BushBlitz
SPECIES DISCOVERY PROGRAM

BUSH BLITZ SPECIES DISCOVERY PROGRAM

Kurtonitj, Lake Condah, Tyrendarra Indigenous Protected Areas Victoria

21 March–1 April 2011

Australian Government

bhpbilliton
resourcing the future

EARTHWATCH INSTITUTE

Australian Biological Resources Study

What is Bush Blitz?

Bush Blitz is a multi-million dollar partnership between the Australian Government, BHP Billiton and Earthwatch Australia to document plants and animals in selected properties across Australia's National Reserve System.

This innovative partnership harnesses the expertise of many of Australia's top scientists from museums, herbaria, universities, and other institutions and organisations across the country.

Contents

Summary

A Bush Blitz was conducted at the Lake Condah, Kurtonitj and Tyrendarra Indigenous Protected Areas (IPA) during March 2011. In total, 854 species new to the reserves were identified. Of these, 18 are possibly new to science, including a moth in the genus *Pterolocera*; nine species of true bug including a new genus in the tribe Austromirini; and eight crustaceans, five of which are new stygofauna species.

This Bush Blitz survey provided a number of unique research opportunities. It was the first occasion on which stygofauna were surveyed in this area of Victoria, resulting in the discovery of new species. The first detailed study of lower plants, including lichens, freshwater algae, mosses and fungi, was also undertaken. Several lichen species were collected for only the second time in Victoria, resulting in large range extensions. Species of moth were discovered that have rarely been recorded, including first, second and third records for Victoria, and range extensions for more than 20 species.

Thirteen threatened animal species were recorded, of which ten were new records for the reserves. The discovery of a Southern Bell Frog (*Litoria raniformis*) in the Lake Condah Mission area was a

Abbreviations

DEPI
Department of Environment and Primary Industries (Victoria)

EVC
Ecological Vegetation Classes

EPBC Act
Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

FFG Act
Flora and Fauna Guarantee Act 1988 (Victoria)

IPA
Indigenous Protected Area

NRS
National Reserve System

Bush Blitz participants in Week 1, M. Norman © Copyright, Museum Victoria

Bush Blitz participants in Week 2 © Copyright, R. Kuiter

notable record. Yarra Pygmy Perch (*Nannoperca obscura*) were present in some of the most pristine areas on the Allambie, Kurtonitj and Tyrendarra reserves. Eastern Dwarf Galaxias (*Galaxiella pusilla*) were found to be common throughout Darlot Creek. The Glenelg Spiny Freshwater Crayfish (*Euastacus bispinosus*) was a new record for the Portland Basin. All of these species are listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Flora and Fauna Guarantee Act 1988* (FFG Act).

Ten threatened flora species were collected, seven of which were new records for the reserves. Of these, the Curly Sedge (*Carex tasmanica*) was a particularly significant collection. This sedge is listed under the EPBC Act and FFG Act, and is also found on the Department of Environment and Primary Industries (DEPI) Advisory List.[1] It is endemic to Victoria and Tasmania, with most plants in Victoria occurring in just two main populations.

In total, 45 pest animal species were detected. The pest fish species Eastern Gambusia (*Gambusia holbrooki*) was collected from the lower portion of Darlot Creek in Tyrendarra IPA, and Tench (*Tinca tinca*) was widely distributed in Darlot Creek in low numbers. A number of butterflies and moths whose caterpillars are considered serious pests of agricultural crops were recorded. Painted Cup Moth (*Doratifera oxleyi*) was prolific at the time of the survey, with hundreds observed. The caterpillars can defoliate eucalypts when in high numbers. The true bug species Rutherglen Bug (*Nysius vinitor*) and Green Mirid (*Creontiades dilutus*) were found across the reserves. These sap-sucking insects can migrate into crops in very large numbers during favourable seasons, causing damage. Introduced species of land snails were far more abundant than native land snails on all reserves except Tyrendarra.

Eighteen weed species were observed. One filament of a potentially toxic cyanobacterium (*Cylindrospermopsis* sp.) was observed at Allambie sinkhole. Further sampling would confirm this observation. None of the waterbodies were dominated by nuisance algae, although euglenophytes were found, possibly indicating high levels of organic matter in the water.

1 The advisory lists are not the same as the statutory lists. There are no legal requirements and consequences as a result of the listing of a species on the DEPI Advisory Lists; their primary role is to help managers plan and set priority actions for biodiversity conservation.

Introduction

This is a report for the Bush Blitz program, which aims to survey recent additions to the National Reserve System (NRS).[2] Bush Blitz is an initiative of the Australian Government, through the Australian Biological Resources Study, in partnership with BHP Billiton and Earthwatch Australia. The Bush Blitz objectives are:

+ to promote, publicise and demonstrate the importance of taxonomy through species discovery;
+ to undertake a national species discovery program targeted at recently acquired properties of the National Reserve System of Australia;

Table 1: Taxonomic groups surveyed in each reserve

Group	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Mammalia	Mammals	X	X	X	X	X	X	X
Aves	Birds	X	X	X	X	X	X	X
Amphibia	Frogs and Toads	X	X	X	X	X	X	X
Reptilia	Reptiles	X	X	X	X	X	X	X
Pisces	Fishes	X	X	X		X	X	
Lepidoptera	Butterflies and Moths		X		X	X		
Heteroptera	True Bugs	X	X	X	X	X	X	X
Terrestrial Mollusca	Terrestrial Molluscs	X	X	X	X	X	X	X
Terrestrial Invertebrates	Terrestrial Invertebrates	X	X	X	X	X	X	X
Freshwater Invertebrates	Freshwater Invertebrates		X	X	X	X		
Stygofauna	Stygofauna	X	X			X	X	
Vascular Plants	Flowering Plants	X	X	X	X	X	X	
Cryptogams	Ferns, Bryophytes, Lichens, Fungi, Algae	X	X	X	X	X	X	

2 The NRS is Australia's network of protected areas, constituting 16.52% of the country—over 12.7 million hectares. It includes Commonwealth, State and Territory reserves, Indigenous lands and protected areas run by non-profit conservation organisations, through to ecosystems protected by farmers on their private working properties.

Bush Blitz scientists and Budj Bim rangers Deb Rose and Simone Sailor prepare to identify specimens, M. Norman © Copyright, Museum Victoria

Gunditjmara elder Ken Saunders and granddaughter Eliza welcome the Bush Blitz team to Lake Condah Mission © Copyright, A. Kuiter

+ to support the science of taxonomy in Australia through training students and early career researchers, and the provision of grants for species description and resolution of taxonomically problematic, nationally important groups;
+ to promote partnerships between scientific institutions, government, industry and non-government organisations; and
+ to inform the National Reserve System, reserve managers and other stakeholders of the results of the Bush Blitz Project.

From 21 March to 31 March 2011, a team of more than 30 scientists gathered in south-western Victoria to undertake this Bush Blitz survey. Six reserves were investigated together comprising the Indigenous Protected Areas of Lake Condah, Kurtonitj and Tyrendarra. Sites at the Lake Condah Mission were also surveyed and the results are presented in this report. The reserves are located within the Budj Bim National Heritage Landscape, situated 350 km from Melbourne.

The survey team included experts from Museum Victoria, Royal Botanic Gardens Melbourne—National Herbarium Victoria, University of New South Wales, South Australian Museum and Australian Biological Resources Study. A highlight of the survey was the close collaboration between the Gunditjmara traditional owners, the *Working on Country*[3] funded Budj Bim Rangers and the visiting scientists.

3 *Working on Country* is an Australian Government program that provides employment and training opportunities for Aboriginal and Torres Strait Islander peoples living in regional and remote Australia to undertake natural resource management work that aligns with Australian Government and local community environmental and cultural priorities, <http://www.environment.gov.au/indigenous/workingoncountry/> accessed 5 August 2013.

Reserves Overview[4]

Lake Condah, Kurtonitj and Tyrendarra IPAs lie within the Victorian Volcanic Plains bioregion. The properties are part of the Budj Bim National Heritage Landscape, which was included on the National Heritage List[5] in 2004. The geology of the region is predominantly weathered basalt rocks laid down by the eruption and lava flows from Mount Eccles about 20,000 years ago. The lava flows are seen today as sinkholes and stony rises (ridges and hillocks) radiating across the landscape. Level plains with relatively deeper soils lie between the stony rises.

A network of waterways criss-cross the landscape, in particular Lake Condah and the Condah Swamp, Darlot Creek and Fitzroy River. The waterways are central to Gunditjmara culture. The conservation values of the region largely relate to the long history of occupation by the Gunditjmara people who created a complex system of natural and artificial wetlands connected by stone weirs and fish traps to harvest eels. This traditional fishery, based primarily on Southern Shortfin Eel (*Anguilla australis*), is considered Australia's oldest and largest aquaculture system. This aquaculture system provided the basis for a settled society, the remains of which can still be seen in the form of circular stone huts, fish traps, weirs and channels.

Gunditj Mirring Traditional Owners Aboriginal Corporation oversees the management of the properties while the Winda-Mara Aboriginal Corporation undertakes the on-ground land management through the *Working on Country* funded Budj Bim Rangers. The IPAs are managed using a combination of traditional ecological knowledge and contemporary land management practices. In addition, a co-management arrangement between Parks Victoria and the Gunditjmara Traditional Owners for Mount Eccles National Park provides the opportunity for whole-of-Budj Bim landscape planning.

4 Information from the NRS applications and assessments and the Gunditj Mirring Traditional Owners Aboriginal Corporation (2010) Lake Condah on the Budj Bim Landscape Draft five-year management plan 2010–2015.

5 The National Heritage List recognises and protects our most valued natural, Indigenous and historic heritage sites. Each place in the List has been assessed by the Australian Heritage Council as having outstanding heritage value to the nation, and is protected under the EPBC Act.

National Reserve System conservation values

The reserves protect and consolidate remnant areas of native vegetation. The Victorian Volcanic Plains bioregion is largely private land used almost entirely for agriculture, and most of the native ecosystems are severely depleted. The extensive fragmentation of the bioregion's ecosystems means that most remnants are highly significant for conservation. In addition, there are relatively few conservation reserves in this bioregion. Lake Condah IPA shares a border with Mount Eccles National Park, which is an important public reserve.[6]

A suite of rare vegetation communities occurs in a unique combination within the lava flow of the region and is of national significance.[7] Two of the Ecological Vegetation Classes (EVC) found within the reserves—Aquatic Herbland and Stony Rises Woodland—are listed by the DEPI as vulnerable and endangered. The Victorian Volcanic Plain has a high proportion of extinct or threatened species relative to the rest of Victoria. Five nationally listed and seven state listed animals are recorded for the reserves, including birds, mammals, reptiles, frogs and fishes. The reserves provide habitat for seven nationally listed migratory bird species. Nineteen species are also listed on the DEPI Advisory List (Fauna). Three nationally listed (EPBC Act) and two state listed (FFG Act) plants are recorded for the reserves, as well as 14 species on the DEPI Advisory List (Flora).

* Separate properties that all belong to Lake Condah IPA

6 Biodiversity Assessment Victorian Volcanic Plain, <http://www.anra.gov.au/topics/vegetation/assessment/vic/ibra-victorian-volcanic-plain.html> accessed 4 December 2012.

7 Carr G. W., Ashby L. A., Kershaw J. S., Frood D., Rosengren N. G. 2008, *Mt Eccles lava flow botanical management plan: field survey and analysis*, Ecology Australia Pty Ltd.

Lake Condah Indigenous Protected Area

Gunditj Mirring Traditional Owners Aboriginal Corporation

Declared an IPA

2010

Area

1,700.96 ha

Collapsed lava tubes form linear pools. Water Ribbons (*Triglochin procera*) thrive in this habitat. The tubers of this species were an important component of aboriginal diets in this area, N. Walsh

Description

Lake Condah IPA encompasses the properties of Lake Condah (290 ha), Allambie (481.5 ha), Muldoons (659.8 ha) and Vaughans (269.66 ha).

Lake Condah, traditionally known as Tae Rak, contains the Aquatic Herbland EVC and Stony Rises Woodland EVC. Following early European settlement around 1881, significant drainage of the wetlands took place over decades to facilitate grazing. During the 1950s engineering works on the lake meant that it only retained water during flood events. As part of the Lake Condah Restoration Project, a weir was constructed in 2009 to reflood the lake, returning it to its natural state and increasing its biodiversity values. The lake now covers more than 600 ha. Current management at Lake Condah is centred on engaging the local community, using traditional methods to harvest eels and other fish, and using traditional knowledge to support land and water management.

The majority of the eastern half of Allambie comprises stony rises supporting or formerly supporting Stony Rises Woodland EVCs. Large areas of exotic dryland vegetation exist in the western half of the property with a wetland complex containing numerous EVCs scattered throughout. Allambie was partially cleared following European settlement around 1900, and land uses from that time have included grazing sheep and cattle, and rock crushing at the quarry. Controlled grazing is still carried out on portions of the property.

Muldoons mainly consists of stony rises carrying Stony Rises Woodland EVC. There are small pockets of exotic dryland vegetation particularly along Darlot Creek. Past land use at Muldoons included grazing.

Vaughans mainly consists of stone rises, carrying Stony Rises Woodland EVC, with some areas of exotic dryland vegetation. Vaughans was cleared and grazed in the past. Revegetation efforts have taken place on cleared areas.

Kurtonitj Indigenous Protected Area

Gunditj Mirring Traditional Owners Aboriginal Corporation

Declared an IPA

2009

Area

361 ha

Description

Kurtonitj means 'crossing place'. The reserve includes stony rise country and an impressive chain of seasonal wetlands in the central section with deep freshwater marshes and seasonally inundated shallow marshes. The reserve's western boundary is bordered by Darlots Creek, known as *Kallara* in the Gunditjmara language.

Kurtonitj is sacred to the Gunditjmara people and has enormous cultural, archaeological and environmental significance. Many important cultural sites are found here. Ancient stone *Kooyang* (eel) traps and stone channels, house sites and *Kooyang* smoking trees are scattered across the landscape. Plants and animals classified as endangered at a national level include the Spotted-tailed Quoll (*Dasyurus maculatus*). Other important species include the Southern Toadlet (*Pseudophryne semimarmorata*) and the Brolga (*Grus rubicunda*).

The fast flowing Darlot Creek in Kurtonitj IPA, depth around 1.5 m © Copyright, R. Kuiter

Tyrendarra Indigenous Protected Area

Winda-Mara Aboriginal Corporation (on behalf of the Gunditjmara people)

Declared an IPA

2003

Area

248 ha

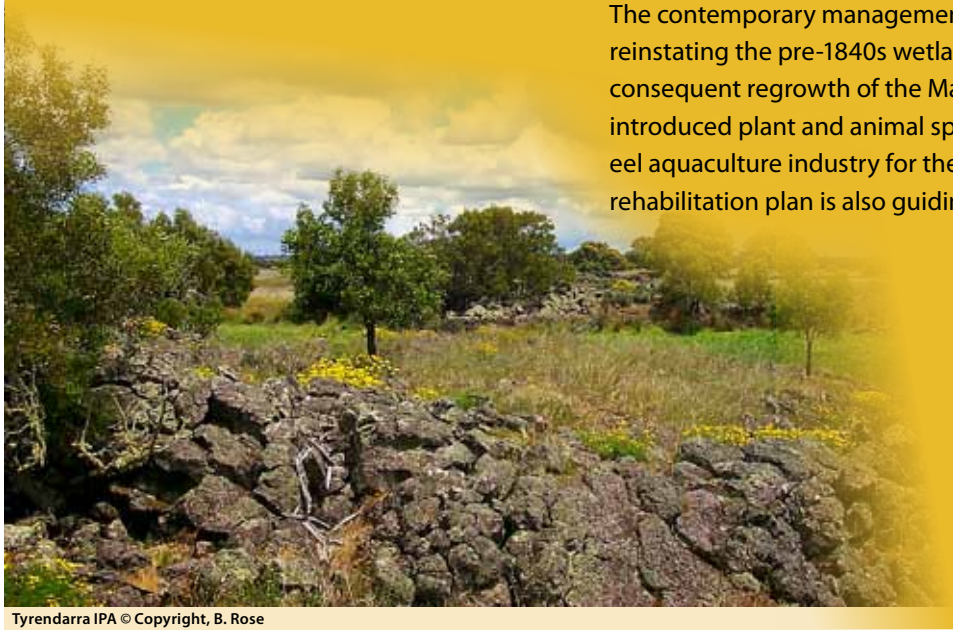
Description

Tyrendarra's vegetation includes a distinctive woodland community of Rough Barked Manna Gum (*Eucalyptus viminalis* subsp. *cygnetensis*) and Blackwood (*Acacia melanoxylon*), with remnants of Messmate Stringybark (*Eucalyptus obliqua*) and the formerly widespread Woolly Silky Tea-tree (*Leptospermum lanigerum*).

Tyrendarra sits on Darlot Creek, a tributary of Lake Condah. Tea-tree removal over many years may have contributed to changes in the reserve's natural water systems. The remaining wetlands are home to a wide variety of sedges, rushes, reeds and grasses. Due to the extensive wetlands, about a fifth of all recorded native animals (vertebrate and invertebrate) are aquatic.

At least two major revegetation efforts have taken place at Tyrendarra IPA. In 2004/05 over 5,000 trees and grasses were planted, which were later destroyed in 2006 by bushfire along with 90% of the property's vegetation. Subsequent revegetation has taken place using locally collected seed.

The contemporary management of Tyrendarra centres on reinstating the pre-1840s wetlands system, supporting the consequent regrowth of the Manna Gum woodland, controlling introduced plant and animal species, and establishing a viable eel aquaculture industry for the local community. A cultural rehabilitation plan is also guiding cultural landscape restoration.



Tyrendarra IPA © Copyright, B. Rose

Methods

Collection and observation sites were selected based on land classes, supplemented by identification of suitable microhabitat during the field visit.

A number of taxonomic groups were identified as targets for study. Table 2 lists the groups surveyed and the specialists who undertook the fieldwork.

Table 2: Taxonomic groups surveyed and personnel

Group	Survey Team	Affiliation
Mammals	Karen Roberts, Kevin Rowe	Museum Victoria
Birds	Wayne Longmore	Museum Victoria
Frogs and Toads	Joshua Hale, Katie Smith, Susie Maldonado	Museum Victoria
Reptiles	Joanna Sumner, Joshua Hale, Katie Smith, Susie Maldonado	Museum Victoria
Fishes	Dianne Bray, Martin Gomon, Rudie Kuiter, Alison Kuiter	Museum Victoria
Moths and Butterflies	Peter Marriot, Marilyn Hewish	Museum Victoria
	Joshua Grubb	Monash University
True Bugs	Marina Cheng, Anna Namyatova	University of New South Wales
Terrestrial Molluscs	Adnan Moussalli, Chris Rowley, Melanie Mackenzie	Museum Victoria
Terrestrial Invertebrates	Rowena Flynn, Simon Hinkley, Patrick Honan, Tracey-Ann Hooley, Peter Lillywhite, Richard Marchant, Catriona McPhee, David Paddock	Museum Victoria
	Joshua Grubb	Monash University
	Mark Harvey (spider identification)	Western Australian Museum
	Alice Wells (caddisflies)	Australian Biological Resources Study
Freshwater Invertebrates	Richard Marchant, Julian Finn, Mark Norman, Liz Greaves	Museum Victoria
Stygofauna	Remko Leijs	South Australian Museum
Vascular Plants	Jeff Jeans, Neville Walsh, Val Stajsic	National Herbarium of Victoria
	Melissa Danks	University of New England
Liverworts and Mosses	Pina Milne, Val Stajsic	National Herbarium of Victoria
Lichens	Pina Milne, Val Stajsic	National Herbarium of Victoria
Algae	Michelle Casanova	National Herbarium of Victoria
	Joan Powling (identification)	Joan Powling Consulting
Fungi	Pina Milne	National Herbarium of Victoria

A standard suite of survey techniques was used:

Vertebrate Fauna

+ Small mammals were trapped using Sherman traps and larger cage traps baited with a peanut butter and oats mixture, and a small amount of sardine. Traps were set at uniform distances in standard rows and were open over three consecutive nights. Animals caught were identified and released in the early morning. For larger mammals direct observations were recorded. Nocturnal animals were surveyed using spotlights and call playback for some of the less visible species.
+ Birds were recorded along transects following roads for distances not exceeding 1 km or from central points up to a distance of 200 m. Presence of some birds, such as the Emu (*Dromaius novaehollandiae*), was detected only from scats or droppings.
+ Frogs were identified from calls and by direct visual searches during the day. Nocturnal surveys were done at Kurtonitj, Lake Condah Mission and Muldoons. Some frogs were by-catch in invertebrate pitfall traps.

