
WALPOLE NORNALUP NATIONAL PARKS ASSOCIATION
WALPOLE WILDERNESS
BIOBLITZ
Discover the Diversity
REPORT
2023

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Discover the Diversity Report

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Corymbia ficifolia blossom
Photo: E Edmonds

ACKNOWLEDGEMENT OF COUNTRY

We would like to acknowledge the Noongar Elders and Traditional Custodians of the land on which the Walpole Wilderness BioBlitz 2023 was held. We wish to acknowledge and pay respect to their ancestors and to them for their continuing culture and care of this land.

ACKNOWLEDGEMENTS

Funding support

We are very grateful for the generous funding support provided by Walpole-Nornalup National Park Association (WNNPA), Manjimup Shire Community Grant, and the PEAT project funded through the Ian Potter Foundation to undertake the Walpole Wilderness BioBlitz 2023.

The PEAT project (Protecting peatland ecosystems and addressing threats in Southwestern Australia) has been established with funding from The Ian Potter Foundation. Guided by Noongar Elders, and co-led by The University of Western Australia and Edith Cowan University, the project is a collaboration between academic and community-based scientists, managers, and volunteers, including the Undalup Association, the Department of Biodiversity, Conversation and Attractions, the Western Australian Museum and the Walpole-Nornalup National Park Association.

The Bioblitz is a key event in this new and exciting 5-year project and will enable the Walpole Wilderness BioBlitz to be undertaken annually for the next 5 years!

Organisers, Team leaders, Tail-end Charlies & Specialists

Thank you to the volunteers and specialists that dedicated their time, energy and expertise as team leaders, assistant leaders, tail-end Charlies (bringing up the rear to accompany the slower and more distractable participants) and specialists that assisted with species identification and provided identification resources and equipment.

Walpole Wilderness BioBlitz 2023 Participants

Many thanks to all participants who were involved in the Walpole Wilderness BioBlitz 2023 whether it was in person or for your assistance with the organisation, identification or evaluation of the event and project. Your contribution and enthusiasm were greatly appreciated.

Special thanks to the amazing caterers and staff who fed and watered us so well on Friday and Saturday night as part of the BioBlitz registration session, introductory talks and keynote speaker presentations.

Speakers

Dr David Edmonds
WWBB23 Organiser and Committee member of Walpole-Nornalup National Park Association

Associate Professor Nicki Mitchell School of Biological Sciences
University of Western Australia *Protecting peatland ecosystems and addressing threats in SW Australia*

Prof Pierre Horwitz
Emeritus Professor of Environmental Sciences'
Edith Cowan University WA
Protecting peatland ecosystems and addressing threats in SW Australia

Dr Joe Fontaine
Disturbance Ecologist
Murdoch University WA

Brad Durrant
Zoologist, Biologic Consulting
WWBB23 Photographic presentation, Quiz Master, Chocolate provider & Committee Member of Walpole-Nornalup National Parks Association

Participating Organisations & Institutions

- Walpole-Nornalup National Parks Association (WNNPA)
- University of Western Australia (Crawley and Albany campuses)
- Edith Cowan University (Joondalup campus)
- Murdoch University
- Undalup Association
- Birdlife Western Australia
- National Waterbug Blitz
- WA Museum
- Albany Wildflower Society
- WA Herbarium
- Biologic Environmental
- Department of Water and Environmental Regulation (DWER)
- Department of Biodiversity, Conservation and Attractions (DBCA), Biodiversity and Conservation Science

CONTENTS

EXECUTIVE SUMMARY

WALPOLE WILDERNESS BIOBLITZ 2023

The Walpole Wilderness Bioblitz 2023 is a citizen science based project held on one weekend annually, though observations recorded in the project data include July 2023 to June 2024. The WWBB23 focused on the Soho Hills region which is home to the largest tracts of rare Rates Tingle (*Eucalyptus brevistylis)* forests and Red Flowering Gum (*Corymbia ficifolia*) woodlands. The third WWBB took place over the weekend of 30 Sept - 2 October, 2023 celebrating the following outcomes (as of January 2024):

