more frequently studied taxa will be discussed in more detail hereunder. Multi-taxa documents typically refer to fauna and/or flora surveys, literature reviews or documents presenting an overview of rainforest in general, though with reference to CERRA properties, or an overview of one or more CERRA parks and reserves.

Table 6. Number of documents pertaining to particular taxa

Taxa	Single taxon	Multi-taxa
Vascular plants	334	33
Invertebrates	158	25
Birds	121	59
Mammals	83	54
Frogs	60	58
Reptiles	13	60
Non-vascular plants	14	1
Fungi	8	3
Fish	5	4
Algae	6	1

There are many ways in which the information contained within this bibliography and its associated web-based resources could be summarised. Unfortunately any summary of the documents will be misleading to some degree, as the number of documents may not actually reflect the quality or substance of the research. A simple species list ranks just as highly as a journal article or PhD thesis in terms of number of documents. In an effort to minimise this possible exaggeration of the work that has been conducted on a particular taxa, the following summaries relate solely to work predominately about a particular taxa category, i.e., the single taxon documents of Table 6. An exclusion of multi-taxa work at the very least removes those documents that are more or less literature reviews or overviews of a particular reserve or area. This point is further addressed in the Discussion below.

Vascular plants

The broad taxon category most frequently referred to in CERRA-related documents, is vascular plants (see Table 6). Of the 334 that primarily focus on vascular plants, 229 are ecological documents (see Table 5 for other categories), 65 taxonomic papers, 27 planning/ management documents, ten papers deal with genetics, two detail the chemistry of particular species and one is considered to be social in content. Species lists for particular locations, considered ecological documents, obviously refer to many species. Of the more specific documents concerning vascular plants, only eight species featured four or more times in ecological research (Table 7). Two of these are weed species, *Lantana camara* and *Cytisus scoparius* (broom). A third species, *Banksia spinulosa*, does not occur in rainforest.

Table 7. Number of documents pertaining to particular vascular plant species

Species	Number*
Antarctic beech (aka negrohead beech) *Nothofagus moorei*	12
sassafras *Doryphora sassafras*	7
broom *Cytisus scoparius*	7
Banksia spinulosa	6
stinging tree *Dendrocnide excelsa*	5
coachwood *Ceratopetalum apetalum*	4
red cedar *Toona ciliata* (syn. *T. australis*)	4
lantana *Lantana camara*	4

* only ecological documents included

Invertebrates

The majority of the 158 documents primarily concerned with invertebrates are taxonomic revisions, typically with little or no biological detail. Thirty-six documents are considered to be ecological in nature with the remaining four dealing with the genetics of various organisms. Research into the biology of invertebrates, or indeed even of invertebrate assemblages, is represented by multiple studies conducted by a very limited number of researchers. A summary of the invertebrate taxa that feature most frequently as a study subject is provided in Table 8.

Table 8. Number of documents pertaining to particular invertebrate taxa

Taxa	Research category	Number
Hemiptera (bugs)	Taxonomic	24
Coleoptera (beetles)	Taxonomic	22
Hymenoptera (ants/ bees/ wasps)	Taxonomic	15
Diptera (flies)	Taxonomic	12
Acari (mites)	Taxonomic	10
Araneae (spiders)	Taxonomic	10
Diptera (flies)	Ecological	10
Acari (mites)	Ecological	8
Multi-Order study	Ecological	7
Coleoptera (beetles)	Ecological	5

Birds

The vast majority (in fact 91%) of the 121 documents, primarily focused on birds, are ecological documents. Table 9 lists the species that occur most frequently as study subjects. The two species that dominate studies numerically are both of conservation significance with one, rufous scrub-bird *Atrichornis rufescens*, occurring only within the CERRA region. Even greater study effort, at least in terms of the number of studies, has been given to the critically endangered northern race of the eastern bristlebird *Dasyornis brachypterus monoides*, which is restricted to a few CERRA parks and adjacent lands (Garnett & Crowley 2000). Some work has also been done on species which perform the important roles of seed dispersal (e.g., Date & Recher 1989; Date *et al*. 1991; 1996) or pollination (e.g., McFarland 1986a, b), though the relevance of the latter will be discussed subsequently (see Discussion).