Checking the bait trap for fish,
B. Bowler © Copyright, Department of the Environment

Setting up a malaise trap to catch terrestrial invertebrates,
B. Bowler © Copyright, Department of the Environment

+ Fishes were caught using a box-net trap, bait traps and push nets. The number released at the point of capture was estimated rather than counted to reduce handling of the fish. Tissue samples for future genetic studies were taken from many specimens. Species seen but not caught were also recorded.
+ Reptiles were collected by searching each site for a minimum of six person hours. This mainly involved turning over rocks followed by hand capture. Trap lines were also used; these consisted of approximately 20 m of drift fence with pairs of funnel traps installed every 10 m. Traps were checked morning and evening for three consecutive days. Additional specimens were caught as by-catch in invertebrate traps.

Invertebrate Fauna

+ Moths and butterflies were collected using light traps over six nights. Traps were set at dusk and checked throughout the night and early morning. Where possible, one or two specimens of each species were collected and photographed. By day, butterflies, larvae and a few day-flying moths were photographed or collected opportunistically.
+ True bugs were collected by beating vegetation and the reproductive parts of seed plants, hand collecting and sweeping the surface of water bodies for aquatic species.

Anna Namyatova collecting true bugs,
M. Norman © Copyright, Museum Victoria

- Terrestrial invertebrates (ants, caddisflies, flies, beetles, crickets, grasshoppers, katydids, stoneflies, dragonflies, damselflies, mayflies and spiders) were sampled using a combination of pitfall, malaise and light traps, beating trays and direct searches. Pitfall traps consisted of 10 half litre plastic containers buried level with the soil surface and partially filled with 70% alcohol.
- Live specimens and post-mortem shells of land snails were collected by hand. A site was rapidly surveyed for approximately 15 minutes with a preliminary focus on post-mortem shells. If diversity or abundance was high, a systematic survey was then undertaken with survey effort extended to two hours.
- Freshwater invertebrates (dragonfly and damselfly nymphs, molluscs, crustaceans, insects, leeches, sponges and water mites) were collected with a hand net (250 µm mesh). The net was swept through vegetation in the channel and the river bed was disturbed directly in front of the net. At Kurtonitj, specimens of larger invertebrates (mussels, sponges and freshwater crayfish) were collected by divers. In Lake Condah, the net was swept through edge habitats which consisted of rocky areas and beds of aquatic plants. Deeper sections of the lake were not sampled. In the sink hole at Muldoons, a diver took samples using an air-lift sampler from both the deep (2–3 m) central area and from the shallow (1 m) margins.
- Groundwater fauna were sampled from wells and bores using weighted plankton nets that fitted the inner diameter of the bores. Sinkholes and lava cracks containing water were sampled using a hand net. The Bou-Rouch method was used to sample springs. This involved hammering a perforated metal pipe into the substrate, pumping and filtering water from about 1 m below surface level.
- Microinvertebrates were collected by passing several litres of wetland, lake or stream water through a 35 µm phytoplankton net, retaining a sample and preserving it with Lugol's iodine.

Flora

- Vascular plants were recorded during a 'walk through' of each reserve. Collecting focused on pooid grasses, mainly *Poa* and *Festuca* species; specimens of Tree Violet (*Melicytus* spp.) for taxonomic, ecological and germination studies; seeds and vouchers of grassland and other rare or threatened Victorian species for the Victorian Conservation Seedbank (VCS); Woolly Tea-tree (*Leptospermum lanigerum*) communities in gullies and swamp margins; and threatened Victorian ferns, primarily in basalt and limestone areas. Fertile plant specimens were collected for pressing and drying, and preservation in silica gel or spirit.

- Mosses, liverworts and lichens were collected by hand and air-dried during the survey.
- Macrofungi were collected opportunistically. Collections comprised 3–10 fruiting bodies of each species at different stages of maturity. Truffle-like fungi were found by raking leaf litter and surface soil to a depth of 2–4 cm from small areas across a variety of microhabitats. Soil and litter were replaced after raking. Mushroom-like fungi were collected from the soil surface, and bark and woody debris. The colour, size and shape of fruit bodies were described while the fungi were fresh. The fruit bodies were then air-dried in a forced air dehydrator and stored for further examination.
- Microalgae were collected by passing several litres of water from wetlands, lakes and streams through a 35 µm phytoplankton net, retaining a sample and preserving it with Lugol's iodine. Red and green algae (macroalgae) were collected by hand from freshwater habitats. Green algae were pressed or preserved in 70% alcohol and live samples retained for DNA analysis.

Fauna specimens were lodged with Museum Victoria, and plant specimens (except microalgae) were lodged with the National Herbarium of Victoria. The microalgal samples were placed in the collection of J. Powling in Ivanhoe, Melbourne. Final species lists were compiled by combining data provided by the results of this Bush Blitz and the Australian Natural Heritage Assessment Tool.

Joseph Saunders, a traditional owner at the time working with the Gunditj Mirring Corporation, collects stygofauna using the Bou-Rouch method, R. Leijs © Copyright, South Australian Museum

Results

The locational data of collected and observed specimens are available to reserve managers. A total of 854 species were added to those previously known across the reserves. Eighteen species possibly new to science were discovered—these await assessment. Thirteen threatened animal species were observed, of which ten are new records for the reserves. Ten threatened plant species were recorded, of which seven are new records for the reserves. Forty-five exotic or pest fauna species and 18 weed species were also recorded.

Species Lists

Appendix A provides updated species lists for each reserve. Names in **brown bold text** are putative new species. Species marked with an asterisk (*) have not been recorded previously. Those without an asterisk were recorded previously and were found again during this survey. Species shown with blue squares were not recorded on this survey, but are known from previous records for the reserve.

Table 3 provides a summary of the number of new flora and fauna records and putative new species for each reserve. Table 4 provides a summary of the number of new records for each reserve by taxonomic group.

Thousands of invertebrate specimens were collected during this Bush Blitz. The species lists in this report include only the core taxa collected for the Bush Blitz program and specimens that have been identified to at least family level. A great deal of time is required to examine and identify the collections. Microscopic examination of the material is often necessary. Other limitations include the lack of experts working on particular groups, and the taxonomic literature for some groups is not current. These collections will be subject to further study.

Nomenclature and taxonomic concepts accepted in this report are consistent with the Australian Faunal Directory, Australian Plant Name Index, Australian Plant Census, Checklist of the Lichens of Australia and its Island Territories, AusMoss, and the Catalogue of Australian Liverworts and Hornworts.

Table 3: Summary of new records and putative new species

Reserve	Species new to the reserve	Putative species new to science
Allambie	151	7
Kurtonitj	298	7
Lake Condah	220	0
Lake Condah Mission	364	4
Muldoons	255	6
Tyrendarra	238	8
Vaughans	51	0

Table 4: Summary of species newly recorded during this survey for each reserve by group

Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Mammals	1	11	1	14	12	8	6
Birds	9	32	20	49	19	32	20
Frogs and Toads	2	0	4	7	5	6	2
Reptiles	0	1	3	4	7	5	5
Fishes	6	6	2	0	0	6	0
Ants	9	9	11	5	3	8	0
Butterflies and Moths	–	51	–	192	10	–	–
Caddisflies	0	10	2	0	6	3	0
Flies	8	22	21	24	13	24	0
Beetles and Weevils — Terrestrial	8	10	14	7	12	11	2
Beetles and Weevils — Aquatic	0	2	2	3	4	1	1
True Bugs — Terrestrial	16	27	7	18	6	18	8
True Bugs — Aquatic	0	6	5	2	1	1	0
Crickets, Grasshoppers and Katydids	5	3	7	5	7	4	0
Stoneflies	0	1	0	0	0	1	0
Damselflies and Dragonflies	1	0	6	0	9	3	1
Mayflies	0	5	1	0	4	2	0
Spiders	5	6	6	6	20	11	2
Crustaceans	4	12	2	0	11	10	0
Molluscs — Terrestrial	5	5	7	10	9	2	4
Molluscs — Aquatic	1	5	6	7	7	5	0
Worms — Aquatic	0	0	0	0	1	0	0
Leeches	0	0	0	0	1	1	0
Freshwater Sponges	0	1	0	0	1	0	0
Microinvertebrates — Aquatic	13	12	10	0	12	17	0
Flowering Plants	25	4	6	5	11	18	–
Ferns	1	0	0	0	4	0	–
Liverworts	0	1	5	0	1	0	–
Mosses	1	0	14	1	9	2	–
Lichens	8	0	26	1	4	1	–
Red and Green Algae	2	0	12	2	13	5	–
Filamentous and Micro-algae	15	51	19	1	27	32	–
Fungi	6	6	1	1	6	2	–

Threatened Species

Appendix B lists the threatened species known from the reserves. These are included in statutory lists under the Commonwealth EPBC Act and the FFG Act of Victoria. Also included are species found on the DEPI Threatened Species Advisory Lists. A summary of threatened species identified during the study is provided in Table 5.

Table 5: Summary of threatened species identified in each reserve

Reserve	Fauna	Flora
Allambie	2	2
Kurtonitj	5	1
Lake Condah	4	0
Lake Condah Mission	4	0
Muldoons	4	4
Tyrendarra	4	3
Vaughans	0	0

Exotic and Pest Species

Appendix C lists the exotic and pest species known from the reserves. A summary of exotic and pest species identified during the study is provided in Table 6.

While most exotic and pest species on this list are non-native species, not all are introduced. A species is considered exotic where it occurs outside of its normal range. A pest is a species that has the potential to have a negative environmental, social or economic impact. Native species that are at times pests or are considered exotic to this region of Victoria are included in Table 6 and Appendix C.

Table 6: Summary of exotic and pest species identified in each reserve

Reserve	Fauna	Flora
Allambie	6	5
Kurtonitj	21	4
Lake Condah	7	6
Lake Condah Mission	30	10
Muldoons	12	5
Tyrendarra	8	8
Vaughans	7	3

Discussion

Putative New Species

Eighteen putative species new to science were discovered during this Bush Blitz. A putative species new to science is one that has been recognised by an expert as never having been named or described in the scientific literature. It is confirmed as a new species once it is named and its description published. In addition to species that are considered new to science, specimens collected during this Bush Blitz include undescribed species that were already known from museum and herbarium collections, but have not yet been formally described and named.

A species of moth in the genus *Pterolocera* was collected that is likely to be new to science. Because females are flightless and grass-feeding, species in this genus are generally confined to local areas. The taxonomically closest known species, *P. amplicornis amplicornis*, was described from collections made near Adelaide, so it is unlikely to be the same species. The specimens also appear to be different to ones collected near Melbourne. *Pterolocera* is a widespread and complex group of moths in southern Australia. There are a couple of broad groups and the specimen found at Lake Condah Mission belongs to a group that is brown and conspicuously lined. Intensive work is required to sort through the *Pterolocera* group and complete the taxonomy.

Nine species of true bug that are putatively new to science were found on this Bush Blitz, including a new genus in the Tribe Austromirini. Five potentially new stygofauna species were found, comprising four species of Syncarida (*Koonunga* n. spp.) and one Isopod species (*Heterias* n. sp.). Two potentially new species of surface amphipods were found in the creeks of the area, *Austrogammarus* n. sp. and *Perthia* n. sp.

A putative new species of true bug (Deraeocolini sp. 46). M. Cheng © Copyright, University of New South Wales

A summary of the groups in which putative new species have been discovered is provided in Table 7.

Table 7: Putative new species by group

Common name	Number of putative new species
Butterflies and Moths	1
True Bugs	9
Crustaceans	8

Threatened Species

Australia is home to around 570,000 species. About 92% of vascular plants, 87% of mammals, and 45% of birds are endemic to Australia. Changes to the landscape and native habitat as a result of human activity have put many of these unique species at risk. Over the last 200 years many species of plants and animals have become extinct; many others are threatened.[8]

Fauna

A single Ground Cuckoo-shrike (*Coracina maxima*) was observed in grassland at Lake Condah, and a pair of Brolga (*Grus rubicunda*) were observed flying over wetland immediately west of the Woolsthorpe-Heywood and Ettrick Road junction, outside Kurtonitj IPA. Both species are listed as threatened under the FFG Act. No mammals listed as threatened were recorded in the reserves during this survey.

A single record was made of the Southern Bell Frog (*Litoria raniformis*) from the Lake Condah Mission area. This frog is listed as vulnerable under the EPBC Act and threatened under the FFG Act. One individual was heard calling. Further investigation is required to verify this record and to determine the population size. The Southern Toadlet (*Pseudophryne semimarmorata*) was recorded at Muldoons within Lake Condah IPA. Despite an intensive search, it was identified only from a number of individuals calling in the area. Previously recorded in Kurtonitj IPA, the Southern Toadlet was not observed there during this survey. It is listed as vulnerable on the DEPI Advisory List.

A native fish, the Eastern Dwarf Galaxias (*Galaxiella pusilla*), was found to be common and widespread throughout Darlot Creek in the Allambie, Kurtonitj, Lake Condah and Tyrendarra properties. This species is listed as vulnerable under the EPBC Act and threatened under the FFG Act. The Eastern Dwarf Galaxias is endemic to south-east Australia, occurring in Victoria, Tasmania and South Australia. Although widely distributed, numbers have declined and populations have become fragmented due to habitat degradation and destruction, and competition and predation by invasive species.[9]

The Yarra Pygmy Perch (*Nannoperca obscura*) was also present in some of the most pristine areas on the Allambie, Kurtonitj and Tyrendarra properties.

Southern Bell Frog (*Litoria raniformis*), a state and nationally listed threatened species © Copyright, A. Dudley

This species is listed as vulnerable under the EPBC Act and threatened under the FFG Act. Endemic to South Australia and Victoria, the Yarra Pygmy Perch is distributed from West Gippsland to near the Murray River mouth. Populations have declined in both distribution and abundance and are now

8 Chapman, A. D. 2009, *Numbers of Living Species in Australia and the World*, 2nd edn., Australian Biological Resources Study, Canberra, 80 pp.

9 Saddlier S., Jackson J., Hammer M. 2010, *National Recovery Plan for the Dwarf Galaxias* Galaxiella pusilla, Department of Sustainability and Environment, Melbourne, 21 pp.

Yarra Pygmy Perch (*Nannoperca obscura*), a threatened species found in Darlot Creek, G. Schmida © Copyright, Murray Darling Basin Authority

highly fragmented. The Yarra Pygmy Perch prefers slow-moving or still water with abundant aquatic vegetation, especially emergent vegetation. Major threats include habitat degradation and loss, drainage and modification of wetlands, and competition and predation from introduced species.[10]

The Glenelg Spiny Freshwater Crayfish (*Euastacus bispinosus*) is a new record for the Portland Basin. It was recorded only from the Glenelg River and Millicent Coast Basins. A number of specimens were seen by divers, usually hiding under rocks along a 200 m stretch of Darlot Creek. This species is probably not confined to Darlot Creek and sampling rivers elsewhere in the Portland Basin would help define its distribution. It is listed as endangered under the EPBC Act and threatened under the FFG Act.

The Darlot Creek Freshwater Snail (*Austropyrgus eumekes*) has a very restricted distribution and is known only from Darlot Creek. During the study it was very abundant on rock and plant surfaces in Darlot Creek. Due to its narrow distribution, this species is considered by experts to be vulnerable, although it is not included on any threatened species lists.

A male of the Eastern Dwarf Galaxias (*Galaxiella pusilla*), a threatened species encountered throughout Darlot Creek, in full colour ready for winter breeding, J. Finn © Copyright, Museum Victoria

Flora

Altogether ten threatened plant species were identified during the survey, seven of which were new records for the reserves—these are listed in Appendix B. A significant new record for the reserves was the discovery of the Curly Sedge (*Carex tasmanica*). This small, perennial, clumping sedge is endemic to Victoria and Tasmania, growing in seasonally damp sites in grassland or grassy woodland. In Victoria the Curly Sedge occurs near Melbourne and in the far south-west, in the Victorian Volcanic Plain bioregion. Most plants occur in just two populations with the remainder generally in small and isolated populations. Much of its habitat has been developed for agriculture and other populations have been lost to industrial and urban development. Major threats include heavy grazing, weed invasion, land use change

10 Saddlier S. & Hammer M. 2010, *National Recovery Plan for the Yarra Pygmy Perch* Nannoperca obscura, Department of Sustainability and Environment, Melbourne.

and climate change. The Curly Sedge is listed as vulnerable under the EPBC Act and the DEPI Advisory List, and threatened under the FFG Act. A national recovery plan is in place for this species.[11]

Exotic and Pest Species

The NRS is designed to conserve and protect Australia's rare and threatened ecosystems and provide a refuge for species at risk. Invasive species can have a major impact on already vulnerable species and ecosystems, as well as economic, environmental and social impacts. The inclusion of exotic and pest species records as part of this report is designed to provide land managers with baseline information to assist with further pest management programs.[12]

Vertebrate Fauna

During this survey, the Brown Hare (*Lepus capensis*) was seen at Lake Condah Mission and the Rabbit (*Oryctolagus cuniculus*) was recorded for Lake Condah Mission, Lake Condah IPA (Muldoons) and Kurtonitj IPA, both species in low abundance. At Tyrendarra IPA, four feral Sheep (*Ovis aries*) were seen. The Black Rat (*Rattus rattus*) and House Mouse (*Mus musculus*) were recorded from most sites. The Black Rat preys on and competes with native species, and can displace or greatly reduce their abundance. The high number of Black Rats throughout the area is a cause for concern, but the problem is difficult to address. Pesticides are the main form of control but pose a significant threat to non-target animals and human health; except on remote islands, reinvasion is rapid and the use of pesticides is not considered a viable long-term strategy.

Large numbers of Eastern Gambusia or Mosquito Fish (*Gambusia holbrooki*) were found in the Fitzroy River, but it was only collected from the lower portion of Darlot Creek (Tyrendarra IPA); however it is likely to spread further upstream. Eastern Gambusia is a declared noxious aquatic species under the Victorian *Fisheries Act 1995*. It was first recorded in the Fitzroy River in 2006 during the *Southern Basins Sustainable Rivers Audit* and has recently been recorded in Darlot Creek.[13] Eastern Gambusia has been implicated in the decline of nine native fish species and more than ten frog species. The threatened Eastern Dwarf Galaxias (*Galaxiella pusilla*) and Yarra Pygmy Perch (*Nannoperca obscura*), along with other native fishes, could be badly impacted by a self-sustaining population of Eastern Gambusia in Darlot Creek. This species has also been implicated in the decline of the Southern Bell Frog (*Litoria raniformis*). Eastern Gambusia competes with native fish and frogs for food, eats native fish and frog eggs, and preys on juvenile fish and tadpoles. It is known to nip the fins of native fish causing a fatal fungal infection.[14]

11 Carter, O. 2010, *National Recovery Plan for the Curly Sedge* Carex tasmanica, Department of Sustainability and Environment, Victoria, <http://www.environment.gov.au/resource/national-recovery-plan-curly-sedge-carex-tasmanica> accessed 8 April 2014.