Table 9. Number of documents pertaining to particular bird species

Species	Number
eastern bristlebird *Dasyornis brachypterus monoides*	16
rufous scrub-bird *Atrichornis rufescens*	8
New Holland honeyeater *Phylidonyris novaehollandiae*	6
topknot pigeon *Lopholaimus antarcticus*	6
white-headed pigeon *Columba leucomela*	5
wompoo fruit-dove *Ptilinopus magnificus*	5
superb fruit-dove *Ptilinopus superbus*	5
rose-crowned fruit-dove *Ptilinopus regina*	5

Mammals

Sixty-four of the 83 documents focused primarily on mammals are ecological in nature. The remaining 19 documents relate to planning/ management (nine), genetics (seven) and taxonomy (three). In broad terms, rodents and dasyurids dominate with two conservation significant species, Hastings River mouse *Pseudomys oralis* and spotted-tailed quoll *Dasyurus maculatus*, providing the majority of these studies respectively (see Table 10). This is especially the case for Hastings River mouse which accounts (either solely or partly) for 76% of rodent research. Similarly, macropod studies are dominated by work on another conservation significant species, brush-tailed rock-wallaby *Petrogale penicillata*.

Table 10. Number of documents pertaining to particular mammal species or species groups

Taxa	Number
rodents (total)	17
dasyurids (total)	16
Hastings River mouse *Pseudomys oralis*	13
multi-family	12
bats	12
spotted-tailed quoll *Dasyurus maculatus*	9
macropods (total)	8
brush-tailed rock-wallaby *Petrogale penicillata*	6
dingo/ wild dog *Canis lupus dingo*	5

Frogs

Thirty-eight of the 60 documents focused primarily on frogs are ecological works. The remaining documents are taxonomic descriptions or revisions (ten), genetic studies (six) or planning/ management

documents (five). The CERRA region encompasses all, or major parts of, the range of a number of conservation significant species including five *Philoria* species, two *Mixophyes* species and the pouched frog *Assa darlingtoni*; these species feature in a large percentage (27%) of taxonomic and genetic research documents. A species endemic to the CERRA region, Fleay's frog *Mixophyes fleayi*, dominates the available research (Table 11).

Table 11. Number of documents pertaining to particular frog species

Species	Number
Fleay's frog *Mixophyes fleayi*	13
sphagnum frog *Philoria sphagnicola* (syn. *Kyarranus sphagnicolus*)	6
cascade tree frog *Litoria pearsoniana*	6
great barred frog *Mixophyes fasciolatus*	4
Blue Mountains tree frog *Litoria citropa*	4
New England tree frog *Litoria subglandulosa*	4

Ecological processes and other topics

Various ecological processes such as dispersal, pollination, succession and recruitment are researched either as a primary focus or as a component of studies into particular taxa. Studies also include topics such as the importance of tree hollows, the effects of grazing by livestock and the use of predictive models. Table 12 summarises the frequency with which these topics appear in the documents contained in this bibliography, as a major or minor focus of research. All documents, including those relevant only to adjacent properties, feature in this summary. Processes occurring on contiguous properties may have a direct impact on CERRA properties, especially disturbance and weed invasion.

Table 12. Number of documents pertaining to ecological processes and other non-taxon specific topics

Process/ topic	Major focus	Minor focus
Rare and threatened species	77	132
Fire	32	186
Disturbance	27	95
Species list compilation	25	231
Regeneration	22	36
Weed control	20	29
Ecotourism	19	35
Breeding biology	13	40
Recruitment	12	1
Water quality	12	31
Fragmentation	10	10
Pollination	10	15
Weed invasion	9	6
Endemism	8	26
Herbivory	8	5
Foraging behaviour	8	10
Frugivory	7	3
Grazing by livestock	6	88
Predictive modelling	6	16
Erosion	4	58
Seed dispersal	4	21
Succession	4	20
Edge effects	4	2
Tree hollows	3	18
Corridor	2	14
Predation	1	21
Nutrient cycling	1	1
Litter fall	1	0
Pollution	0	15

Cultural documents

Documents which focus primarily on either Indigenous or non-indigenous cultural heritage comprise only 2% of this bibliography. Table 13 lists CERRA parks (or locations that include part of CERRA) that have at least one document relating to cultural heritage research. The sensitivity of certain cultural locations results in some deliberate ambiguity of location.