12 Department of the Environment, <http://www.environment.gov.au/topics/biodiversity/invasive-species> accessed 8 April 2014.

13 Aquatic Fauna Database; Tarmo Raadik pers. comm.

14 Rowe D., Moore A., Giorgetti A., Maclean C., Grace P., Wadhwa S., Cooke J. 2008, *Review of impacts of gambusia, redfin perch, tench, roach, yellowfin goby and streaked goby in Australia*, Report prepared for the Australian Government, Department of the Environment, Water, Heritage and the Arts, Canberra, 245 pp.

Eastern Gambusia (*Gambusia holbrooki*), a declared Noxious Aquatic Species and implicated in the decline of the Eastern Dwarf Galaxias and the Southern Bell Frog. G. Schmida © Copyright, Murray Darling Basin Authority

Eastern Gambusia is difficult to eradicate and the best control method is to prevent further dispersal and introduction to new waterways. Physical removal from small, isolated sites before Eastern Gambusia spawn is possible. However, unless complete eradication is achieved, suppression of Eastern Gambusia lasts no more than a month.[15]

Tench (*Tinca tinca*) was collected only from Darlot Creek at Mortons Bridge, Allambie Reserve. These fish feed almost exclusively on invertebrates, and are not a major threat to the native fishes of Darlot Creek.[16] Other introduced species previously recorded from Darlot Creek were not collected during the Bush Blitz. These include Brown Trout (*Salmo trutta*), Rainbow Trout (*Oncorhynchus mykiss*), Goldfish (*Carassius auratus*) and Redfin Perch (*Perca fluviatilis*).

15 Department of Sustainability and Environment 2011, *Bringing Back Native Fish: Eastern Gambusia removal and recovery of native fish communities*, Victorian Government, Nicholson Street, East Melbourne.

16 Rowe D., Moore A., Giorgetti A., Maclean C., Grace P., Wadhwa S., Cooke J. 2008, *Review of impacts of gambusia, redfin perch, tench, roach, yellowfin goby and streaked goby in Australia*, Report prepared for the Australian Government, Department of the Environment, Water, Heritage and the Arts, Canberra, 245 pp.

Invertebrate Fauna

The introduced Cabbage White Butterfly (*Pieris rapae*) and the Native Budworm (*Helicoverpa punctigera*) were recorded at Muldoons and Kurtonitj, respectively, and are considered serious pests of agricultural crops. Adults of other species recorded during the survey, whose caterpillars are also agricultural pests, include Cutworms (*Agrotis* spp.), Armyworms (*Diarsia* spp.), Southern Armyworm (*Persectania ewingii*), Common Armyworm (*Mythimna convecta*), Pasture Webworms (*Hednota* spp.), Green Garden Looper (*Chrysodeixis eriosoma*), Lucerne Seed Web Moth (*Etiella behrii*), Twig Looper (*Ectropis excursaria*), Apple Looper (*Phrissogonus laticostata*), and *Epiphyas* spp. Larvae of the Convolvulus Hawk-moth (*Agrius convolvuli*) were also collected. The year 2011 was an irruption year for the Painted Cup Moth (*Doratifera oxleyi*)—hundreds of adult were observed. The caterpillars, in high numbers, can defoliate eucalypts, as can those of the Gum-leaf Skeletoniser (*Uraba lugens*), also recorded.

The true bug species Rutherglen Bug (*Nysius vinitor*), Green Mirid (*Creontiades dilutus*) and Harlequin Bug (*Dindymus versicolor*) were found across the reserves. These are small native sap-sucking insects that can migrate into crops in very large numbers during favourable seasons. They breed on a wide range of native and exotic plants, building up to large numbers in inland areas when winter and spring rainfall allows the growth of vegetation. In spring, as the host plants start to dry off, large numbers of adult bugs will move into eastern Australian cropping areas, migrating on the winds associated with storm fronts. Rutherglen Bugs and Green Mirids can build up in such numbers that can cause serious damage to fruit and vegetable crops.

Introduced species of land snails were far more abundant than native land snails on all reserves except Tyrendarra, indicating a long history of disturbance. While native molluscs are still present in large numbers in Victoria, the majority of species are introduced. Over 65 land and freshwater snails have been introduced to Australia, but only a few have become serious pests. There is no evidence to suggest that introduced snails have affected the survival of Australia's native snails and most introduced snails invade habitat only after it has become too degraded for native snails.[17] One consequence of the exceptionally high abundance of introduced species on the reserves, particularly of the Common Garden Snail (*Cantareus aspersa*), is a very high abundance of the Australian native Gawler Carnivorous Snail (*Strangesta gawleri*). As predators at the top of the trophic level, carnivorous snails are normally at very low abundance.

Vascular Flora

Lake Condah and Budj Bim (Mount Eccles) in the background, R. Sharrock © Copyright, Department of the Environment

Weeds can smother and out-compete native vegetation, and change hydrological flows, fire regimes and access to resources for fauna. They can also over-grow heritage sites making them difficult to find, monitor and protect. Weed issues at most of the properties have been documented in previous reports and the Budj Bim Rangers undertake weed control as part of the *Working on Country* program. Although the focus of this botanical survey was to document native species diversity and distribution, 18 weeds were recorded, nine for the first time.

17 Australian Museum, accessed 7 August 2013 <http://australianmuseum.net.au/Introduced-snails-in-Australia>.

Intact vegetation that had not been previously cleared was relatively weed-free. Previously cleared or grazed paddocks across the reserves carried a range of weeds typical of agricultural land in the area. An ultimate aim for these cleared sites could be rehabilitation to the surrounding Manna Gum (*Eucalyptus viminalis*) grassy woodland. This would require continual management of invasive species like Fuller's Teasel (*Dipsacus fullonum*), Creeping Thistle (*Cirsium arvense*) and Sweet Briar (*Rosa rubiginosa*), which are likely to reinvade. Targeting these weeds as a first step to rehabilitating sites would improve the areas' appearance and provide ecological benefits.

Watercourses and their verges were a haven for numerous weeds, particularly for Blackberry (*Rubus leucostachys*) in the vicinity of the Lake Condah Mission. Widespread weeds such as White Willow (*Salix alba*) and Hemlock (*Conium maculatum*) were noticed in the same general area. The former is often targeted for eradication, and could be successfully eliminated from this area only if absent upstream and therefore unlikely to re-invade. At the campsite known as Betty Boo, Perennial Beardgrass (*Polypogon lutosus*), which is relatively uncommon in Victoria, was locally dominant. Herbarium records show it was also present on the shores of Lake Condah in 1977. The high level of the lake during the current survey meant its continuing presence there could not be confirmed.

Trailing St John's Wort (*Hypericum humifusum*) was found in a relatively localised patch in Muldoons and potentially could be eradicated before it spreads too far. This weed is known from only a handful of sites in Victoria and one in northern Tasmania, but it has the potential to occupy a wide range of high-rainfall sites with relatively fertile soils.

Jointed Rush (*Juncus articulatus*) was common in the extensive swamplands of Allambie. Eradication of this successful coloniser of wet sites is unlikely due to its tiny, abundant seeds that are freely dispersed by water and waterbirds. Local control could be considered and elimination of new infestations at an early stage would be prudent. In a similar area, the aquatic Pink Water Speedwell (*Veronica catenata*) was locally abundant. This

Botanist Val Stajsic examines a Bur Reed from Darlot Creek, M. Norman © Copyright, Museum Victoria

weed is relatively uncommon in Australia and is largely confined to far south-western Victoria and south-eastern South Australia. Its ecological impact at Allambie, at least currently, is likely to be low. The spread of Pink Water Speedwell beyond its current infestations should be controlled first, then attention should be given to removing it from the Allambie swamps. It also occurs at the Betty Boo camp along Darlot Creek.

Beside Darlot Creek in Tyrendarra IPA there are some extensive areas of Silverweed (*Potentilla anserina*). On a previous visit to the property in the 1980s this species was found to be abundant in the vicinity of Lake Condah itself, but it was not encountered there on this occasion. This weed is uncommon in Victoria, but where it occurs it usually forms dense carpets that exclude native vegetation. There are some heavy infestations at Tyrendarra and its eradication, followed by revegetation, would bring back local ecological systems to those areas.

Two species have doubtful status as native plants. The aquatic Water Parsnip (*Berula erecta*) is locally common in the same general area as Silverweed. While some experts advocate the control of this species as an exotic, others consider it to be native to Australia. Furthermore, it is currently on the DEPI Advisory List as poorly known in Victoria. The native status of Smaller Bur Reed (*Sparganium erectum* subsp. *stoloniferum*) in Victoria is also disputed. While not observed within the IPAs, it was collected just outside the reserves at the crossing of Darlot Creek and Coustleys Road south of the Muldoons block. Until a firm decision is made on the origins of these species, it may be better to monitor and consider control only if they expand considerably beyond their current range.[18]

Algae

Macroalgae are often used as indicators of water quality. Many macroalgae species assimilate nutrients from the surrounding water and store them over short periods; they can therefore be used to monitor changes in nutrient levels. Macroalgae also respond to nutrient levels, increased abundance often indicating elevated nutrient levels.

None of the waterbodies were dominated by nuisance algae, although euglenophytes were found, and these can indicate high levels of organic matter. Aerobic bacteria, which break down organic matter in the water column and in sediment, consume large amounts of oxygen, thus reducing the amount available for other animals. In serious cases, this can cause the death of other organisms living in the waterbody.

Cyanobacteria (also known as blue-green algae), are best known for the extensive and highly visible blooms that can form in freshwater and marine environments. If the cyanobacteria involved are toxic, these algal blooms can become harmful to humans and other animals. One filament of a potentially toxic cyanobacterium (*Cylindrospermopsis raciborskii*) was observed at the Allambie sinkhole. Further sampling is required in order to clarify this observation. The other cyanobacteria recorded were non-toxic.

18 Pers. comm. Neville Walsh, National Herbarium of Victoria.

Tree violets (*Melicytus* spp.) were a target for taxonomic study by Melbourne Herbarium botanists. The Lake Condah area was unusual in having two distinct taxa of tree violet growing in close proximity. N. Walsh © Copyright, National Herbarium of Victoria

Other Points of Interest

Vertebrates

The results of this Bush Blitz present many new records. A number of studies of vertebrate fauna had been undertaken prior to this Bush Blitz, particularly on the Lake Condah IPA properties, but a comprehensive study across the reserves had not been made.

Most species of mammals and birds in the reserves have healthy populations, and the recording of 23 mammals (15 native and 8 exotic), and 108 birds (105 native and 3 exotic) over a two week period is a good result. The greatest numbers of mammal and bird species were found in the tall open woodland at Lake Condah Mission. The areas with the next highest diversity of mammals were the woodlands of Kurtonitj and Muldoons, and for birds Muldoons woodlands. From this study and discussion with local staff, the area showing the least disturbance appears to be Muldoons. There the woodlands contain a wealth of native fauna, especially of mammals. It would be highly desirable to remove exotic species from this area.

Bird species newly recorded for the reserves include the Little Corella (*Cacatua sanguinea*), Australian Owlet-nightjar (*Aegotheles cristatus*), Ground Cuckoo-shrike (*Coracina maxima*) and Yellow Thornbill (*Acanthiza nana*). The record of the Australian Owlet-nightjar was not unexpected, but owing to its cryptic nature and the short duration of its distinctive nocturnal calls, it might have been overlooked by previous observers. Likewise, the presence of the Little Corella was not unusual, and all flocks of cockatoos should be carefully checked for this species. Little Corellas are highly mobile and their current occupation of the area may be only temporary. The Ground Cuckoo-shrike is another highly mobile species in open woodlands and grassland. Its recording at Lake Condah could simply represent a bird travelling through the area. On the other hand, Yellow Thornbills are normally local in their distribution and known to have a preference for wattle groves, which is where the birds were detected. Further investigations would be useful to validate the record.

Healthy frog numbers were found throughout the reserves—eight species representing two families (Hylidae and Myobatrachidae) and five genera were encountered. All, apart from the threatened Southern Toadlet (*Pseudophryne semimarmorata*) and Southern Bell Frog (*Litoria raniformis*), appeared to be extremely abundant with a large number of juveniles.

Only 12 species of reptile were found during this survey, however, four skinks and two elapid snake species were recorded for the first time. The Dark-flecked Garden Sunskink (*Lampropholis delicata*) and Glossy Grass Skink (*Pseudemoia rawlinsoni*), despite being common in the area, were not on Museum Victoria's *Victorian Lizard Checklist*.[19] The weather during the survey was cold and wet, so many lizard species could have been relatively inactive and therefore less likely to be captured. Although overall species diversity was low, some species were very abundant, especially White's Skink (*Liopholis whitii*).

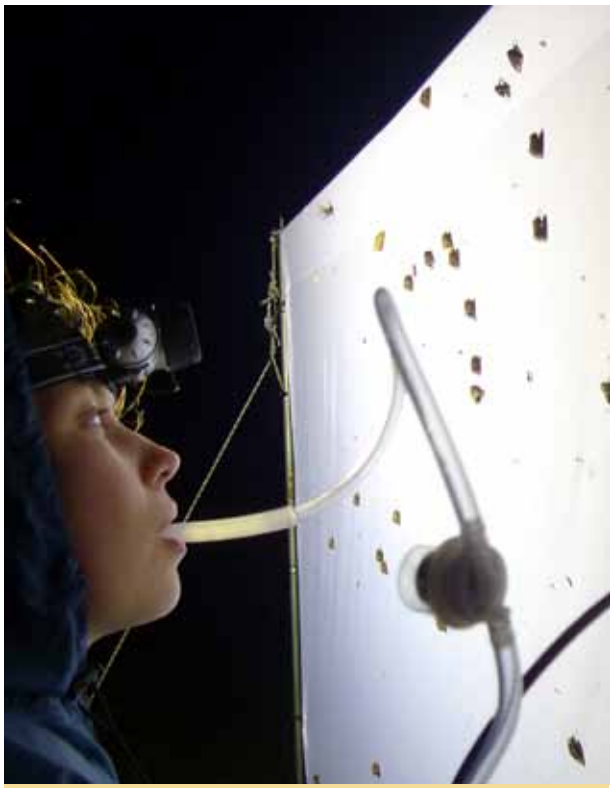
Eastern Banjo Frog (*Limnodynastes dumerilii*), J. Finn © Copyright, Museum Victoria

A number of fish surveys have been undertaken in the region by staff of the Arthur Rylah Institute. The region was surveyed in 1990 and again in 2006 as part of the Southern Basins Sustainable Rivers Audit. In 2007 and 2008, seasonal biodiversity surveys were undertaken as part of the Lake Condah Restoration Project.[20] Results from these studies were similar to those obtained during the Bush Blitz survey, although the diversity and abundance of native freshwater fishes was much higher than expected. Eight native species were collected or sighted during the Bush Blitz survey. River Blackfish (*Gadopsis marmoratus*) with an unusual colouration were collected from one location in Darlot Creek, Kurtonitj IPA. This species

Spotted Grass Frog (*Limnodynastes tasmaniensis*), J. Finn © Copyright, Museum Victoria

19 Museum Victoria's Victorian Lizard Checklist, <http://museumvictoria.com.au/bioinformatics/lizards/>, accessed 17 January 2013.

20 Crook D., MacDonald J., Belcher C., O'Mahony D., Dawson D., Lovett D., Walker A., Bannam L. 2008, *Lake Condah Restoration Project Biodiversity Assessment*, Arthur Rylah Institute for Environmental Research Technical Report Series No. 180, Department of Sustainability and Environment, Heidelberg, Victoria, 47 pp.



Checking for moths and true bugs attracted to the light trap, K. Gillespie © Copyright, Department of the Environment

is endemic to south-eastern Australia, with a wide distribution that includes tributaries of the Murray–Darling river system as far north as the Condamine River in southern Queensland, as well as in Tasmania. The existence of distinct northern and southern forms on either side of the Great Dividing Range has long been proposed, but the taxonomy remains unresolved.[21]

Southern Shortfin Eel (*Anguilla australis*) was collected from all sites surveyed as part of the Lake Condah Restoration Project, and Congolli (*Pseudaphritis urvillii*) was collected from the lower Darlot Creek in Kurtonitj and Tyrendarra. These species were not collected during this Bush Blitz survey, most likely because electrofishers and fyke nets were not used. The Australian Smelt (*Retropinna semoni*), a previous record for the reserves, was also not seen during this survey.

Fish were not seen in any of the sink holes visited, including the large one at Muldoons, despite clear water, aquatic vegetation and abundant aquatic invertebrates. Although three species were collected from the Darlot Creek channel at Lake Condah, no fish were collected from Lake Condah itself. Bait traps and push nets were used without success in the southern part of the lake adjacent to the Darlot Creek channel outlet. The lake shore further north was visited but the area was degraded and a thick layer of algae had collected along the shoreline making access to the water difficult.

An undescribed galaxid fish (*Galaxias* n. sp.) was collected from Darlot Creek in Kurtonitj and Allambie reserves. A single specimen was collected in a bait trap off the Coustleys Road Bridge, and 12 specimens were collected in bait traps off Mortons Bridge at the entrance to Allambie. In the past, this species has been misidentified as the Mountain Galaxias (*Galaxias olidus*). Only a single specimen—identified as *G. olidus*—has previously been recorded from Darlot Creek.[22] This fish is known from the entire Glenelg, Portland Coast, Hopkins and Corangamite river basins and is currently being described.[23]

Terrestrial Invertebrates

There has been comparatively little survey work on terrestrial invertebrates in south-western Victoria. Many groups can be identified to family level only, with ants being sorted to genus level, and

21 Hammer, M. 2008, *A molecular genetic appraisal of biodiversity and conservation units in freshwater fishes from southern Australia*, PhD thesis, University of Adelaide, 251 pp.

22 Recorded in 2008 during the Lake Condah Restoration Project surveys.

23 Raadik, T. A. 2011, *Systematic revision of the Mountain Galaxias*, Galaxias olidus *Günther, 1866 species complex (Pisces: Galaxiidae) in eastern Australia*, Unpublished PhD Thesis, University of Canberra, Canberra, 530 pp.

some well-known invertebrates being identified to species. This makes commenting on species changes and diversity difficult. However, most of the species recorded during the Bush Blitz were widespread in the greater area and as expected. The composition of fauna differed between sites, most likely as a result of sampling intensity and the diversity of habitats, these ranging from eucalypt woodland to paddocks with very little remnant vegetation. Not surprisingly, a greater diversity of habitats within an area led to a higher number of recorded families. For example, Lake Condah Mission, with its proximity to water, cleared paddock and remnant bushland, offered the greatest variety of habitats and yielded 24 families of flies (*Diptera*), compared to Kurtonitj with 18, Lake Condah and Tyrendarra with 17, and Allambie and Muldoons with eight each. Allambie, which is now predominantly agricultural land, had a comparatively low diversity of fly families. However, caution must be used in undertaking simple comparisons of numbers of families between sites, because while fewer families may have been recorded at a particular site, those families might actually have higher species diversity.