Table 13. Number of documents pertaining to Indigenous and non-indigenous culture

Park or location	No. of Indigenous cultural documents	No. of non-indigenous cultural documents
Barrington Tops NP	2	8
Nightcap NP	2	3
Lamington NP	0	5
Gibraltar Range NP	2	1
Washpool NP	2	1
Springbrook NP	0	3
Mt Warning NP	2	0
Beaury SF (Tooloom NP)	1	1
Border Ranges NP	1	1
Dorrigo NP	1	1
Spicer's Gap	0	1
Cunningham's Gap (Main Range NP)	0	1
Mt Mistake (Main Range NP)	1	0
Main Range (other than Spicer's Gap, Mt Mistake and Cunningham's Gap)	0	1
Goomburra FR	0	1
Koreelah NP	1	0
Limpinwood NR	1	0
Mt Barney NP	0	1
Mt Hyland NR	1	0
New England NP	1	0
Oxley Wild Rivers NP	1	0
Richmond Range	1	0
Toonumbar NP	1	0

4. Discussion

Although a substantial number of documents, of the many thousand that were perused, were included in this bibliography, many relevant documents remain to be accessed and examined. An exercise such as this, where so many individual researchers and institutions are currently involved in on-going work means that at no one stage are all relevant documents going to be catalogued or even identified. In addition to this somewhat constant supply of documents, the incomplete nature of the bibliography also results from the fact that time constraints precluded the completion of all intended actions.

Given that this project was driven primarily by location rather than taxa, process or other topic, the provision of location names was very important in the identification of relevant documents. This means that publications that do not identify study location in title, keywords or abstract may remain unrecognised unless referred to within another document. This is especially the case for documents concerning taxa not pertinent only or significantly to the CERRA region. This difficulty was compounded by the number of former names of each of the CERRA reserves (see Table 1).

Acknowledgment of the existence of a document also did not necessarily result in access. Many taxonomic descriptions or revisions of Australian taxa, of invertebrates in particular, are published in comparatively obscure and different to access journals, often reflecting the institutional origins of the author(s). Similarly, a number of ecotourism journals identified as including relevant articles were not available either electronically or as hard copy. Any future extension of this bibliography should include provision for the individual purchase of such articles.

Approximately a third of the documents within the bibliography are journal articles (see Table 4). Many journals are not data-based and have no facility for searching electronically. This is especially the case for some of the journals most relevant to CERRA properties, namely journals published by Australian museums such as *Records of the Australian Museum* and the *Memoirs of the Queensland Museum*. Not only do these journals require perusal of hard copies but the methods section must also be examined to determine location. Furthermore, in the case of taxonomic descriptions and revisions, locations are often only mentioned within the list of specimens collected. This equates to a very time-consuming process where many non-relevant articles are examined before being excluded.

Williams (2002) compiled a comprehensive review of work on invertebrates in CERRA properties. It was therefore decided that if a search of particular journals was to be incomplete then those featuring invertebrates, especially taxonomic work, would be granted least priority. Hence botanical journals such as *Telopea* and *Cunninghamia* were searched exhaustively, whereas *Records of the Australian Museum* and *Memoirs of the Queensland Museum* were searched more sporadically, often volumes were perused only when they contained an article of known relevance as identified by reference within another document. This decision has patently resulted in an under-representation of invertebrate research in the bibliography. However, it is considered that the majority of the missing references will be taxonomic in nature.

Reports, both published and unpublished, were the other dominant document type (see Table 4). Some unpublished reports were

available through university libraries however many were accessible only through government agencies, either via departmental libraries or by contacting individual staff members. This meant that it was necessary to visit both head and regional offices in both Queensland and NSW. Many offices were visited during this project. There are however some notable exceptions, again due to time constraints. These include the QPWS office at the Gold Coast and the relevant NPWS offices in the North Coast Region (Dorrigo and Grafton), the Mid North Coast Region (Port Macquarie) and the Hunter Region (Gloucester and Nelson Bay).

Often even more uninformative in regards to location details than journal articles and reports are Honours, Masters and PhD theses. Typically, if study location is not stated in the thesis title, no such details are included in university library catalogues. Undoubtedly many theses appropriate to this project remain unidentified. Some universities were also not visited, despite the likelihood of their libraries possessing relevant work. The decision not to visit the University of Newcastle and any university in Sydney was a purely logistical one, based on an early assessment of the scope of the project.

A more minor, and perhaps obvious, additional caveat to be considered by users of this bibliography is document quality. No effort was made to judge the quality of research conducted or of a document in its entirety. For example, documents include projects conducted by undergraduate students as assessment items. For this bibliography such documents, and all others, were accepted at face value and included regardless of any possible shortcomings.

Most importantly, the simple summaries of research work conducted (see Results above) are only numerical assessments of the work done on a particular park or reserve, taxa, process or other topic. This may be misleading for a number of reasons. First, many publications may result from a single piece of research by one or more authors though each work may be of high standard. Second, work conducted within a CERRA property may not actually relate to rainforest taxa (of key relevance for the World Heritage values of the sites). For example, some of the work of McFarland on birds (e.g., McFarland 1986a, b) and Vaughton (1988, 1990) on *Banksia* conducted in New England National Park was conducted in the subalpine heathlands of New England National Park rather than the rainforest areas. Third, work may be by way of literature review rather than new research. Fourth, in similar vein, no differentiation has been attempted in the nature or significance of the work. Hence a simple species list carries the same potential weight as a journal article or comprehensive report. A further issue is that work on a CERRA park or reserve may be but a small part of research conducted in a number of locations. The summaries, therefore, may greatly exaggerate the amount of work that has been conducted.

This is not a factor of concern in regards to recommendations hereunder for further research to be conducted within certain parks or on particular taxa, processes or topics. It does mean, however, that research may also be highly desirable in other parts of CERRA or on additional topics that have not been identified by this process.

5. Conclusions

In terms of broad categories of research the three fields that are poorly represented within this bibliography are:

- Genetics;
- Earth sciences; and
- Culture, both Indigenous and non-indigenous.

These disciplines each account for no more than three percent of the documents included in the bibliography. This paucity of genetics and earth sciences research may, however, reflect differences in how study locations are reported within these fields of research. Searches of electronic databases were based on property names and certain taxa highly relevant to the CERRA region such as rufous scrub-bird and *Nothofagus moorei*. Not all genetic studies are particularly concerned with location and the earth sciences often work on scales of such magnitude as to preclude the mention of specific locations.

Time constraints meant that a search of the library of Natural Resources and Mines at Mineral House in Brisbane was not included in this project. It is possible therefore that a considerable body of work on the earth sciences in regards to CERRA remains to be accessed and that conclusions on the quantity of research conducted in the earth sciences need to be guarded. The significance of documenting research in this field, compared to (for example) documenting additional ecological studies in regards to CERRA, also warrants some contemplation.

Unlike the earth sciences, cultural research is very location-based and, notwithstanding some protective secrecy concerning location details, the lack of a substantive body of research probably reflects reality. Although Lamington National Park, for example, features in more than 300 documents only five of these are cultural and all are concerned with non-indigenous culture.

Indeed only one specifically Indigenous culture document was accessed in regards to the Queensland section of CERRA, although there is some mention within park management documents. While there are at least two other documents of likely relevance held by the Environmental Protection Agency in Brisbane (available for examination with permission), Indigenous cultural heritage appears to be extremely poorly documented in the Queensland parts of CERRA. The situation in NSW is slightly better, with all major CERRA parks having at least one Indigenous culture document but obviously more research needs to be conducted. With the exception of Lamington and Barrington Tops National Parks, the quantity of non-indigenous culture documentation is also scant.