In Victoria, there is a considerable amount of information on butterflies, but by comparison, moths are poorly known. Much survey and collecting effort for moths has been focussed on central and eastern Victoria, but little is known about the south-western moth fauna. During this survey, eight butterfly and 202 moth species were recorded—more than 100 species of moth were collected in just two nights. The butterfly species were all within their known ranges. The survey revealed some very rare moth species, including first, second and third records for Victoria, range extensions for more than 20 species that link gaps in distribution, and species in unusually high numbers and unusual colour forms. Some of the significant findings are presented in Table 8. Most of the range extensions were to the west of populations in central and eastern Victoria. The exceptions were *Armactica conchidia*, which was thought to be confined to the drier areas of north-western Victoria, and *Thallarcha staurocola*, previously known only from far-eastern Gippsland. The records also provided links between apparently isolated populations in Victoria and South Australia, such as for Clara's Satin Moth (*Thalaina clara*) which was previously known to occur only near Ballarat in central Victoria and at Naracoorte, South Australia.

The species list for butterflies and moths across the reserves is unlikely to be complete as many species have restricted flight times. Late summer and early autumn species are likely to overlap and fly together. Surveys at other times of the year, particularly late winter, spring, summer and late autumn, would capture additional species. Surveys in the undisturbed woodland on lava flows (stony rises) not accessed during this Bush Blitz, and those of larvae and day-flying adults would also potentially reveal more species.

Fifty species of terrestrial true bug belonging to 17 families were discovered, all of which are new records for the reserves. The collection of 50 species was above expectations because autumn is generally a period of low activity for true bugs. These tend to be most diverse and abundant during spring in temperate Australia, when plant growth and flowering is greatest. True bugs of Victoria have never been documented at state level, and many areas are poorly surveyed.

Table 8: Significant finds for moths

Species	Reserve	Significance
Bathytricha leonina	Lake Condah Mission	Rarely recorded in Victoria.
Chiriphe pelochroa	Lake Condah Mission	Second record for Victoria and greatly extended range.
Doratifera oxleyi	Lake Condah Mission, Kurtonitj	The most numerous moth species observed. Early in the survey period mainly females occurred in extraordinary numbers. 180 individuals were counted on one side of a light sheet; the total on both sides would have been 300–350.
Heliocosma argyroleuca	Kurtonitj	First record for Victoria.
Nola pothina	Lake Condah Mission, Kurtonitj	Range extension to the west. Only three Victorian specimens were previously known. This species is considered to be rare to uncommon.
Philenora omophanes	Lake Condah Mission, Kurtonitj	The known range was a small area east of Melbourne (Beaconsfield, Tynong North), apparently isolated from other populations in NSW. The Condah records were the first indication of a wider Victorian distribution.
Spilosoma glatignyi	Lake Condah Mission, Kurtonitj	Very common at light traps with well over 100 specimens each night. Many were of an unusual colour form. Known Victorian specimens have white forewings with small dark markings. In the Condah specimens, the dark markings have coalesced into large patches. In some, the forewings were entirely dark with fine white lines over the veins. This may be a regional colour form restricted to the western or drier parts of Victoria. It would be interesting to compare the Condah specimens with those from South Australian and Western Australian populations.
Thallarcha pellax	Lake Condah Mission	Only nine Victorian specimens are known. It was thought to be restricted to montane areas in central and eastern Victoria. While this record would be a major range extension, the forewing pattern has some unusual features. No other specimens like it are known from Victoria. It might represent an unknown species.
Thallarcha staurocola	Lake Condah Mission	Third record for Victoria.

A male huntsman spider (*Delena* sp.) at Lake Condah Mission, J. Finn © Copyright, Museum Victoria

The sighting of a Mountain Katydid (*Acripeza reticulata*) was of interest. This species typically occurs in high country in south-eastern Australia and is rarely found in the lowlands of Victoria, but has been noted in paddocks in parts of New South Wales and Queensland, and documented previously on the Lake Condah reserve. Healthy lowland populations might buffer this species against the predicted impacts of climate change on its high country habitat.

The spider fauna collected was consistent with expectations for disturbed and semi-disturbed areas of south-eastern Australia. Not surprisingly, the data shows that a greater diversity of spider habitats and a greater percentage of natural bushland led to the recording of more taxa. At Muldoons, 20 taxa were identified compared with 6 or fewer at other sites, except Tyrendarra which had 11. Much of the spider material has been sorted to family level only, as adults are often needed to identify specimens to a lower level.

Terrestrial molluscs were surveyed at seven sites. Approximately half of the indigenous terrestrial mollusc species previously known from the region were recorded. It is possible that with additional surveys at least four more species might be found on the reserves. There was an exceptionally high abundance of the Pinwheel Micro-snail (*Elsothera murrayana*). The highly porous nature of the basalt substrate is probably an ideal micro-habitat for this species.

Freshwater Invertebrates

Freshwater invertebrates were sampled from three lotic (moving water) sites on Darlot Creek in Tyrendarra, Kurtonitj and Muldoons, and two lentic (still water) sites, at Lake Condah and a sinkhole on Muldoons. The composition of the fauna differed very little between the three lotic sites, but was distinct from that found at the lentic sites. Dragonflies, water beetles and water bugs were prominent at lotic habitats. The freshwater invertebrate fauna recorded was typical of lowland areas in western Victoria. With the exception of the Glenelg Spiny Freshwater Crayfish (*Euastacus bispinosus*) and a freshwater sponge (*Ephydatia fluviatilis*), none of the species recorded was rare or unknown. Dragonflies, in particular, were represented by species with wide distributions in southern Australia. The results were comparable with those obtained by the Environment Protection Authority (EPA) of Victoria, which had sampled freshwater invertebrates repeatedly since the mid-1990s at one site on Darlot Creek—approximately midway between the Kurtonitj and Tyrendarra sites. Occasional samples had also been taken from Darlot creek near the town of Tyrendarra.[24]

The burrows of the Hairy Burrowing Spiny Crayfish (*Engaeus sericatus*) were common along the edge of Darlot Creek in Kurtonitj, but the specimen collected was actually taken in the water. These crayfish usually remain in their burrows and rarely enter the water, although they do wander on the ground at night. Healthy populations of the freshwater sponge *Ephydatia fluviatilis*, previously considered rare in Victoria, were also found. It was collected by hand and had not been recorded before by the EPA, whose use of nets for standard sampling makes it unlikely that they would retrieve sponges. The sponge occurred as clumps attached to rocks and wood in Darlot Creek at Kurtonitj and Muldoons.

Freshwater snails and some caddisfly larvae were abundant on the extensive macrophyte beds in the main channel of Darlot Creek in Kurtonitj and Tyrendarra. Macrophytes provide habitat and refuge for many organisms, and snails and caddisfly larvae feed on the periphyton that colonises the leaves of macrophytes. At Muldoons a stony riffle occurred and the water was considerably shallower than at the other two sites on Darlot Creek, so few macrophytes were present. A single species of leech (*Helobdella papillornata*) was encountered in Darlot Creek at Tyrendarra and Muldoons.

Stygofauna (Groundwater Fauna)

During this survey, the fauna associated with underground waters was recorded for the Lake Condah area for the first time. Stygofauna research in Australia is relatively new and no systematic surveys for stygofauna have been undertaken in Victoria. Prior to this survey, the knowledge of stygofauna in Victoria was restricted to a single amphipod species, *Giniphargus pulchellus*, from Thorpdale, Gippsland.[25]

24 Marchant R., Hirst A., Norris R., Metzelling L. 1999, 'Classification of macroinvertebrate communities across drainage basins in Victoria, Australia: consequences of sampling on a broad spatial scale for predictive modelling', *Freshwater Biology* **41**(2): 253–268.

25 Williams W. D. & Barnard J. L. 1988, 'The taxonomy of crangonyctoid Amphipoda (Crustacea) from Australian fresh waters: foundation studies', *Records of the Australian Museum* **Supplement 10**: 1–180.

Melicytus dentatus, the more common of the two Victorian species of tree violet, has more slender branches that arise at a narrower angle than those of *M. angustifolius*, N. Walsh © Copyright, National Herbarium of Victoria

Stygofauna have been found in a range of aquifer types such as fractured rock, alluvial and limestone aquifers and they are also found in the underflow (hyporheic zone) of rivers and in the gaps within the sediment of coarse sand and pebble beaches. Stygofauna species have naturally small distribution areas and because taxa are often restricted to single aquifers, sampling a new area usually results in the discovery of new species.

Although not all reserves had suitable access to groundwater through bores, wells or springs, stygofauna were found in lava collapse sinkholes at Allambie and in a tiny subterranean stream in a lava tunnel and spring at Muldoons. The stygofauna consisted mainly of syncarids (*Koonunga* n. spp.) and isopods (*Heterias* n. sp.) while in a spring at Muldoons a second much smaller species of syncarid was found.

Some groundwater localities also contained surface amphipods of the genus *Austrogammarus*. Darlot Creek at Kurtonitj and the Fitzroy River at Tyrendarra were sampled for surface crustaceans. In addition to the large numbers of amphipods of the genera *Austrogammarus*, *Paracalliope* and *Austrochiltonia*, some individuals of *Koonunga* and *Perthia* were also found. The faunal composition resembles that of the Mount Gambier area, and unpublished molecular analyses from that area have revealed several new species additional to *Koonunga crenarium*, so far the only described species from that area. It is likely that the *Koonunga*, *Heterias*, *Austrogammarus* and *Perthia* species from the Lake Condah area are also undescribed while the *Perthia* samples are also the first record of this amphipod genus in Victoria.

Vascular Flora and Cryptogams

Over 300 collections of vascular flora and cryptogams were made during this Bush Blitz. The survey was the first detailed study of fungi, lichens, bryophytes and freshwater algae in the area. Some significant finds, including geographic range extensions and possible undescribed taxa, are presented in Tables 9 and 10.

Table 9: Significant finds for vascular flora

Species	Reserve	Significance
Leucopogon aff. *parviflorus*	Allambie, Muldoons	Possibly an undescribed species. It is unusual to find this plant in swampy sites.
Picris angustifolia subsp. *angustifolia*	Muldoons	Uncommon.
Potamogeton sp. (*australiensis*)	Muldoons	Possibly an undescribed species.

Seed and voucher collections were made for the VCS and the Millennium Seed Bank.[26] The VCS project aims to collect seeds from native plants within Victoria for long-term storage, research and restoration programs. The program mainly targets seeds from rare, threatened or endemic species, and during this Bush Blitz seeds from the following taxa were collected: Jointed Twig-rush (*Baumea articulata*), Marsh Club-rush (*Bolboschoenus medianus*), Mountain Sedge (*Carex gunniana* var. *gunniana*), Lake Omeo Sedge (*Carex tereticaulis*), Clammy Goosefoot (*Dysphania pumilio*), Flecked Flat-sedge (*Cyperus gunnii* subsp. *gunnii*), Australian Gipsywort (*Lycopus australis*), Kangaroo Apple (*Solanum laciniatum*), Water Ribbons (*Triglochin procera*) and Streaked Arrowgrass (*Triglochin striata*).

Micro- and macroalgae form the basis of many food webs in permanent and temporary wetland, lake and river ecosystems. Despite this, comprehensive sampling of algae in Australian inland systems has been rare and the collection of algae in botanical surveys is usually opportunistic. It is unusual to see a number of specimens of the same species from a single region in herbarium collections. Sufficient taxonomic treatments and expertise have only recently become available to reliably identify some micro- and macroalgae in Australian inland systems.

The Lake Condah area had not previously been surveyed for algae, so all of the species collected were new records for the area. Ninety-one species of microalgae and filamentous algae, one species of red algae, and 20 species of green algae of the family Characeae were collected. The green algae included one basalt-plains endemic (*Nitella* sp. aff. *cristata* 'Basalt Plains') and some widely distributed species (*Chara australis*, *C. hookeri*, *C.* sp. aff. *virgata* 'ANZAC'; *C.* sp. aff. *globularis* 'Victoria', *C. muelleri*, *Nitella woodii*, *N.* sp. aff. *lhotzkyi*, N. sp. aff. *australiensis*).

Many of the species found can be considered perennial or species of permanent water bodies. It is likely that additional species would be found if the area was sampled in late spring. Algae can be seasonal, and the timing of the Bush Blitz was not ideal for a thorough documentation of algal biodiversity. Many of the specimens were not reproductive, and therefore lacked some useful diagnostic characteristics.

26 <http://www.seedpartnership.org.au/partners/vic>, accessed 7 August 2013.

Table 10: Significant finds for cryptogams

Group	Species	Reserve	Significance
Liverwort	*Frullania prosbosciphora*	Lake Condah	Not many collections from south-west Victoria.
Moss	*Amphidium tortuosum*	Muldoons	Uncommon, not many collections.
Moss	*Fissidens berteri*	Lake Condah	Uncommon aquatic moss.
Moss	*Hypopterygium didictyon*	Muldoons	Rare in western Victoria.
Moss	*Leptodictyum riparium*	Muldoons	Uncommon.
Lichen	*Cladonia pertricosa*	Lake Condah Mission, Muldoons	There are very few collections of this species.
Lichen	*Lecanora subcoarctata*	Lake Condah	Possibly a second record for Victoria, one record exists from eastern Victoria.
Lichen	*Parmotrema cooperi*	Lake Condah	Only known from one other Victorian specimen.
Lichen	*Pertusaria* sp. (*xanthoplaca*)	Lake Condah	Possibly a second record for Victoria, one record exists from eastern Victoria.
Lichenicolous Fungi	*Marchandiomyces* sp.	Lake Condah	Possibly an undescribed species.

The south-east shore of Lake Condah with Water Ribbons (*Triglochin* sp.) in the water, and mosses and lichens in foreground, J. Milne © Copyright, National Herbarium of Victoria

Appendix A: Species Lists

Additional supplements containing the appendices for individual reserves are available to download from:

www.bushblitz.org.au

Nomenclature and taxonomy used in this appendix are consistent with that from the Australian Faunal Directory (AFD), the Australian Plant Name Index (APNI) and the Australian Plant Census (APC).

Current at June 2013

Fauna

Vertebrates

Mammals									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Bovidae	*Ovis aries* ^	Sheep						X *	
Canidae	*Vulpes vulpes* ^	Red Fox		X *			X *	X *	X *
Cervidae	unid. sp. ^	Deer			X *				
Dasyuridae	*Antechinus swainsonii*	Dusky Antechinus				X *	X *		
	Dasyurus maculatus # +	Spotted-tailed Quoll		▪	■		■		
Felidae	*Felis catus* ^	Cat		X *					
Leporidae	*Lepus capensis* ^	Brown Hare				X *			
	Oryctolagus cuniculus ^	Rabbit		X *		X *	X *		
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo		X *			X *	X *	X *
	Macropus giganteus	Eastern Grey Kangaroo	X *				X *	X *	
	Macropus rufogriseus	Red-necked Wallaby				X *			
	Wallabia bicolor	Swamp Wallaby		X *			X *	X *	X *
Molossidae	*Tadarida australis*	White-striped Freetail Bat				X *			
Muridae	*Hydromys chrysogaster*	Water-rat							X *
	Mus musculus ^	House Mouse		X *		X *	X *	X *	
	Rattus fuscipes	Bush Rat		X *		X *		X *	
	Rattus lutreolus	Swamp Rat				X *			
	Rattus rattus ^	Black Rat		X *		X *	X *	X *	
Petauridae	*Petaurus australis*	Yellow-bellied Glider					X *		
	Petaurus breviceps	Sugar Glider				X *	X *		
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum		X *		X *	X *		X *
Phascolarctidae	*Phascolarctos cinereus*	Koala		X *		X *	X *		X *
Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum		X *		X *			
Vespertilionidae?	unid. sp.	Microbat				X *			

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

\+ = DEPI listed

O = **Putative new species**

▪ = Previously recorded on the reserve but not found on this survey

A native Bush Rat (*Rattus fuscipes*), J. Finn © Copyright, Museum Victoria

Koala (*Phascolarctos cinereus*), W. Longmore © Copyright, Museum Victoria

Birds										
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill			X		X	X *	
	Acanthiza lineata	Striated Thornbill		X *	■		X		
	Acanthiza nana	Yellow Thornbill				X *			
	Acanthiza pusilla	Brown Thornbill		X *	X	X *	X	X *	X
	Acanthiza reguloides	Buff-rumped Thornbill		X *	■	X *	X		
	Calamanthus fuliginosus	Striated Fieldwren	X *	X *	X *			X *	
	Sericornis frontalis	White-browed Scrubwren			X	X *	X	X	X
Accipitridae	*Accipiter fasciatus*	Brown Goshawk					X *	X *	X *
	Aquila audax	Wedge-tailed Eagle		X *	X *				
	Circus approximans	Swamp Harrier			■		X		
	Haliastur sphenurus	Whistling Kite		X *	■				
Acrocephalidae	*Acrocephalus australis*	Australian Reed-Warbler			X *				
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar					X *		
Anatidae	*Anas castanea*	Chestnut Teal			X *				
	Anas gracilis	Grey Teal		X	X				■
	Anas rhynchotis +	Australasian Shoveler			■				■
	Anas superciliosa	Pacific Black Duck		X	X		X	■	
	Aythya australis +	Hardhead			■				■
	Biziura lobata +	Musk Duck			X *			■	

Birds									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Anatidae	*Cereopsis novaehollandiae* +	Cape Barren Goose			■				
	Cygnus atratus	Black Swan		X *	X			X	
	Stictonetta naevosa +	Freckled Duck			■				
	Tadorna tadornoides	Australian Shelduck	X *		X		X	■	
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter			■				■
Apodidae	*Hirundapus caudacutus*	White-throated Needletail			■		X		
Ardeidae	*Ardea modesta*	Eastern Great Egret		■	■			■	
	Ardea pacifica	White-necked Heron		■	■		X		
	Egretta novaehollandiae	White-faced Heron		X	X		X	■	■
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow			■		X		
	Cracticus tibicen	Australian Magpie	X *	X *	X	X *	X	X *	X
	Strepera graculina	Pied Currawong		X *	X	X *	X		
	Strepera versicolor	Grey Currawong			X	X *	X		
Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo		X *	X	X *	X	X *	X
	Cacatua sanguinea	Little Corella				X *		X *	X *
	Cacatua tenuirostris	Long-billed Corella			X	X *	X	X *	■
	Callocephalon fimbriatum	Gang-gang Cockatoo		X *		X *			
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	X *		X *	X *			X *
	Eolophus roseicapillus	Galah		X *		X *	X *	X *	
Campephagidae	*Coracina maxima* ~ +	Ground Cuckoo-shrike			X *				
	Coracina novaehollandiae	Black-faced Cuckoo-shrike				X *			
Casuariidae	*Dromaius novaehollandiae*	Emu						X *	X *
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover			■		X		
	Elseyornis melanops	Black-fronted Dotterel				X *			
	Vanellus miles	Masked Lapwing			X	X *	X	■	
Cisticolidae	*Cisticola exilis*	Golden-headed Cisticola		X *	■				

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Birds									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Climacteridae	*Cormobates leucophaea*	White-throated Treecreeper		X *	X	X *	X	X *	X
Columbidae	*Ocyphaps lophotes*	Crested Pigeon							X *
	Phaps chalcoptera	Common Bronzewing			X *	X *			X *
Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough			X	X *	X		
Corvidae	*Corvus mellori*	Little Raven			X				
	Corvus tasmanicus	Forest Raven			X	X *	X *	X *	X
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo			■	X *	X		■
	Chalcites lucidus	Shining Bronze-Cuckoo			■				■
Estrildidae	*Neochmia temporalis*	Red-browed Finch			X *	X *	X		X
Falconidae	*Falco berigora*	Brown Falcon	X *	X *	■		X	X *	X *
	Falco cenchroides	Nankeen Kestrel	X *		■		X *		
	Falco longipennis	Australian Hobby							X *
	Falco subniger +	Black Falcon						X *	
Fringillidae	*Carduelis carduelis* ^	European Goldfinch			X *			X *	X *
Gruidae	*Grus rubicunda* ~ +	Brolga		X					
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra			X	X *	X	X *	X
	Todiramphus sanctus	Sacred Kingfisher			■		X		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	X *	X *	X	X *	X	X *	X
	Petrochelidon nigricans	Tree Martin		X *	X *	X *			

Golden Whistler (*Pachycephala pectoralis*), W. Longmore © Copyright, Museum Victoria

Birds										
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Laridae	*Chlidonias hybrida*	Whiskered Tern			■				
Maluridae	*Malurus cyaneus*	Superb Fairywren	X *	X *	X	X *	X	X *	X
Megaluridae	*Anthochaera carunculata*	Red Wattlebird		X *	X	X *	X	X *	X *
	Epthianura albifrons	White-fronted Chat			■		X		
	Lichenostomus chrysops	Yellow-faced Honeyeater		X *	■	X *	X	X *	■
	Lichenostomus leucotis	White-eared Honeyeater			X		X	X *	X *
	Megalurus gramineus	Little Grassbird			X *			X *	
	Melithreptus brevirostris	Brown-headed Honeyeater					X *		
	Melithreptus lunatus	White-naped Honeyeater			■	X *	X		X
	Phylidonyris novaehollandiae	New Holland Honeyeater			■	X *	X		
Monarchidae	*Grallina cyanoleuca*	Magpie-lark			X	X		X	
	Myiagra cyanoleuca	Satin Flycatcher	X *						
	Myiagra inquieta	Restless Flycatcher			■	X *		X *	
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit			X *				
Nectarinidae	*Dicaeum hirundinaceum*	Mistletoebird		X *		X *			X *
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		X *	■	X *	X	X *	
	Falcunculus frontatus	Eastern Shrike-tit			■		X		
	Pachycephala pectoralis	Golden Whistler			■	X *	X *		■
	Pachycephala rufiventris	Rufous Whistler		X *	■				■
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote			■	X *	X *	X *	■
	Pardalotus striatus	Striated Pardalote			■		X *	X *	■
Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin			■	X *	X		
	Microeca fascinans	Jacky Winter					X *		
	Petroica multicolor	Pacific Robin			■		X		
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant			X				■
	Phalacrocorax carbo	Great Cormorant			X			X *	
	Phalacrocorax sulcirostris	Little Black Cormorant			X				■
	Phalacrocorax varius +	Pied Cormorant			■				
Phasianidae	*Coturnix ypsilophora*	Brown Quail		X *		X *	X *		X *

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Birds										
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Podargidae	*Podargus strigoides*	Tawny Frogmouth		X *		X *	X *		X *
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe			X *				
	Tachybaptus novaehollandiae	Australasian Grebe			X *				
Psittacidae	*Glossopsitta concinna*	Musk Lorikeet					X *		
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet			X *		X *	X *	
	Neophema chrysostoma	Blue-winged Parrot		X *	X *	X *			X *
	Platycercus elegans	Crimson Rosella		X *	X	X *	X	X *	■
	Platycercus eximius	Eastern Rosella		X *	■		X		
	Psephotus haematonotus	Red-rumped Parrot		X *	X *	X *			
Rallidae	*Fulica atra*	Eurasian Coot			X				■
	Gallinula tenebrosa	Dusky Moorhen					X *	X *	
	Galliralus philippensis	Buff-banded Rail				X *			
	Porphyrio porphyrio	Purple Swamphen			X				
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail		X *	X *	X *	X *	X *	X *
	Rhipidura fuliginosa	New Zealand Fantail			■		X		■
	Rhipidura leucophrys	Willie Wagtail			X *	X *	X		X *
Strigidae	*Ninox novaeseelandiae*	Southern Boobook			■	X *	X		X *
	Ninox strenua +	Powerful Owl				X *	X *		
Sturnidae	*Sturnus vulgaris* ^	Common Starling		X *		X *			X *
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill			■				
	Threskiornis molucca	Australian White Ibis		■	■		X	■	
	Threskiornis spinicollis	Straw-necked Ibis			■				
Timaliidae	*Zosterops lateralis*	Silvereye		X *	X	X *	X *	X *	■
Turdidae	*Turdus merula* ^	Eurasian Blackbird				X *			
	Zoothera lunulata	Bassian Thrush			■		X		
Tytonidae	*Tyto javanica*	Eastern Barn Owl					X *		X *

Frogs and Toads									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Hylidae	*Litoria ewingii*	Brown Tree Frog	X *	X	X *	X *	X *	X *	X *
	Litoria raniformis # ~ +	Southern Bell Frog				X *			
Myobatrachidae	*Crinia signifera*	Common Eastern Froglet	X	■	X *	X *	X *	X *	X *
	Geocrinia laevis	Smooth Frog		■	X *	X *		X *	
	Limnodynastes dumerilii	Eastern Banjo Frog		X	X *	X *	X *	X *	
	Limnodynastes peronii	Brown-striped Frog	X *	X	X	X *	X *	X *	
	Limnodynastes tasmaniensis	Spotted Grass Frog		X		X *		X *	
	Pseudophryne semimarmorata +	Southern Toadlet		■			X *		

Reptiles									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Agamidae	*Amphibolurus muricatus*	Jacky Lizard			■				
Elapidae	*Austrelaps superbus*	Lowland Copperhead						X *	
	Drysdalia coronoides	White Lipped Snake						X *	
	Notechis scutatus	Tiger Snake			■		X *		
	Pseudonaja textilis	Eastern Brown Snake			■				

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

\+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

White's Skink (*Liopholis whitii*) were common during the Bush Blitz, J. Finn © Copyright, Museum Victoria

Reptiles									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Scincidae	*Acritoscincus duperreyi*	Three-lined Skink		X *	X *	X *	X *		X *
	Anepischetosia maccoyi	Highlands Forest-skink		■					
	Eulamprus tympanum	Southern Water-skink		■	■				X *
	Eulamprus tympanum tympanum	Southern Water-skink							X *
	Lampropholis delicata +	Dark-flecked Garden Sunskink			X *	X *	X *	X *	
	Lampropholis guichenoti	Pale-flecked Garden Sunskink		■	■		X *	X *	X *
	Liopholis whitii	White's Skink		X	X		X *	X *	X *
	Pseudemoia entrecasteauxii	Southern Grass Skink		■	X *	X *	X *		
	Pseudemoia rawlinsoni +	Glossy Grass Skink, Swampland Cool-skink				X *	X *		
	Tiliqua scincoides	Eastern Blue-tongue		X					

Fishes									
Family	Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Cyprinidae	*Tinca tinca* ^	Tench	X *						
Eleotridae	*Philypnodon grandiceps*	Flathead Gudgeon						X *	
Galaxiidae	*Galaxias maculatus*	Common Galaxias	X *	X *				X *	
	Galaxias n. sp.	Galaxias	X *	X *					
	Galaxiella pusilla # ~ +	Eastern Dwarf Galaxias	X *	X *	X *			X *	
Percichthyidae	*Gadopsis marmoratus*	River Blackfish		X					
	Nannoperca australis	Southern Pygmy Perch	X *	X *	X *			X *	
	Nannoperca obscura # ~ +	Yarra Pygmy Perch	X *	X *				X *	
Poeciliidae	*Gambusia holbrooki* ^	Eastern Gambusia						X *	
Pseudaphritidae	*Pseudaphritis urvillii*	Congolli		X *					

Common Galaxias (*Galaxias maculatus*) © Copyright, R. Kuiter

Southern Pygmy Perch (*Nannoperca australis*) © Copyright, R. Kuiter

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

An ant belonging to the genus *Myrmecia* which includes Bullants and Jumping Jack Ants, J. Finn © Copyright, Museum Victoria

Invertebrates

Ants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Formicidae	*Adlerzia* sp.	X *	X *					
	Aphaenogaster sp.				X *			
	Camponotus consobrinus				X *	X *		
	Camponotus sp.				X *			
	Crematogaster sp.	X *						
	Heteroponera sp.			X *				
	Hypoponera sp.	X *						
	Iridomyrmex sp.	X *	X *	X *	X *		X *	
	Mayriella sp.			X *				
	Melophorus sp.		X *	X *			X *	
	Monomorium sp.	X *	X *	X *				
	Myrmecia sp.		X *	X *	X *	X *	X *	
	Ochetellus sp.						X *	
	Paratrechina sp.	X *	X *	X *			X *	
	Pheidole sp.	X *	X *	X *		X *	X *	
	Rhytidoponera sp.	X *	X *	X *			X *	
	Solenopsis sp.	X *	X *	X *			X *	
	Stigmacros sp.			X *				

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Anthelidae	*Anthela ferruginosa*				X *			
	Anthela nicothoe		X *		X *			
	Nataxa flavescens					X *		
	***Pterolocera* n. sp. (Condah)**				O			
	unid sp. (*Anthela acuta* complex)		X *		X *			
Arctiidae	*Anestia ombrophanes*		X *		X *			
	Anestia semiochrea				X *			
	Asura lydia				X *			
	Calamidia hirta				X *			
	Castulo doubledayi		X *		X *			
	Chiriphe pelochroa				X *			
	Chiriphe procrena		X *		X *			
	Halone pteridaula				X *			
	Halone sejuncta		X *		X *			
	Nyctemera amicus		X *		X *			
	Palaeosia bicosta				X *			
	Palaeosia n. sp.				X *			
	Phaeophlebosia furcifera				X *			
	Philenora aspectalella				X *			
	Philenora omophanes		X *		X *			
	Spilosoma glatignyi		X *		X *			
	Thallarcha albicollis				X *			
	Thallarcha pellax				X *			
	Thallarcha phalarota				X *			
	Thallarcha staurocola				X *			
	Threnosia myochroa				X *			
	Threnosia sp. 1				X *			
	Tigrioides alterna				X *			
	Utetheisa pulchelloides				X *			
Carposinidae	*Sosineura mimica*				X *			
Choreutidae	*Tebenna micalis*				X *			
Coleophoridae	*Coleophora alcyonipennella*		X *					

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Cosmopterigidae	*Limnaecia scoliosema*				X *			
	Macrobathra chrysotoxa				X *			
Crambidae	*Achyra affinitalis*				X *			
	Culladia cuneiferellus				X *			
	Glaucocharis dilatella				X *			
	Hednota grammellus		X *		X *			
	Hednota pedionoma ^		X *		X *			
	Hednota relatalis				X *			
	Hygraula nitens		X *		X *			
	Musotima ochropteralis				X *			
	Nacoleia rhoeoalis				X *			
	Pyraustinae sp.				X *			
	Sceliodes cordalis				X *			
	Scoparia plagiotis				X *			
	Scoparia sp. A		X *		X *			
	Scoparia spelaea				X *			
	Scoparia syntaractica		X *		X *			
	unid. sp. D				X *			
Geometridae: Ennominae	*Amelora* group sp.				X *			
	Authaemon stenonipha				X *			
	Chlenias sp.		X *		X *			
	Ciampa arietaria		X *					
	Didymoctenia exsuperata				X *			
	Dissomorphia australiaria		X *		X *			
	Ectropis excursaria ^				X *			
	Ectropis fractaria				X *			
	Fisera eribola				X *			
	Mnesampela heliochrysa				X *			
	Mnesampela privata				X *			
	Palleopa innotata				X *			
	Phelotis cognata				X *			
	Plesanemma fucata				X *			
	Scioglyptis canescaria				X *			
	Scioglyptis loxographa				X *			

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Geometridae: Ennominae	*Scioglyptis lyciaria*				X *			
	Stibaroma melanotoxa				X *			
	Thalaina clara				X *			
	Thalaina selenaea				X *			
	unid. gen. (*Azelina*?) *biplaga*				X *			
	unid. gen. (*Gymnopteryx*?) *ada*				X *			
	Zermizinga sinuata				X *			
Geometridae: Geometrinae	*Chlorocoma cadmaria*				X *			
	Chlorocoma carenaria				X *			
	Chlorocoma dichloraria				X *			
	Chlorocoma sp. (Condah)		X *		X *			
	Chlorocoma stereota		X *		X *			
	Crypsiphona ocultaria				X *			
	Dichromodes sp. (Condah)				X *			
	Heliomystis electrica				X *			
	Hypobapta tachyhalotaria				X *			
	Unplaced (*Cerura*?)				X *			
Geometridae: Larentiinae	*Chloroclystis approximata*				X *			
	Chloroclystis catastreptes				X *			
	Chrysolarentia conifasciata					X *		
	Chrysolarentia imperviata				X *			
	Chrysolarentia vicissata				X *			
	Epicyme rubropunctaria				X *			
	Epyaxa subidaria				X *			
	Microdes diplodonta				X *			
	Microdes squamulata		X *		X *			
	Phrissogonus laticostata ^				X *			
	Xanthorhoe anaspila				X *			
Geometridae: Oenochrominae	*Monoctenia falernaria*				X *			

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Moths on the light sheet, left to right: *Scioglyptis canescaria*, *Spilosoma glatignyi*, *Phelotis cognata*, B. Bowler © Copyright, Department of the Environment

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Geometridae: Sterrhinae	*Idaea halmaea*		X *		X *			
	Idaea nephelota				X *			
	Idaea philocosma				X *			
	Scopula optivata		X *		X *			
	Scopula rubraria		X *		X *			
Hepialidae	*Abantiades latipennis*		X *		X *			
	Elhamma australasiae				X *			
	Trictena atripalpis				X *			
Hesperiidae	*Taractrocera papyria*				X *			
Lasiocampidae	*Entometa apicalis*				X *			
	Genduara subnotata				X *			
	Pararguda nasuta		X *		X *			
Limacodidae	*Doratifera oxleyi* ^		X *		X *			
	unid. sp. (*Pseudanapaea transvestita* group)				X *			

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Lycaenidae	*Zizina otis labradus*		X *		X *	X *		
Lymantriidae	*Acyphas chionitis*		X *		X *			
	Acyphas semiochrea		X *					
Noctuidae	*Acontia clerana*				X *			
	Adisura marginalis				X *			
	Agrotis infusa ^		X *					
	Agrotis munda ^		X *					
	Agrotis porphyricollis ^		X *		X *			
	Agrotis radians ^		X *		X *			
	Alapadna pauropis				X *			
	Athetis tenuis		X *		X *			
	Bathytricha leonina				X *			
	Chrysodeixis eriosoma ^				X *			
	Comocrus behri				X *			
	Cosmodes elegans		X *		X *			
	Dasygaster padockina				X *			
	Dasypodia selenophora				X *			
	Helicoverpa punctigera ^		X *					
	Mythimna convecta ^				X *			
	Persectania ewingii ^				X *			
	Proteuxoa amaurodes				X *			
	Proteuxoa bistrigula				X *			
	Proteuxoa interferens				X *			
	Proteuxoa marginalis				X *			
	Proteuxoa microspila		X *					
	Proteuxoa oxygona				X *			
	Proteuxoa sanguinipuncta				X *			
	Proteuxoa sp. 1				X *			
	Proteuxoa sp. 2				X *			
	Proteuxoa spodias		X *		X *			
	Proteuxoa tortisigna				X *			
	Sandava scitisignata		X *		X *			
	unid. sp. (*Diarsia* sp.) ^				X *			

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Nolidae	*Armactica conchidia*				X *			
	Nola melanogramma				X *			
	Nola monozona				X *			
	Nola pleurosema				X *			
	Nola pothina		X *		X *			
	Nola semograpta				X *			
	Uraba lugens ^				X *			
Notodontidae	*Trichiocercus sparshalli*		X *					
Nymphalidae	*Geitoneura acantha ocrea*					X *		
	Heteronympha merope		X *		X *	X *		
	Heteronympha penelope alope				X *	X *		
	Vanessa itea					X *		
	Vanessa kershawi				X *			

More than 100 moth species were recorded in just two nights, B. Bauer © Copyright, Department of the Environment

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Oecophoridae	*Agriophara* sp. 1				X *			
	Agriophara sp. 2				X *			
	Cosmaresta anarrecta				X *			
	Cosmaresta archedora				X *			
	Epicurica laetiferanus				X *			
	Epithymema incomposita		X *		X *			
	Eulechria sigmophora				X *			
	Garrha amata				X *			
	Heteroteucha anthodora				X *			
	Heteroteucha kershawi				X *			
	Scatochresis episema		X *					
	Scatochresis sp. (Condah)				X *			
	Stathmopoda melanochra				X *			
	Stictochila sarcoptera				X *			
	unid. sp. (*Barea* sp.?)				X *			
	unid. sp. 1 (subfamily Oecophorinae)				X *			
	unid. sp. 2 (subfamily Oecophorinae)				X *			
Oenosandridae	*Discophlebia lucasii*				X *			
	Oenosandra boisduvalii				X *			
Pieridae	*Pieris rapae* ^					X *		
Plutellidae	unid. sp.				X *			
Psychidae	*Cebysa leucotelus*					X *		
	Lepidoscia characota		X *		X *			
	unid. sp.				X *			
Pterophoridae	*Platyptilia omissalis*				X *			
	Stenoptilia zophodactylus				X *	X *		
Pyralidae	*Etiella behrii* ^				X *			
	Mimaglossa habitalis				X *			
	Orthaga thyrisalis				X *			
	Salma marmorea				X *			
	unid. sp.				X *			
	unid. sp. (subfamily Phycitinae)				X *			
	unid. sp. 1				X *			
	unid. sp. 2		X *					

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Butterflies and Moths								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Sphingidae	*Agrius convolvuli* ^		X *		X *			
	Hippotion scrofa				X *			
Tineidae	*Moerarchis inconcisella*				X *			
	Monopis icterogastra				X *			
Tortricidae	*Acropolitis rudisana*				X *			
	Epiphyas sp. (*postvittana* group) ^		X *		X *			
	Epitymbia alaudana				X *			
	Epitymbia scotinopa				X *			
	Glyphidoptera insignana		X *					
	Heliocosma argyroleuca		X *					
	Holocola triangulana				X *			
	Meritastis sp.				X *			
	Thrincophora signigerana				X *			
	Tortricid sp.				X *			
	unid. gen. (*Conchylis*?) *subfurcatana*				X *			
	unid. gen. (*Grapholita*?) *decolorana*				X *			
Xyloryctidae	*Leistarcha* sp.				X *			
	Lichenaula melanoleuca				X *			
	Lichenaula onychotypa				X *			
	Maroga melanostigma				X *			
	Tymbophora peltastis				X *			

Collecting true bugs at the light trap, K. Gillespie © Copyright, Department of the Environment

Caddisflies								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Atriplectididae	*Atriplectides dubius*		X *					
Calamoceratidae	*Anisocentropus* sp.		X *					
Conoesucidae	*Costora delora*		X *				X *	
	Lingora sp. AV1		X *			X *	X *	
Ecnomidae	*Ecnomus tillyardi*		X *			X *		
Hydrobiosidae	*Ethochorema hesperium*		X *			X *		
Hydropsychidae	*Asmicridea* sp. AV1		X *			X *		
Leptoceridae	*Notalina spira*		X *	X *		X *	X *	
	Oecetis sp.					X *		
	Triplectides australis			X *				
	Triplectides ciuskus		X *					
	Triplectides truncatus		X *					