Certain taxa are also under-represented in the bibliography. For reptiles, and for fish in particular, this reflects a comparatively depauperate fauna in rainforest habitats within the CERRA region. Nonetheless, fish warrant some future research in the lower altitude streams within CERRA. Given that aquatic macroinvertebrates, including crustaceans, also suffer from a lack of study, despite the fact that this group is quite diverse and displays high levels of endemism, lack of fish diversity cannot be considered the only justification for the limited research in aquatic habitats. Reptiles are an admittedly difficult group to study but some regional endemism would appear to demand further attention for this group. It is important, however, to be aware of some research conducted on adjacent properties, e.g., Fitzgerald *et al*. (2002a, b; 2003).

For non-vascular plants, fungi and algae insufficient research is more likely a

consequence of a lack of taxonomic expertise and a comparative dearth of researchers. This makes future research difficult but no less important.

As already acknowledged, the amount of research conducted within a particular park or reserve appears to reflect proximity to centres of population and universities, and general accessibility to researchers. It is unlikely that universities will significantly alter their study locations, especially in regards to undergraduate or postgraduate students. It appears necessary, therefore, that government agencies target those small and difficult to access properties that remain little studied. A fauna survey was conducted on Burnett Creek State Forest and Rabbit Board Reserve R470 by the Queensland Department of Natural Resources (Smith *et al*. 1997). Such documents, despite their limitations, still provide valuable information about CERRA's values and may influence future research through the identification of the presence of conservation significant taxa. Other minor CERRA reserves are included in this bibliography courtesy solely of those documents which consider CERRA parks and reserves on a large scale (e.g., Hunter 2003). It is important that at least some baseline flora and fauna data be collected within all parks and reserves so far neglected.

Invertebrates appear reasonably well studied especially considering the number of relevant journal articles that failed to be included in the bibliography. However, the majority of the research is taxonomic description or revision.

Invertebrate-plant interactions are especially poorly studied, although Lowman has produced a number of publications on insect herbivory (e.g., Lowman 1991; 1992a, b). This paucity of invertebrate-plant interactions is indicative of a general lack of research into animal-plant interactions within the CERRA properties.

Table 12 indicates that a number of other very important processes have also gained very little attention within CERRA properties. Litter fall, nutrient cycling, edge effects, seed dispersal and pollination all require further research. What work that has been done on seed dispersal has focused almost entirely on pigeons (see Date *et al*. 1996 and associated publications). The majority of pollination work, particularly by vertebrates, has in fact occurred in non-rainforest habitats in New England National Park (see McFarland 1986a, b and associated publications).

6. Recommendations

This report, the bibliography and the associated web-based resources are intended to serve as aids in the preparation of a research strategy by the CERRA Technical and Scientific Advisory Committee.

Based on the documents contained within the bibliography, a number of recommendations of future scientific research are made here. Suggestions of possible future management actions for existing and future CERRA related documents are also made.

Recommendations for further research

Actions per park/ reserve

The seven parks that have been most studied still require some attention to address shortcomings in the research for a number of taxa. These deficits are as follows:

Lamington National Park:
reptiles

Barrington Tops National Park:
frogs

Nightcap National Park:
mammals.

Border Ranges National Park:
vascular plants,
reptiles,
invertebrates.

New England National Park:
mammals,
rainforest birds.

Dorrigo National Park:
mammals,
birds,
frogs.

Mt Warning National Park:
mammals,
birds,
invertebrates.

Taxa requiring further research

Certain taxa require further work in all the parks and reserves throughout CERRA. These are:

- Reptiles
- Fish
- Aquatic macroinvertebrates
- Non-vascular plants
- Fungi
- Algae

Even for the better-studied taxa, there is a need for additional research within particular parks and reserves, as follows:

Mammals:
Dorrigo National Park
Limpinwood Nature Reserve,
Mt Seaview Nature Reserve,
Mt Warning National Park
New England National Park
Nightcap National Park
Spicer's Gap Forest Reserve,
Springbrook National Park.