Flies								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Anthomyiidae	unid. sp.	X *						
Asilidae	unid. sp.				X *			
Bibionidae	unid. sp.	X *	X *	X *	X *			
Calliphoridae	unid. sp.		X *		X *		X *	
Cecidomyiidae	unid. sp.		X *	X *	X *	X *	X *	
Chironomidae	*Chironomus* sp.			X *		X *		
	Coelopynia sp.		X *				X *	
	Cricotopus sp.					X *	X *	
	Cryptochironomus sp.						X *	
	Kiefferulus sp.			X *				

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Flies								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Chironomidae	*Paratanytarsus* sp.			X *				
	Polypedilum sp.					X *	X *	
	Procladius sp.			X *		X *	X *	
	Rheotanytarsus sp.		X *			X *		
	Tanytarsus sp.		X *				X *	
	Thienemanniella sp.					X *	X *	
	unid. sp.		X *	X *	X *		X *	
	Xenochironomus sp.		X *					
Culicidae	unid. sp.		X *		X *		X *	
Dolichopodidae	unid. sp.		X *		X *	X *	X *	
Empididae	unid. sp.	X *	X *		X *		X *	
Ephydridae	unid. sp.	X *	X *	X *	X *	X *	X *	
Heteromyzidae	unid. sp.	X *	X *	X *	X *	X *	X *	
Hybotidae	unid. sp.	X *			X *			
Keroplatidae	unid. sp.			X *	X *			
Lauxaniidae	unid. sp.		X *	X *	X *		X *	
Muscidae	unid. sp.		X *	X *	X *		X *	
Mycetophilidae	unid. sp.			X *	X *			
Phoridae	unid. sp.	X *	X *	X *	X *	X *	X *	
Psychodidae	unid. sp.		X *	X *	X *		X *	
Sarcophagidae	unid. sp.	X *	X *	X *	X *		X *	
Scatopsidae	unid. sp.				X *			
Sciaridae	unid. sp.			X *	X *			
Simuliidae	*Simulium ornatipes*		X *			X *	X *	
Sphaeroceridae	unid. sp.		X *					
Stratiomyidae	unid. sp.			X *	X *			
Syrphidae	unid. sp.			X *	X *		X *	
Tachinidae	unid. sp.		X *	X *	X *		X *	
Tipulidae	unid. sp.		X *	X *	X *	X *	X *	

Beetles and Weevils — Terrestrial								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Anthicidae	unid. sp.			X *				
Bostrichidae	unid. sp.					X *		
Buprestidae	unid. sp.				X *			
Cantharidae	unid. sp.		X *			X *		
Carabidae	unid. sp.	X *	X *	X *		X *	X *	
Cerambycidae	unid. sp.			X *				
Chrysomelidae	unid. sp.			X *	X *	X *		
unid. family (Cleridae?)	unid. sp.					X *		
Coccinellidae	*Orcus australasiae*	X *	X *	X *			X *	
	unid. sp.	X *	X *	X *			X *	
Curculionidae	unid. sp.		X *	X *	X *	X *	X *	X *
Elmidae	*Simsonia* sp.					X *		
Latridiidae	unid. sp.	X *	X *	X *			X *	
Melandryidae	unid. sp.			X *				
Melyridae	unid. sp.						X *	
Phalacridae	unid. sp.						X *	
Psephenidae	*Sclerocyphon striatus*					X *		
Ptiliidae	unid. sp.	X *		X *		X *		
Scarabaeidae	unid. sp.	X *	X *		X *	X *	X *	
Scirtidae	unid. sp.			X *				
Scydmaenidae	unid. sp.		X *		X *			
Silphidae	unid. sp.		X *		X *		X *	
Staphylinidae	unid. sp.	X *	X *	X *	X *	X *	X *	
Tenebrionidae	unid. sp.	X *		X *		X *	X *	X *
Throscidae	unid. sp.			X *				

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Beetles and Weevils — Aquatic								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Dytiscidae	*Chostonectes* sp.			X *		X *		
	Onychohydrus scutellaris			X *		X *		
	unid. sp.				X *	X *	X *	X *
	unid. sp. (larval stage)		X *					
Hydrophilidae	*Anacaena* sp.				X *			
	Limnoxenus sp.				X *			
	unid. sp.		X *			X *		

The Horehound Bug (*Agonoscelis rutila*) was very common at Lake Condah, J. Finn © Copyright, Museum Victoria

True Bugs — Terrestrial								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Acanthosomatidae	*Amphaces* sp. 1				X *			
	Amphaces sp. 2				X *			
	Anischys sp.		X *					
	Anischys sp.						X *	
Alydidae	*Leptocorisa* sp.		X *		X *			
	Melanacanthus sp.		X *					
	Mutusca sp. (*brevicornis*?)						X *	
Anthocoridae	unid. sp. 1		X *		X *		X *	
	unid. sp. 2				X *			
Cydnidae	unid. sp.		X *					
Lygaeidae	*Nysius vinitor* ^	X *	X *	X *		X *	X *	X *
Miridae	*Coridromius chenopoderis*		X *	X *	X *			X *
	Creontiades dilutus ^		X *	X *	X *		X *	
	***Deraeocoris* n. sp. 1**						O	
	***Deraeocoris* n. sp. 2**		O					
	Sidnia kinbergi	X *						X *
	unid sp. (*Democoris*?)	X *	X *	X *		X *	X *	X *
	unid. n. sp. (tribe Austromirini)	O						
	unid. n. sp. (tribe Mirini)						O	
	unid. n. sp. (tribe Phylini)	O	O		O		O	
	unid. n. sp. (tribe Zanchiini)				O			
	unid. n. sp. 1 (tribe Orthotylini)	O	O				O	
	unid. n. sp. 2 (tribe Orthotylini)	O	O		O		O	
	unid. n. sp. 3 (tribe Orthotylini)					O		
Nabidae	*Nabis kinbergii*	X *	X *				X *	X *
Naucoridae	*Naucoris* sp.			X *				
Pachygronthidae	*Stenophyella macreta*		X *					X *
Pentatomidae	*Agonoscelis rutila*		X *					
	unid. sp. 1 (subfamily Asopinae)	X *	X *			X *	X *	
	unid. sp. 1 (subfamily Pentatominae)	X *		X *				
	unid. sp. 2 (subfamily Pentatominae)	X *						
	unid. sp. 3 (subfamily Pentatominae)		X *					
	unid. sp. 4 (subfamily Pentatominae)				X *			

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

True Bugs — Terrestrial								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Pentatomidae	unid. sp. 5 (tribe Diemeniini)				X *			
	unid. sp. 6 (subfamily Pentatominae)					X *	X *	
	unid. sp. 7 (subfamily Pentatominae)					X *		
Piesmatidae	*Mcateella elongata*	X *					X *	
	Mcateella interioris		X *		X *		X *	
Pyrrhocoridae	*Dindymus versicolor* ^	X *			X *			
Reduviidae	*Pseudobargylia* sp.				X *			
	unid. sp. (subfamily Harpactorinae)		X *					
Rhyparochromidae	*Brentiscerus australis*	X *	X *					
	Plinthisus sp. (*bassianus*?)		X *		X *			X *
	Remaudiereana inornata	X *	X *	X *	X *		X *	X *
	Udeocoris sp.		X *					
	unid. sp. (tribe Lethaeini)		X *					
Thaumastocoridae	*Baclozygum bergrothi*		X *				X *	
Tingidae	*Engynoma* sp.	X *						
	unid sp. (*Tingis*?)				X *			
Veliidae	*Drepanovelia* sp.		X *					

Putative new species of true bug belonging to the Miridae family.
M. Cheng © Copyright, University of New South Wales

True Bugs — Aquatic								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Corixidae	*Agraptocorixa* sp.		X *	X *				
	Micronecta annae		X *	X *				
Mesoveliidae	*Mesovelia hungerfordi*		X *	X *				
Notonectidae	*Anisops deanei*		X *	X *		X *	X *	
	Enithares loria		X *	X *				
Veliidae	*Microvelia peramoena*				X *			
	Microvelia sp.		X *		X *			

Mountain Katydids (*Acripeza reticulata*) repel predators by showing their bright colours and squirting noxious liquid, J. Finn © Copyright, Museum Victoria

Mountain Katydid (*Acripeza reticulata*), J. Finn © Copyright, Museum Victoria

Giant Green Slant-face (*Acrida conica*), J. Finn © Copyright, Museum Victoria

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Crickets, Grasshoppers and Katydids								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Acrididae	*Acrida conica*	X *		X *	X *	X *		
	Gastrimargus musicus	X *		X *			X *	
	Goniaea sp.					X *		
	unid. sp.	X *	X *	X *	X *	X *	X *	
Gryllacrididae	unid. sp.				X *			
Gryllidae	*Bobilla* sp.	X *	X *	X *	X *	X *	X *	
	Teleogryllus sp.				X *		X *	
	unid. sp.			X *				
Rhaphidophoridae	unid. sp.		X *					
Tetrigidae	unid. sp.	X *		X *		X *		
Tettigoniidae	*Acripeza reticulata*					X *		
	unid. sp.			X *		X *		

Yellow-winged Locust (*Gastrimargus musicus*), J. Finn © Copyright, Museum Victoria

Stoneflies								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Gripopterygidae	*Riekoperla williamsi*		X *				X *	

Dragonfly, B. Bowler © Copyright, Department of the Environment

Damselflies and Dragonflies								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Aeshnidae	*Aeshna brevistyla*							X *
	Hemianax papuensis			X *		X *		
Coenagrionidae	*Ischnura aurora*			X *		X *		
	Ischnura heterosticta			X *		X *	X *	
	Xanthagrion erythroneurum			X *				
Hemicorduliidae	*Hemicordulia tau*					X *		
	Procordulia jacksoniensis			X *				
Lestidae	*Austrolestes analis*	X *				X *	X *	
	Austrolestes annulosus					X *		
	Austrolestes leda					X *		
Libellulidae	*Diplacodes bipunctata*					X *	X *	
	Orthetrum caledonicum			X *				
Telephlebiidae	*Austroaeschna unicornis*					X *		

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Mayflies								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Baetidae	*Cloeon paradieniense*			X *		X *		
	Offadens sp. 5					X *	X *	
Caenidae	*Tasmanocoenis tonnoiri*		X *					
	unid. sp. (genus C species D)		X *					
Leptophlebiidae	*Atalophlebia albiterminata*		X *			X *		
	Nousia sp.		X *			X *	X *	
	Ulmerophlebia sp. AV1		X *					

Spiders								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
[suborder Prostigmata]	unid. sp.		X *			X *	X *	
Araneidae	*Araneus bradleyi*		X *			X *	X *	
	Araneus eburnus					X *		
	Araneus sydneyicus	X *						
	Austracantha minax					X *	X *	
	Cyclosa fuliginata				X *			
	unid. sp.					X *		
Clubionidae	*Cheiracanthium* sp.					X *		
	unid. sp.				X *	X *		
Corinnidae	*Supunna* sp.	X *						
Desidae	*Badumna insignis*					X *		
Gnaphosidae	*Anzacia* sp.						X *	
	unid. sp.						X *	
Linyphiidae	*Erigone* sp.			X *			X *	
	unid. sp.	X *		X *		X *		
Lycosidae	*Hogna* sp.				X *			
	Tasmanicosa godeffroyi		X *		X *	X *	X *	
	Tasmanicosa sp.					X *		
	unid. sp.		X *	X *				
	Venatrix funesta		X *					

Spiders								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Miturgidae	*Mituliodon tarantulinus*			X *			X *	
	unid. sp.				X *			
Nemesiidae	*Dolomedes* sp.					X *		
	unid. sp. (*Aname tepperi*?)						X *	
Salticidae	*Opisthoncus* sp.					X *		
	Simaethula sp.					X *		
	unid. sp.	X *				X *	X *	
Sparassidae	*Delena cancerides*				X *			
	Neosparassus sp.			X *				X *
	unid. sp.					X *		
Tetragnathidae	*Phonognatha graeffei*					X *		
	Tetragnatha sp.			X *				X *
Thomisidae	unid. sp.					X *		
Zodariidae	*Storosa* sp.	X *				X *		
	unid. sp.		X *			X *	X *	

A jewel spider (*Austracantha minax*), J. Finn © Copyright, Museum Victoria

A female water spider (*Dolomedes* sp.) with an egg sac, J. Finn © Copyright, Museum Victoria

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

An undescribed species of crustacean from the genus *Heterias*, J. Finn © Copyright, Museum Victoria

A freshwater crab, J. Finn © Copyright, Museum Victoria

Crustaceans								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
[class Ostracoda]	unid. sp.					X *	X *	
[suborder Cladocera]	unid. sp.			X *				
Atyidae	*Paratya australiensis*		X *				X *	
Chiltoniidae	*Austrochiltonia* sp.		X *			X *	X *	
	Austrochiltonia subtenuis			X *		X *		
unid. family (Corophiidae?)	unid. sp.		X *				X *	
Hymenosomatidae	*Amarinus lacustris*		X *			X *	X *	
	unid. sp.		X *					
Janiridae	***Heterias* n. sp.**	O				O		
Koonungidae	***Koonunga* n. sp. 1**	O					O	
	***Koonunga* n. sp. 2**					O		
	***Koonunga* n. sp. 3**					O		
	***Koonunga* n. sp. 4**					O		
Paracalliopiidae	***Paracalliope* n. sp.**		O				O	
	Paracalliope vicinus		X *			X *	X *	
Paramelitidae	***Austrogammarus* n. sp.**	O	O			O	O	
	Austrogammarus sp.	X *	X *			X *	X *	
Parastacidae	*Engaeus sericatus* +		X *					
	Euastacus bispinosus # ~ +		X *					
Perthiidae	***Perthia* n. sp.**		O					

Molluscs — Terrestrial								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Agriolimacidae	*Deroceras* sp. (*panormitanum*?) ^	X *		X *	X *	X *		X *
Arionidae	*Arion intermedius* ^	X *						X *
Charopidae	*Elsothera murrayana*		X *	X *	X *	X *	X *	X *
	Pernagera tamarensis			X *	X *	X *		
Helicidae	*Cantareus aspersa* ^		X *	X *	X *	X *		
	Theba pisana ^		X *					
Hygromiidae	*Cochlicella barbarta* ^				X *	X *		X *
Limacidae	*Lehmannia* sp. (*nyctelia*?) ^	X *	X *					
Lymnaeidae	*Austropeplea tomentosa*		X *	X *	X *			
Milacidae	*Milax gagates* ^				X *	X *		
Punctidae	*Magilaoma penolensis*				X *	X *		
	Miselaoma sp. (*weldii*?)			X *				
	Paralaoma caputspinulae	X *			X *	X *	X *	
Rhytididae	*Strangesta gawleri*			X *	X *	X *		
Succineidae	*Succinea australis*	X *						

There was an unusually high abundance of the Australian native Gawler Carnivorous Snail (*Strangesta gawleri*), probably due to the abundant introduced species that are its prey, A. Moussalli © Copyright, Museum Victoria

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Molluscs — Aquatic								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Ancylidae	*Ferrissia* sp.		X *			X *	X *	
Corbiculidae	*Corbicula australis*			X *	X *	X *	X *	
Hydrobiidae	*Austropyrgus angasi*			X *	X *			
	Austropyrgus eumekes		X *				X *	
	Austropyrgus vulgaris		X *				X *	
	Potamopyrgus antipodarum ^				X *	X *		
Hyriidae	*Velesunio ambiguus*		X *					
Physidae	*Physa* sp. aff. *acuta* ^			X *	X *	X *		
Planorbidae	*Glyptophysa gibbosa*		X *	X *	X *	X *		
	Gyraulus meridionalis			X *	X *	X *		
	Isidorella hainesii			X *				
	Isidorella sp. (*newcombi*?)	X *						
Sphaeriidae	*Sphaerium tasmanicum*				X *			
	unid. sp.					X *	X *	

A freshwater snail (*Physa* sp. aff. *acuta*), recorded in Muldoons Sinkhole, J. Finn © Copyright, Museum Victoria

Worms — Aquatic								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Naididae	unid. sp.					X *		

Leeches								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Glossiphoniidae	*Helobdella papillornata*					X *	X *	

Freshwater Leech (*Helobdella papillornata*),
J Finn © Copyright, Museum Victoria

Freshwater Sponges								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Spongillidae	*Ephydatia fluviatilis*		X *			X *		

Julian Finn collects vegetation and invertebrates in Darlot Creek,
M. Norman © Copyright, Museum Victoria

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Microinvertebrates — Aquatic								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
[class Arachnida]	unid. sp. (mite)	X *	X *				X *	
[class Ostracoda]	unid. sp.	X *				X *	X *	
[order Calanoida]	unid. sp.			X *			X *	
	unid. sp. (nauplius life stage)	X *		X *			X *	
[order Cyclopoida]	unid. sp.	X *	X *	X *		X *	X *	
	unid. sp. (nauplius life stage)			X *		X *	X *	
[order Harpacticoida]	unid. sp.						X *	
[Phylum Ciliophora]	unid. ciliate sp. 1	X *				X *	X *	
	unid. ciliate sp. 2	X *					X *	
[Phylum Nematoda]	Nematoda sp.		X *			X *		
[suborder Cladocera]	unid. sp.			X *				
Arcellidae	*Arcella* sp. 1		X *				X *	
Brachionidae	*Brachionus quadridentatus*			X *				
	Keratella quadrata			X *				
Centropyxidae	*Centropyxis* sp. 1					X *		
Chironomidae	unid. sp. (larval stage)	X *	X *			X *	X *	
Chydoridae	unid. sp.	X *					X *	
Difflugiidae	*Difflugia* sp. 1						X *	
Euchlanidae	*Euchlanis* sp. 1	X *	X *					
	Euchlanis sp. 2	X *						
Euglyphidae	*Euglypha* sp. 1						X *	
Floscullariidae	unid. sp. 1 (*Floscularia* sp.?)		X *					
Habrotrochidae	unid. sp. 1 (*Habrotrocha* sp.?)		X *					
Lecanidae	*Lecane* sp. 1		X *	X *		X *	X *	
Lepadellidae	*Lepadella* sp. 1		X *			X *	X *	
Spongillidae	unid. sp. (*Eunapius fragilis*?)		X *	X *		X *	X *	
Synchaetidae	*Polyarthra* sp. 1	X *	X *	X *				
Testudinellidae	*Testudinella* sp. 1	X *				X *		
Trichocercidae	*Trichocerca* sp. 1					X *		
Trichotriidae	*Macrochaetus* sp. 1	X *						

Flora

Flowering Plants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Aizoaceae	*Tetragonia implexicoma*						■	
Amaranthaceae	*Alternanthera denticulata*	■	■	■			■	
Apiaceae	*Berula erecta* ^ +						X *	
	Conium maculatum ^				X			
Araceae	*Landoltia punctata*		■	X *				
	Lemna disperma	X *	■					
	Lemna trisulca +		■			X *		
Asteraceae	*Brachyscome graminea*	X *					■	
	Cassinia longifolia	■		■		■	■	■
	Centipeda cunninghamii	X *						
	Cirsium arvense ^	X	X	X	X	X	X	X
	Euchiton involucratus	■	■	■			■	
	Euchiton sphaericus						■	
	Helichrysum luteoalbum						■	
	Lagenophora stipitata			■		■		
	Leptinella reptans		■	■				
	Olearia glandulosa	X *						
	Ozothamnus ferrugineus						■	
	Picris angustifolia subsp. *angustifolia*					X *		
	Picris squarrosa +			■		■		
	Senecio glomeratus		■				■	
	Senecio minimus		■				■	
	Senecio pinnatifolius	■	■	■		■	■	■
	Senecio pinnatifolius var. *lanceolatus*						■	
	Senecio psilocarpus # +						X	

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Flowering *Montia australasica*, N. Walsh © Copyright, National Herbarium of Victoria

Flowering Plants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Asteraceae	*Senecio quadridentatus*	■		■				
	Sigesbeckia orientalis subsp. *orientalis*			X *				
	Sonchus hydrophilus		■				■	
	Taraxacum sp. 1						■	
Boraginaceae	*Cynoglossum suaveolens*						X *	
	Myosotis laxa subsp. *caespitosa* ^						X *	
Brassicaceae	*Cardamine papillata* +					X *		
Campanulaceae	*Lobelia irrigua*	X *						
	Lobelia pedunculata						X *	
	Lobelia pratioides						X *	
Caprifoliaceae	*Dipsacus fullonum* ^	X	X	X	X	X	X	X
Caryophyllaceae	*Stellaria angustifolia*	■	■	■			■	
	Stellaria flaccida						■	
	Stellaria pungens						■	
Centrolepidaceae	*Centrolepis strigosa*						■	

Flowering Plants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Chenopodiaceae	*Chenopodium album* ^		X *					
	Chenopodium glaucum		■					
	Dysphania pumilio		X *					
Convolvulaceae	*Cuscuta australis* +						X *	
	Dichondra repens	■	■	■		■	■	
Cyperaceae	*Baumea arthrophylla*		■				■	
	Baumea articulata						X	
	Baumea rubiginosa	X *						
	Bolboschoenus medianus	X *		■			■	
	Carex appressa	■	■	■			X	
	Carex gaudichaudiana						■	
	Carex gunniana	X *						
	Carex incomitata			■		X		
	Carex inversa			■		■	■	
	Carex tasmanica # ~ +	X *						
	Carex tereticaulis		■	■			X	■
	Cladium procerum +	X *						
	Cyperus gunnii	■	X	■			■	
	Eleocharis acuta	■	■	■			■	
	Eleocharis gracilis			■			■	
	Eleocharis pusilla						■	
	Eleocharis sphacelata		■	■			■	
	Gahnia clarkei	X *						
	Isolepis cernua			■			■	
	Isolepis fluitans	■	■	■			■	
	Isolepis inundata		■	■				
	Isolepis producta			■				
	Schoenoplectus tabernaemontani						■	
	Schoenus apogon			■				
	Schoenus maschalinus			■				
	Schoenus nitens	X *						
Ericaceae	*Leucopogon parviflorus*	X *				X *		

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Flowering Plants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Fabaceae	*Acacia mearnsii*	■	■	■		■	■	
	Acacia melanoxylon	■	■	■		■	■	■
	Acacia stricta				X *			
	Desmodium gunnii			■		■		
	Glycine clandestina			■		■		
	Glycine microphylla						X *	
	Kennedia prostrata						■	
	Trifolium glomeratum ^			■			■	■
Geraniaceae	*Geranium gardneri*						X *	
	Geranium sp. pale pink flowers (M.Gray 5847)					X *		
	Pelargonium australe			X *				
Hemerocallidaceae	*Dianella callicarpa* +		■					
	Dianella tasmanica	■		■				
Hypericaceae	*Hypericum humifusum* ^					X *		
Hypoxidaceae	*Hypoxis glabella*			■		■		

Michelle Casanova and Val Stajsic collecting at Kurtonitj IPA, J. Milne © Copyright, National Herbarium of Victoria

Lobelia pratioides **was present occasionally in dense semi-aquatic vegetation fringing wetlands, N. Walsh**

Flowering Plants									
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Juncaceae	*Juncus amabilis*						■	
	Juncus articulatus ^	X *	■	■			■	
	Juncus bufonius		■	■			■	
	Juncus caespiticius	X *						
	Juncus pallidus	■	■	■			■	
	Juncus pauciflorus	X *	■					
	Juncus procerus	■	■	■			■	
Juncaginaceae	*Triglochin alcockiae*	■	■	■			■	
	Triglochin procera						X *	
	Triglochin sp.				X *			
	Triglochin striata	X *		■				
Lamiaceae	*Lycopus australis*						X *	
	Mentha australis	X *						
Lythraceae	*Lythrum hyssopifolia*		■	■			■	
	Lythrum junceum ^		■				■	
Malvaceae	*Gynatrix pulchella*						X *	
Menyanthaceae	*Ornduffia umbricola*						■	
	Villarsia reniformis						■	
Myrtaceae	*Eucalyptus ovata*		■				■	
	Eucalyptus viminalis	■	■	■		■	■	■
	Eucalyptus viminalis subsp. *cygnetensis*		X *					
	Leptospermum laevigatum			■				
	Leptospermum lanigerum	X *	■				■	
	Melaleuca squarrosa	X *						

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Flowering Plants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Onagraceae	*Epilobium billardiereanum* subsp. *cinereum*	■		■		■	■	■
	Epilobium billardiereanum subsp. *billardiereanum*	X *						
	Epilobium hirtigerum	■		■			■	
	Epilobium pallidiflorum		■				■	
Orchidaceae	*Prasophyllum diversiflorum* # +			■				
	Pterostylis curta			■		■	■	
	Pterostylis pedunculata			■		■		
Oxalidaceae	*Oxalis exilis*						X *	
Phrymaceae	*Limosella australis*			X *				
	Mazus pumilio			■			X *	
Plantaginaceae	*Gratiola peruviana*						■	
	Veronica calycina			■		■		
	Veronica catenata ^	X *		X *	X *			
Poaceae	*Amphibromus neesii*						X	
	Amphibromus sinuatus +	■	X	■			■	
	Anthoxanthum odoratum ^	■	■	■		■	■	■
	Deyeuxia quadriseta						■	
	Dichelachne crinita			■		■	■	■
	Elymus scaber	■	■	■		■	■	
	Festuca arundinacea ^						X *	
	Glyceria australis	■	■	■			■	
	Hemarthria uncinata		■				■	
	Lachnagrostis filiformis	X	X	■			■	
	Microlaena stipoides var. *stipoides*	■	■	■		■	■	
	Paspalum distichum ^						X	
	Phragmites australis	■	■	■			■	
	Poa ensiformis	■	■	■		■		■
	Poa labillardierei var. *labillardierei*		■			X	■	
	Poa tenera	X *						
	Polypogon lutosus ^			X	X			
	Rytidosperma caespitosum		■					
	Rytidosperma geniculatum	■	■	■			■	
	Rytidosperma racemosum	■	■	■		■	■	■
Polygonaceae	*Rumex bidens*			X *				

Flowering Plants								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Portulacaceae	*Montia australasica*	■	■	■		X *	■	
Potamogetonaceae	*Potamogeton australiensis* +						■	
	Potamogeton sp. (*australiensis*)					X *		
	Potamogeton crispus					X *		
	Potamogeton pectinatus	X *						
	Potamogeton tricarinatus			■				
Rosaceae	*Potentilla anserina* ^			■			X *	
	Rosa rubiginosa ^	X	X	X	X	X	X	X
	Rubus leucostachys ^				X *			
Rubiaceae	*Asperula subsimplex*						X *	
Ruppiaceae	*Ruppia maritima* +					X *		
Salicaceae	*Salix alba* ^				X			
Solanaceae	*Solanum laciniatum*		■	■			■	
Sparganiaceae	*Sparganium erectum* subsp. *stoloniferum* ^				X *	X *		
Typhaceae	*Typha orientalis*						■	
Violaceae	*Melicytus angustifolius*		X *				X *	
	Melicytus dentatus	X *					X *	

Ferns								
Family	Species	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Aspleniaceae	*Asplenium aethiopicum* +					X *		
	Asplenium flabellifolium					X *		
	Pleurosorus rutifolius					X *		
Pteridaceae	*Pellaea falcata*	X *				X *		

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Liverworts								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Frullaniaceae	*Frullania falciloba*			X *				
	Frullania prosbosciphora			X *				
	Frullania sp.			X *		X *		
Ricciaceae	*Riccia* sp.			X *				
	Ricciocarpos natans		X *	X *				

The lichen *Pseudocyphellaria neglecta* and mosses *Triquetrella papillata* and *Hedwigia ciliata*, on the south east shore of Lake Condah, J. Milne © Copyright, National Herbarium of Victoria

Mosses								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Amblystegiaceae	*Leptodictyum riparium*					X *		
Bartramiaceae	*Breutelia affinis*			X *				
Brachytheciaceae	*Eurhynchium praelongum* ^			X *	X *			
Bryaceae	*Rosulabryum campylothecium*			X *				
Fabroniaceae	*Ischyrodon lepturus*					X *		
Fissidentaceae	*Fissidens berteri*			X *				
Grimmiaceae	*Schistidium rivulare* subsp. *rivulare*						X *	
Hedwigiaceae	*Hedwigia ciliata*			X *				
Hypopterygiaceae	*Hypopterygium didictyon*					X *		
Lembophyllaceae	*Lembophyllum divulsum*						X *	
	Lembophyllum sp.			X *		X *		
Leucobryaceae	*Campylopus introflexus*			X *				
Polytrichaceae	*Polytrichum* sp.			X *				

Mosses								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Pottiaceae	*Barbula calycina*			X *		X *		
	Barbula sp.			X *		X *		
	Syntrichia antarctica			X *				
	Syntrichia papillosa	X *						
	Trichostomum sp.			X *				
	Triquetrella papillata			X *				
Ptychomitriaceae	*Ptychomitrium australe*			X *				
Rhabdoweisiaceae	*Amphidium tortuosum*					X *		
Sematophyllaceae	*Sematophyllum homomallum*					X *		
Thuidiaceae	*Thuidiopsis sparsa*					X *		

***Breutelia affinis*, a moss found at Lake Condah, M. Fagg © Copyright, Australian National Botanic Gardens <www.anbg.gov.au/photo>**

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Lichens								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Bacidiaceae	*Tephromela* sp.			X *				
Cladoniaceae	*Cladia aggregata*			X *				
	Cladonia pertricosa				X *	X *		
Hymeneliaceae	*Aspicilia* sp.			X *				
Lecanoraceae	*Lecanora subcoarctata*			X *				
	Lecidella sp.			X *				
Lobariaceae	*Pseudocyphellaria neglecta*					X *		
Parmeliaceae	*Austroparmelina elixiana*					X *		
	Flavoparmelia haysomii			X *				
	Flavoparmelia rutidota			X *				

Lichen *Xanthoria* sp. in Lake Condah IPA, J. Milne © Copyright, National Herbarium of Victoria

Lichens								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Parmeliaceae	*Hypogymnia* sp.	X *						
	Hypogymnia subphysodes var. *austerodioides*	X *						
	Parmotrema cooperi			X *				
	Parmotrema reticulatum			X *				
	Usnea inermis			X *				
	Usnea molliuscula subsp. *molliuscula*			X *				
	Usnea sp.			X *				
	Xanthoparmelia scabrosa	X *						
	Xanthoparmelia sp.			X *				
	Xanthoparmelia tasmanica			X *				
Pertusariaceae	*Pertusaria lophocarpa*			X *				
	Pertusaria petractata	X *						
	Pertusaria sp. (*xanthoplaca*)			X *				
Physciaceae	*Amandinea punctata*	X *						
	Buellia sp.			X *				
	Hyperphyscia adglutinata						X *	
	Physcia jackii	X *						
	Physcia poncinsii			X *				
Ramalinaceae	*Ramalina glaucescens*			X *				
	Ramalina inflata subsp. *australis*			X *				
Rhizocarpaceae	*Rhizocarpon* sp.			X *				
Stereocaulaceae	*Stereocaulon ramulosum*					X *		
Teloschistaceae	*Caloplaca* sp.			X *				
	Teloschistes chrysophthalmus			X *				
	Teloschistes velifer			X *				
	Xanthoria coomae	X *						
	Xanthoria sp.	X *						
Thelotremataceae	*Diploschistes* sp.			X *				
Xanthopyreniaceae	*Zwackhiomyces* sp.			X *				

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Extensive colonies of mosses and lichens at Lake Condah, J. Milne © Copyright, National Herbarium of Victoria

Red and Green Algae								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Characeae	*Chara australis*						X *	
	Chara corallina						X *	
	Chara fibrosa					X *		
	Chara globularis	X *		X *		X *	X *	
	Chara hookeri			X *				
	Chara muelleri					X *		
	Chara sp.			X *		X *		
	Chara sp. aff. *benthamii*					X *		
	Chara sp. aff. *globularis* 'Victoria'	X *		X *		X *		
	Chara sp. aff. *virgata* 'ANZAC'			X *		X *		
	Chara sp. nov.					X *		
	Nitella lhotzkyi			X *				
	Nitella sp.					X *	X *	
	Nitella sp. aff. *australiensis*			X *				
	Nitella sp. aff. *cristata* 'Basalt Plains'			X *		X *		
	Nitella sp. aff. *lhotzkyi*			X *				
	Nitella sp. nov.			X *		X *		
	Nitella subtilissima			X *				
	Nitella woodii			X *	X *	X *	X *	
	unid. sp.					X *		
Rhodomelaceae	*Bostrychia* sp.				X *			

Filamentous and Micro-algae								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
[class Bacillariophyceae]	small epiphytic diatoms		X *	X *		X *	X *	
[class Cyanophyceae]	unid. sp.						X *	
Astasiaea	*Euglena acus*		X *				X *	
	Euglena oxyuris		X *				X *	
	Euglena sanguinea		X *					
	Euglena sp. 1		X *	X *				
	Euglena sp. 2			X *				
Bacillariaceae	*Bacillaria* sp. (*paxillifera*?)					X *	X *	
	Nitzschia acicularis var. *closterioides*						X *	
	Nitzschia palea		X *				X *	
	Nitzschia sp. 1		X *			X *		
Catenulaceae	*Amphora* sp. 1						X *	
Characiaceae	*Ankyra* sp. (*judayi*?)		X *					
Cladophoraceae	*Cladophora* sp. 1						X *	
Closteriaceae	*Closterium ehrenbergii*					X *		
	Closterium gracile		X *					
	Closterium kuetzingii		X *					
	Closterium sp. (*dianae*?)			X *				
	Closterium sp. 1	X *	X *			X *	X *	
	Closterium sp. 2		X *	X *			X *	
	Closterium sp. 3		X *				X *	
Cocconeidaceae	*Cocconeis* sp. 1	X *	X *	X *		X *	X *	
Cryptophyceae	*Cryptomonas* sp. 1	X *						
Cymbellaceae	*Cymbella* sp. 1		X *			X *		
Desmidiaceae	*Cosmarium punctulatum*		X *					
	Cosmarium sp. 1		X *					
	Cosmarium sp. 2		X *					
	Cosmarium sp. 3		X *					
	Staurodesmus dejectus var. *apiculatus*		X *					
Dinobryaceae	*Dinobryon* sp. (*sertularia*?)	X *						
Euglenaceae	*Trachelomonas volvocina*		X *	X *				
Eunotiaceae	*Eunotia bilunaris*		X *					

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Filamentous and Micro-algae								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Fragilariaceae	*Synedra nana*	X *						
	Ulnaria acus					X *	X *	
	Ulnaria ulna		X *	X *		X *	X *	
Gomphonemataceae	*Gomphonema* sp. 1		X *	X *				
Gymnodiniaceae	*Gymnodinium* sp. 1						X *	
Melosiraceae	*Melosira varians*			X *		X *	X *	
Naviculaceae	*Navicula* sp. 1			X *				
	Navicula sp. 2			X *				
Nostocaceae	*Anabaena pseudoscillatoria*		X *					
	Anabaena sp. 1	X *	X *					
	Aphanizomenon issatschenkoi	X *				X *		
	Cylindrospermopsis raciborski	X *						
	Nostoc sp.					X *		
	Sphaerospermopsis aphanizomenoides	X *	X *			X *		
Oedogoniaceae	*Bulbochaete* sp. 1		X *					
	Oedogonium sp. 1	X *	X *			X *	X *	
	Oedogonium sp. 2			X *				
	Oedogonium undulatum		X *					
Oocistaceae	*Ankistrodesmus falcatus*		X *			X *		
	Ankistrodesmus fusiformis		X *					
Oocystaceae	*Oocystis* sp. 1		X *					
Ophiocytiaceae	*Ophiocytium* sp. 1		X *				X *	
Oscillatoriaceae	*Lyngbya* sp. 1						X *	
	Oscillatoria sp. 1						X *	
	Trichodesmium iwanoffianum		X *					
Peridinaceae	*Cystodinium* sp. 1		X *					
	Peridiniopsis sp. 1					X *		
Phacaceae	*Phacus curvicauda*		X *	X *				
	Phacus longicauda		X *					
	Phacus sp. (*helikoides*?)						X *	
	Phacus sp. 1		X *	X *				
Phormidiaceae	*Planktothrix agardhii*						X *	
	Planktothrix sp. 1						X *	
Pinnulariaceae	*Pinnularia* sp. 1		X *				X *	
Pleurosigmataceae	*Gyrosigma* sp. 1			X *		X *	X *	
Psilosiphonaceae	*Psilosiphon* sp.				X *			

Filamentous and Micro-algae								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Rhopalodiaceae	*Rhopalodia gibba*		X *			X *		
Rhyacophilidae	*Acnanthidium* sp. 1					X *		
Rivulariaceae	*Gloeotrichia pisum*		X *					
	Gloeotrichia sp. (*raciborskii*?)		X *					
Scenedesmaceae	*Scenedesmus obtusus*		X *					
	Scenedesmus quadricauda			X *				
	Scenedesmus sp. 1		X *	X *		X *		
	Scenedesmus sp. 2		X *			X *		
	Scenedesmus sp. 3					X *		
	Scenedesmus sp. 4					X *		
Stephanodiscaceae	*Cyclotella* sp. 1		X *					
Surirellaceae	*Campylodiscus* sp.						X *	
	Surirella minuta					X *	X *	
	Surirella robusta					X *		
unid. order	unid. green filamentous algae						X *	
unid. order	unid. small flagellates	X *	X *					
Volvocaceae	*Eudorina elegans*			X *				
	Pandorina morum		X *					
	Volvox sp. 1	X *						
Zygnemataceae	*Mougeotia* sp. 1	X *	X *			X *	X *	
	Spirogyra sp. 1	X *	X *			X *	X *	
	Spirogyra sp. 2						X *	
	Zygnema sp. 1	X *						

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Fungi samples, B. Bauer © Copyright, Department of the Environment

Fungi								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Agaricaceae	*Agaricus* sp.		X *					
	Agaricus xanthodermus				X *			
Corticiaceae	*Marchandiomyces* sp.			X *				
	unid. sp.					X *		
Cortinariaceae	*Crepidotus* sp.					X *		
	Dermocybe sp.	X *						
Fomitopsidaceae	*Fomitopsis lilacinogilva*		X *					
Geastraceae	*Geastrum australe*					X *		
Hygrophoracea	*Hygrocybe fuligineosquamosa*	X *						
Hymenogasteraceae	*Descomyces albus*	X *						
Hysteriaceae	*Hysterographium* sp.	X *						
Lycoperdaceae	*Bovista* sp.						X *	
	Lycoperdon lividum	X *						
Mycenacaea	*Mycena viscidocruenta*		X *					

Fungi								
Family	**Species**	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Mycenastraceae	*Mycenastrum corium*						X *	
Pleurotaceae	*Pleurotus* sp.					X *		
Pluteaceae	*Pluteus cervinus*		X *					
Polyporaceae	*Pycnoporus coccineus*					X *		
Russulaceae	*Cystangium* sp.		X *					
	Gymnomyces wirrabarensis		X *					
Stereaceae	*Stereum* sp.	X *						
Tremellaceae	*Tremella mesenterica*					X *		

Fungi specimens are usually cut and photographed while fresh to record features of the interior and exterior that may be obscured with drying. Cutting larger specimens into smaller pieces also aids the drying process, B. Bowler © Copyright, Department of the Environment

Key

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

^ = Exotic/Pest

= EPBC listed

~ = FFG listed

+ = DEPI listed

O = **Putative new species**

■ = Previously recorded on the reserve but not found on this survey

Appendix B: Threatened Species

Additional supplements containing the appendices for individual reserves are available to download from:

www.bushblitz.org.au

Nomenclature and taxonomy used in this appendix are consistent with that from the Australian Faunal Directory (AFD), the Australian Plant Name Index (APNI) and the Australian Plant Census (APC).