Birds:
Barrington Tops National Park
Dorrigo National Park
Gambubal Forest Reserve,
Mallanganee National Park,
Mt Mistake part of Main Range NP,
Mt Warning National Park
Springbrook National Park.

Frogs:
Dorrigo National Park
Gambubal Forest Reserve,
Mallanganee National Park,

Mt Chinghee National Park,
Oxley Wild Rivers National Park,
Spicer's Gap Forest Reserve.

Invertebrates:

Border Ranges National Park
Iluka Nature Reserve,
Mallanganee National Park,
Mt Mistake part of Main Range NP,
Mt Warning National Park
Oxley Wild Rivers National Park,
Spicer's Gap Forest Reserve.

Vascular plants:

Border Ranges National Park
Gambubal Forest Reserve,
Goomburra Forest Reserve.

Processes and other topics

There are a number of processes that require further research. These include:

- Animal-plant interactions such as herbivory and pollination;
- Litterfall;
- Nutrient-cycling;
- Seed dispersal;
- Edge effects.

The most important non-taxa based topic requiring further attention is cultural heritage, especially Indigenous culture.

Recommendations for the handling of reports

The compilation of this bibliography was prompted by the fact that there was no previous central record of research work conducted in CERRA, even within a particular agency. Unpublished research reports, even those commissioned by the agencies themselves, or as a result of research work permitted by the agencies, are apparently rarely lodged in departmental libraries.

It is therefore recommended that an archive of relevant unpublished documents, especially those not available through university libraries, be compiled and situated within either the Department of Environment and Conservation (NSW) or the Environmental Protection Agency (Q'ld). With this purpose in mind, details of the specific locations of one or more copies of difficult-to-access documents have been recorded in the bibliography.

In addition, a Compact Disc containing this report and bibliography (in both EndNote and Excel forms) should be produced and lodged with all local university libraries, departmental libraries and the NSW and Queensland state libraries.

Through contacting appropriate staff in government agencies, as well as university faculties and departments, a CERRA-wide registry of researchers and their on-going work could be compiled. This would facilitate greater coordination of research and increase the likelihood of future documents being placed in the proposed library. Furthermore it would identify 'permanent plot' study sites, a process that proved beyond the scope of this project.

Recommendations for completing the bibliography

Consideration should be given to a further rationalisation of keywords, ensuring the accuracy of any searches conducted of the bibliography in its electronic forms. Name changes to government departments, universities, university faculties, and to properties within the CERRA region, including many CERRA parks and reserves and additions to CERRA properties, also require some attention to reduce possible confusion. This proved to be beyond the time frame for this report.

The most important recommendation is that this process of reviewing the literature, both published and unpublished, be repeated as soon as possible with specific targeting of the fields of research and the potential sources of documents that this project failed to fully encompass. As acknowledged, many relevant documents are known to exist which, for a variety of reasons, were not accessed. Knowledge of these documents was typically gained by citations in other very CERRA specific publications or reports (e.g. Adam 1987, Williams 2002, Hunter 2003), from plans of management, or from publication lists of specific researchers.

To fully complete the bibliography of CERRA documents it is necessary to:

(a) identify as yet unseen documents through further perusal of reference lists;

(b) locate more unpublished reports and other documents held in those offices of QPWS and NPWS not visited as part of this project;

(c) comprehensively work through non-databased journals that have a high likelihood of relevant articles, especially *Memoirs of the Queensland Museum* and *Records of the Australian Museum*;

(d) locate 'missing' reports from within a series of documents, e.g., the North East Forests Biodiversity Study reports compiled by, or on behalf of, NPWS in the early 1990s;

(e) locate known documentation of monitoring projects such as the series of reports by Mackay and Gross on *Olearia flocktoniae* and work on *Mixophyes* species by Michael Mahony;

(f) visit the library of the University of Newcastle to search for undergraduate and, more importantly, postgraduate research; and

(g) visit the Australian Museum and Queensland Museum libraries and staff.

7. References

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Fitzgerald, M., Shine, R. and Lemckert, F. (2002b) Spatial ecology of arboreal snakes (*Hoplocephalus stephensii*, Elapidae) in an eastern Australian forest. *Austral Ecology* **27**, 537-545.

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Lowman, M. D. (1991) The impact of herbivorous insects on Australian rainforest tree canopies. in Werren, G. and Kershaw, P. (Eds), *The rainforest legacy: Australian National Rainforests Study: Volume 3—Rainforest history, dynamics and management.* Canberra: Australian Government Publishing Service, pp. 177-190.

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Williams, G. (2002) *CERRA invertebrates: a taxonomic and biogeographic review of the invertebrates of the Central Eastern Rainforest Reserves of Australia (CERRA) World Heritage Area, and adjacent areas.* Sydney: Australian Museum.

8. Appendix: List of journals cited in the CERRA bibliography

Journal name	No. of articles
Acarologia	1
Agricultural Gazette of N.S.W.	2
American Museum Novitates	1
Annals of Botany	1
Annual Review of Ecology and Systematics	1
Aquatic Insects	1
Austral Ecology	6
Australasian Mycologist	1
Australasian Plant Pathology	1
Australian Systematic Botany	1
Australian Birds	3
Australian Entomological Magazine	1
Australian Entomologist	1
Australian Forest Research	1
Australian Forestry	2
Australian Geographer	1
Australian Geographic Studies	1
Australian Journal of Botany	14
Australian Journal of Earth Sciences	2
Australian Journal of Ecology	16
Australian Journal of Entomology	14
Australian Journal of Herpetology	1
Australian Journal of Zoology	20
Australian Mammalogy	10
Australian Systematic Botany	12
Australian Veterinary Journal	1
Australian Wildlife Research	8
Australian Zoologist	7
Austrobaileya	2
Biocontrol News and Information	1
Biodiversity and Conservation	1
Biological Conservation	6
Biological Control	1
Biological Journal of the Linnean Society	1
Biotropica	3
Bryologist	1

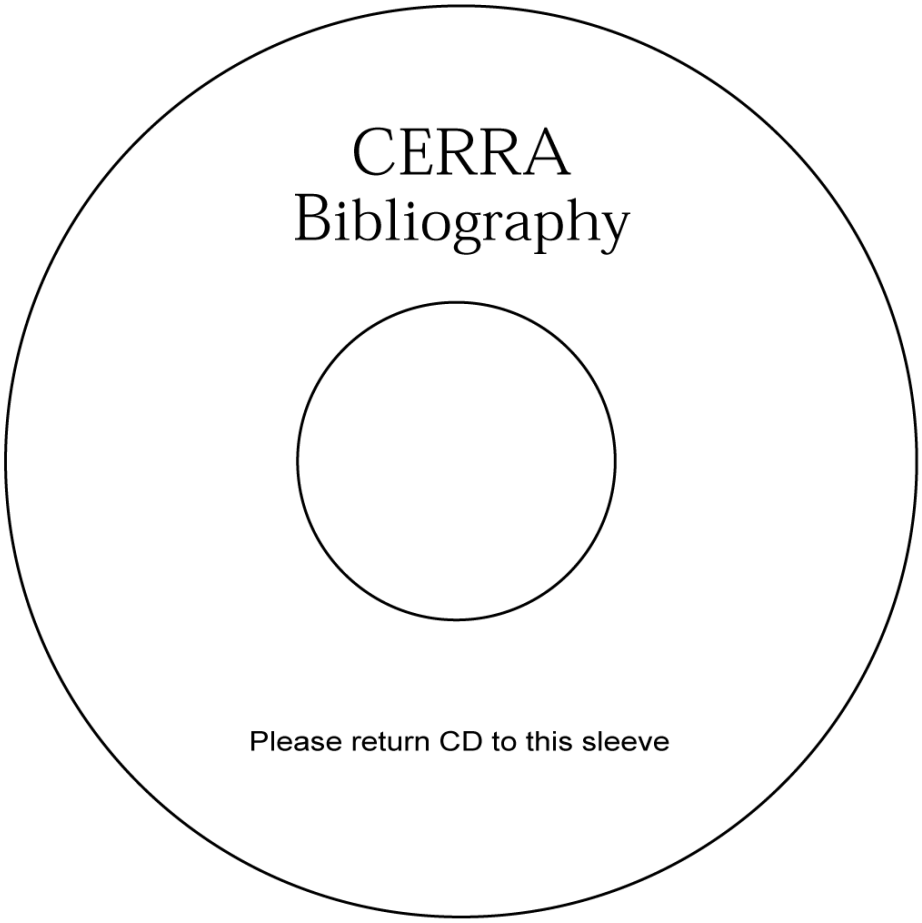
Journal name	No. of articles
Bulletin of the American Museum of Natural History	1
C.S.I.R.O. Wildlife Research	1
Coleopterists Bulletin	1
Conservation Biology	2
Conservation Genetics	2
Copeia	3
Corella	9
Cunninghamia	12
Danthonia	1
Diversity and Distributions	1
Earth and Planetary Science Letters	1
Ecological Monographs	1
Ecology	2
Emu	48
Environmental Politics	1
Evolution	1
Experimental & Applied Acarology	1
Flavour and Fragrance Journal	2
Forest Ecology and Management	2
Freshwater Biology	1
Genetic Resources and Crop Evolution	1
Geography Bulletin	1
Heredity	1
Herpetofauna	3
Herpetologica	1
International Journal of Lifelong Education	1
International Journal of Plant Sciences	2
International Journal of Tourism Research	1
International Journal of Wilderness	1
Invertebrate Systematics	2
Invertebrate Taxonomy	17
Journal and Proceedings, Royal Society of New South Wales	1
Journal of Animal Ecology	2
Journal of Applied Ecology	2