Current at June 2013

Fauna

Mammals									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Dasyurus maculatus	Spotted-tailed Quoll	EPBC—Endangered FFG—Threatened DEPI—Endangered		■	■		■		

Birds									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Anas rhynchotis	Australasian Shoveler	DEPI—Vulnerable			■				■
Aythya australis	Hardhead	DEPI—Vulnerable			■				■
Biziura lobata	Musk Duck	DEPI—Vulnerable			X *			■	
Cereopsis novaehollandiae	Cape Barren Goose	DEPI—Near Threatened			■				
Coracina maxima	Ground Cuckoo-shrike	FFG—Threatened DEPI—Vulnerable			X *				
Falco subniger	Black Falcon	DEPI—Vulnerable						X *	
Grus rubicunda	Brolga	FFG—Threatened DEPI—Vulnerable		X					
Ninox strenua	Powerful Owl	DEPI—Vulnerable				X *	X *		
Phalacrocorax varius	Pied Cormorant	DEPI—Near Threatened			■				
Stictonetta naevosa	Freckled Duck	DEPI—Endangered			■				

Key
DEPI = Refers to the Department of Environment and Primary Industries Advisory List (Victoria)
EPBC = Refers to the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFG = Refers to the *Flora and Fauna Guarantee Act 1988* (Victoria)

Frogs and Toads									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Litoria raniformis	Southern Bell Frog	EPBC—Vulnerable FFG—Threatened DEPI—Endangered				X *			
Pseudophryne semimarmorata	Southern Toadlet	DEPI—Vulnerable		■			X *		

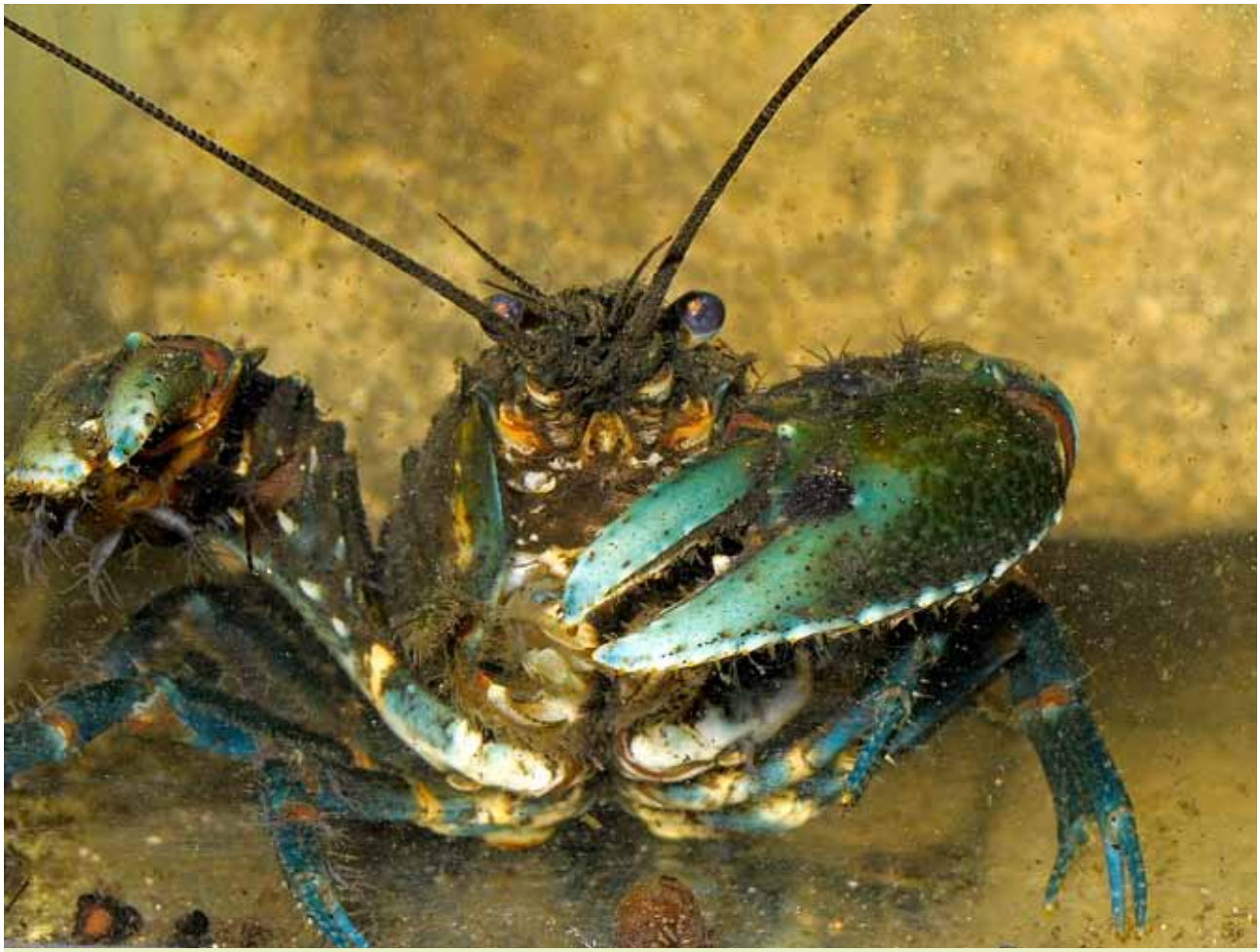
Reptiles									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Lampropholis delicata	Dark-flecked Garden Sunskink	DEPI—Data Deficient			X *	X *	X *	X *	
Pseudemoia rawlinsoni	Glossy Grass Skink, Swampland Cool-skink	DEPI—Near Threatened				X *	X *		

Fishes									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Galaxiella pusilla	Eastern Dwarf Galaxias	EPBC—Vulnerable FFG—Threatened DEPI—Vulnerable	X *	X *	X *			X *	
Nannoperca obscura	Yarra Pygmy Perch	EPBC—Vulnerable FFG—Threatened DEPI—Near Threatened	X *	X *				X *	

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

■ = Previously recorded on the reserve but not found on this survey



The Glenelg Spiny Freshwater Crayfish (*Euastacus bispinosus*) found in Darlot Creek is a state and nationally listed species, and a new record for the region © Copyright, R. Kuiter

Crustaceans									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Engaeus sericatus	Hairy Burrowing Crayfish	DEPI—Vulnerable		X *					
Euastacus bispinosus	Glenelg Spiny Freshwater Crayfish	EPBC—Endangered FFG—Threatened DEPI—Endangered		X *					

Key
DEPI = Refers to the Department of Environment and Primary Industries Advisory List (Victoria)
EPBC = Refers to the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFG = Refers to the *Flora and Fauna Guarantee Act 1988* (Victoria)

Flora

Flowering Plants									
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Amphibromus sinuatus	Wavy Swamp Wallaby Grass	DEPI—Vulnerable	■	X	■			■	
Berula erecta	Water Parsnip	DEPI—Poorly Known						X *	
Cardamine papillata	Annual Bitter-cress	DEPI—Vulnerable					X *		
Carex tasmanica	Curly Sedge	EPBC—Vulnerable FFG—Threatened DEPI—Vulnerable	X *						
Cladium procerum	Leafy Twig-rush	DEPI—Rare in Vic	X *						
Cuscuta australis	Australian Dodder	DEPI—Poorly Known						X *	
Dianella callicarpa	Swamp Flax Lily	DEPI—Rare in Vic		■					
Lemna trisulca	Ivy Duckweed	DEPI—Poorly Known		■			X *		
Picris squarrosa	Squat Picris	DEPI—Rare in Vic			■		■		
Potamogeton australiensis	Thin Pondweed	DEPI—Poorly Known						■	
Prasophyllum diversiflorum	Gorae Leek Orchid	EPBC—Endangered FFG—Threatened DEPI—Endangered			■				
Senecio psilocarpus	Smooth-fruited Groundsel	EPBC—Vulnerable DEPI—Vulnerable						X	
Ruppia maritima	Ditchgrass	DEPI—Poorly Known					X *		

Curly Sedge (*Carex tasmanica*), listed as vulnerable under the EPBC Act and threatened under the FFG Act, R. Hallet © Copyright, Australian National Botanic Gardens <www.anbg.gov.au/photo>

X = Previously recorded on the reserve and found on this survey

X * = New record for this reserve

■ = Previously recorded on the reserve but not found on this survey

Ferns										
Species	Common name	Status	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Asplenium aethiopicum	Shredded Spleenwort	DEPI—Vulnerable					X *		

Key
DEPI = Refers to the Department of Environment and Primary Industries Advisory List (Victoria)
EPBC = Refers to the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFG = Refers to the *Flora and Fauna Guarantee Act 1988* (Victoria)
X = Previously recorded on the reserve and found on this survey
X * = New record for this reserve
■ = Previously recorded on the reserve but not found on this survey

Clay-based swamps support a different community of wetland species. The threatened Wavy Swamp Wallaby Grass (*Amphibromus sinuatus*) was locally abundant around some of these swamps, N. Walsh © Copyright, National Herbarium of Victoria

Appendix C: Exotic and Pest Species

Additional supplements containing the appendices for individual reserves are available to download from:

www.bushblitz.org.au

Nomenclature and taxonomy used in this appendix are consistent with that from the Australian Faunal Directory (AFD), the Australian Plant Name Index (APNI) and the Australian Plant Census (APC).

Current at June 2013

Tench (*Tinca tinca*) is an introduced species that was recorded in the upper part of Darlot Creek. This cryptic fish is rarely seen © Copyright, R. Kuiter

Fauna

Mammals								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Felis catus	Cat		X *					
Lepus capensis	Brown Hare				X *			
Mus musculus	House Mouse		X *		X *	X *	X *	
Oryctolagus cuniculus	Rabbit		X *		X *	X *		
Ovis aries	Sheep						X *	
Rattus rattus	Black Rat		X *		X *	X *	X *	
unid. sp.	Deer			X *				
Vulpes vulpes	Red Fox		X *			X *	X *	X *

Birds								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Carduelis carduelis	European Goldfinch			X *			X *	X *
Sturnus vulgaris	Common Starling		X *		X *			X *
Turdus merula	Eurasian Blackbird				X *			

Fishes								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Gambusia holbrooki	Eastern Gambusia						X *	
Tinca tinca	Tench	X *						

Butterflies and Moths								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Agrius convolvuli	Convolvulus Hawk-moth		X *		X *			
Agrotis infusa	Bogong Moth		X *					
Agrotis munda	Brown Cutworm, Pink Cutworm		X *					
Agrotis porphyricollis	Variable Cutworm		X *		X *			
Agrotis radians	Brown Cutworm		X *		X *			
Chrysodeixis eriosoma	Green Garden Looper				X *			
Doratifera oxleyi	Painted Cup Moth		X *		X *			
Ectropis excursaria	Twig Looper				X *			
Epiphyas sp. (*postvittana* group)	—		X *		X *			
Etiella behrii	Lucerne Seed Web Moth				X *			
Hednota grammellus	Pasture Webworm		X *		X *			
Hednota pedionoma	Pasture Webworm		X *		X *			
Hednota relatalis	Pasture Webworm				X *			
Helicoverpa punctigera	Native Budworm		X *					
Mythimna convecta	Common Armyworm				X *			
Persectania ewingii	Southern Armyworm				X *			
Phrissogonus laticostata	Apple Looper				X *			
Pieris rapae	Cabbage White Butterfly					X *		
unid. sp. (*Diarsia* sp.?)	Armyworms				X *			
Uraba lugens	Gum-leaf Skeletoniser				X *			

Key X = Previously recorded on the reserve and found on this survey
X * = New record for this reserve

True Bugs — Terrestrial								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Creontiades dilutus	Green Mirid		X *	X *	X *		X *	
Dindymus versicolor	Harlequin Bug	X *			X *			
Nysius vinitor	Rutherglen Bug	X *	X *	X *		X *	X *	X *

Molluscs — Terrestrial								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Arion intermedius	Hedgehog Slug	X *						X *
Cantareus aspersa	Common Garden Snail		X *	X *	X *	X *		
Cochlicella barbara	Small Pointed Snail				X *	X *		X *
Deroceras sp. (*panormitanum*?)	Brown Field Slug	X *		X *	X *	X *		X *
Lehmannia sp. (*nyctelia*?)	Striped Field Slug	X *	X *					
Milax gagates	Black-keeled Slug, Greenhouse Slug, Jet Slug				X *	X *		
Theba pisana	White Italian Snail		X *					

Molluscs — Aquatic								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Physa sp. aff. *acuta*	Tadpole Snail			X *	X *	X *		
Potamopyrgus antipodarum	New Zealand Mudsnail				X *	X *		

Flora

Flowering Plants								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Anthoxanthum odoratum	Sweet Vernal Grass	■	■	■		■	■	■
Berula erecta	Water Parsnip						X *	
Chenopodium album	Fat Hen		X *					
Cirsium arvense	Creeping Thistle, Perennial Thistle, Canada Thistle, California Thistle	X	X	X	X	X	X	X
Conium maculatum	Hemlock, Carrot Fern				X			
Dipsacus fullonum	Fuller's Teasel, Wild Teasel	X	X	X	X	X	X	X
Festuca arundinacea	Giant Fescue						X *	
Hypericum humifusum	Trailing St John's Wort					X *		
Juncus articulatus	Jointed Rush	X *	■	■			■	
Lythrum junceum	Mediterranean Loosestrife		■				■	
Myosotis laxa subsp. *caespitosa*	Water Forget-me-not						X *	
Paspalum distichum	Water Couch						X	
Polypogon lutosus	Perennial Beardgrass			X	X			
Potentilla anserina	Silverweed			■			X *	
Rosa rubiginosa	Sweet Briar	X	X	X	X	X	X	X
Rubus leucostachys	Blackberry				X *			
Salix alba	White Willow				X			
Sparganium erectum subsp. *stoloniferum*	Smaller Bur Reed				X *	X *		
Trifolium glomeratum	Ball Clover			■			■	■
Veronica catenata	Pink Water Speedwell	X *		X *	X *			

Key
X = Previously recorded on the reserve and found on this survey
X * = New record for this reserve
■ = Previously recorded on the reserve but not found on this survey

Mosses								
Species	Common name	Allambie	Kurtonitj	Lake Condah	Lake Condah Mission	Muldoons	Tyrendarra	Vaughans
Eurhynchium praelongum	Slender Beaked Moss			X *	X *			

X * = New record for this reserve

An infestation of Fuller's Teasel (*Dipsacus fullonum*) at Muldoons, N. Walsh © Copyright, National Herbarium of Victoria

Glossary

C

Cryptic species (Cryptospecies)
Species that are physically similar but reproductively isolated from each other.

Cryptogams
A plant that reproduces by spores, without flowers or seeds. Includes bryophytes (hornworts, liverworts, mosses), lichens, fungi, slime moulds and algae.

E

Ecological communities
Unique and naturally occurring groups of plants and animals. Their presence can be determined by factors such as soil type, position in the landscape, climate and water availability.

Emergent vegetation
Vegetation that grows in water but pierces the surface so that it is partially in air.

Euglenophytes
Single-celled, aquatic, microscopic organisms of the phylum Euglenophyta. Some are photosynthetic, while others are not. All swim by means of one or two anterior flagella.

F

Filamentous algae
These algae are composed of a linear series of cells, and generally not consolidated into a substantial plant body (a thallus).

H

Hyporheic zone
The region below and alongside a stream bed where groundwater and surface water mix in the gaps within the sediment.

M

Macroalgae
Algae that are clearly visible to the naked eye.

Macrofungi
Fungi that produce large fruiting bodies, i.e. those visible to the naked eye and generally one centimetre or more in width or height.

Macrophytes
Aquatic plants, including flowering plants, ferns and bryophytes, large enough to be clearly seen with the naked eye.

Microalgae
Algae seen clearly only with a microscope.

Morphospecies
A group of individuals that are considered to belong to the same species on grounds of morphology (physical features) alone.

P

Periphyton
A complex of aquatic biota (algae, cyanobacteria, heterotrophic microbes and detritus) attached to submerged surfaces such as rocks and plants in most freshwater aquatic systems. Sensitive to environmental change in still water, they are good biological indicators.

Putative new species
A species that has been recognised by an expert as never having been named or described in the scientific literature. Note that specimens may already be in museum or herbarium collections.

S

Stygofauna
Animals that live in underground water, including crustaceans, worms, snails, insects, other invertebrate groups, and in Australia a blind fish and a newt.

T

Taxon (plural taxa)
A member of any particular taxonomic group, e.g. a species, genus, family.

Taxonomy
The categorisation and naming of species.
The science of identifying and naming species, as well as grouping them based on their relatedness.

Trophic level
The position an organism occupies in a food chain (food web).

U

Undescribed taxon
A taxon (usually a species) that has not yet been formally described or named.

ISBN 978 0 642 56873 1

Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for the Environment.

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

PUBLISHER ABRS, Canberra
EDITOR ABRS
LAYOUT Y's Communication
DESIGN TEMPLATE ABRS
PRINTER Instant Colour Press

All publications are available online at:

www.bushblitz.org.au

Additional supplements available for this publication:

+ Kurtonitj Indigenous Protected Area
+ Lake Condah Indigenous Protected Area including Allambie, Lake Condah, Muldoons and Vaughans properties
+ Lake Condah Mission
+ Tyrendarra Indigenous Protected Area

Contributors

Bush Blitz is coordinated by the Australian Biological Resources Study (ABRS), which is part of the Australian Government Department of the Environment. The program is a partnership between the Australian Government, BHP Billiton and Earthwatch Australia.

Research agencies involved in this Bush Blitz were Museum Victoria, Royal Botanic Gardens Melbourne – National Herbarium Victoria, University of New South Wales, South Australian Museum and the Australian Biological Resources Study.

Photo credits

Photographs have been reproduced in this publication with permission. Effort has been made to credit the photographers correctly, however, please contact us if incorrectly credited.

FRONT COVER *Pterolocera* n. sp. (Condah), a putative new species of Anthelid moth found at Lake Condah Mission
© Copyright, M. Hewish

BIO284.1012

BushBlitz
SPECIES DISCOVERY PROGRAM

Bush Blitz survey report

South Western Victoria + 21 March–1 April 2011

Australian Government

bhpbilliton
resourcing the future

EARTHWATCH INSTITUTE

Australian Biological Resources Study