Journal name	No. of articles
Journal of Aquatic Ecosystem Stress and Recovery	1
Journal of Arachnology	2
Journal of Biogeography	3
Journal of Ecology	12
Journal of Ecotourism	1
Journal of Environmental Management	2
Journal of Mammalogy	1
Journal of Natural History	2
Journal of Small Business and Enterprise Development	1
Journal of Sustainable Tourism	2
Journal of the Australian Entomological Society	39
Journal of the Geological Society of Australia	2
Journal of the New York Entomological Society	2
Journal of Thermal Biology	1
Journal of Travel Research	1
Journal of Tropical Ecology	2
Journal of Zoology	2
Memoirs of Museum of Victoria	3
Memoirs of the Queensland Museum	44
Molecular Ecology	3
Molecular Phylogenetics and Evolution	2
Mycologia	1
Mycological Research	1
Mycologist	1
New Zealand Journal of Zoology	1
Novitates Zoologicae	1
Pacific Conservation Biology	4
Palaeogeography Palaeoclimatology Palaeoecology	1
Phytologia	2
Plant, Cell and Environment	1
Population Ecology	1
Preventive Veterinary Medicine	1
Proceedings of the Ecological Society off Australia	2

Journal name	No. of articles
Proceedings of the Linnean Society of New South Wales	13
Proceedings of the Royal Society of London B	1
Proceedings of the Royal Society of Queensland	41
Quaternary International	1
Queensland Naturalist	8
Records of the Australian Museum	9
Records of the South Australian Museum	1
Records of the South Australian Museum Monograph Series	1
Sunbird	1
Systematic & Applied Acarology Special Publications	1
Systematic Biology	1
Systematic Botany	1
Systematic Parasitology	3
Telopea	46
Tourism Geographies	1
Tourism Management	1
Tourism Review International	1
Transactions of the Royal Society of South Australia	4
University of Queensland Papers	1
Vegetatio	1
Wetlands Ecology and Management	1
Wildlife Research	15
Zoological Journal of the Linnean Society	1
Zoologische Mededelingen	1
Zoosystema	1
Zootaxa	1

CD affixed, containing CERRA bibliography in the following formats:

- List in Microsoft Word (no annotations)
- Microsoft Excel (includes annotations)
- Bibliographical databases as EndNote and ProCite



Department of
Environment and
Conservation (NSW)