2515 Volunteers hours

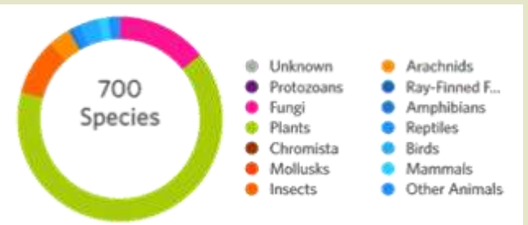
353 Identifiers/ Participants

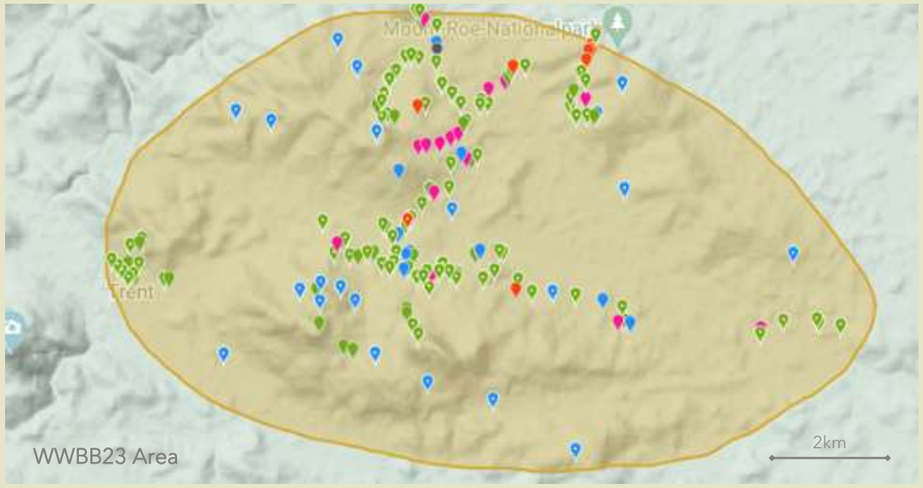
3,894 Observations

700 Species identified to genus level

$130,000 Project value

2 Days
43 Surveys
10 Habitats
18 Significant species





Over the weekend of Saturday 30th September to Sunday 1st October 2023, over 150 participants gathered to be involved in the Walpole Wilderness BioBlitz 2023 (WWBB23) coordinated by volunteers from the Walpole-Nornalup National Park Association (WNNPA) – a group of volunteers who focus on raising the understanding, care and conservation of the Walpole Wilderness Area.

The WWBB23 was held in the Soho Hills region of the Walpole Wilderness Area. This is an incredibly diverse area containing the rare Rate's Tingle and Red-flowering Gum forests. The location was quite remote (about 50 minutes' drive from Walpole) and accessible only by a 4WD vehicle so shared transport was organised for those without a 4WD.

The WWBB23 comprised a series of surveys conducted by groups of up to 10 individuals in a diversity of vegetation types and habitats within the core of the Walpole Wilderness Area including Rate's tingle forest, red-flowering gum woodlands, jarrah-marri forest, bullich forest, karri forest, banksia woodland, jarrah woodland, peatlands, heathlands, granite outcrops and boulders, paperbark wetlands, riparian areas and artificial fire waterpoints.

Within each group there were experienced volunteers or specialists who guided the groups as to how best to capture the species in the area. Most surveys were about 3 hours long (Saturday morning 9 am–12 noon; Saturday afternoon 1–3.30pm and Sunday morning 9 am–12 noon) and some groups were involved in full day sessions on Saturday.

There was a mix of activities to cater for differing levels of field experience and fitness. Most activities included "off trail" walking (through vegetation and on uneven ground) with participants walking from approximately 1 km to over 10 km.

We aimed to capture as much information as possible through the online platform of iNaturalist. This application allows you to take a photo of a specimen, upload it, then a community of naturalists offered suggestions on the identity – it is a widely recognised database with all observations being collated into the Atlas of Living Australia. This allowed a wider range of participants to contribute to the WWBB23 even from their own home or workplace, originating from anywhere in the world.

Sensor cameras and sound recorders were placed in the WWBB23 project area prior to the event with photos and recordings made available for identification purposes subsequently on iNaturalist.

On Saturday evening, 30th September 2023, there was a social dinner with guest speakers at the Walpole Country Club. This provided a great opportunity to meet new, like-minded people and to spend time with some of the specialists researching the area and discuss the exciting observations of the day.

This year, the WWBB23 was a key event in a new and exciting 5-year project. The PEAT project (Protecting peatland ecosystems and addressing threats in Southwestern Australia, www.peatproject.com.au) has been established with funding from the Ian Potter Foundation. Guided by Noongar Elders and co-led by the University of Western Australia and Edith Cowan University, the project is a collaboration between academic and community-based scientists, managers, and volunteers, including the Undalup Association, the Department of Biodiversity, Conversation and Attractions, the Western Australian Museum and the Walpole-Nornalup National Park Association.

You can access the Walpole Wilderness Bioblitz 2023 project through this link:

https://www.inaturalist.org/projects/walpole-wilderness-bioblitz-2023

The Walpole Wilderness Area is the only gazetted wilderness in Western Australia. It consists of a group of conservation reserves totaling 377,714 hectares of some of the most ecologically rich and unique areas on earth.

The Walpole Wilderness concept was part of a proposal developed by the local community in 1998 to incorporate these reserves into a single integrated conservation reserve for nature conservation and was formally adopted by the WA Labor Government as an election commitment in 2001.

Although recognised for its outstanding beauty, highly specialised habitat, unique species and incredible biodiversity, this area is poorly studied. The area is also rich with Aboriginal cultural and heritage features and values, including sites and landscapes of mythological, ceremonial, cultural and spiritual significance.

Located in the highest rainfall zone of WA, it contains a number of geographically-restricted habitats that act as refugia for species that are relics from ancient times. Climate change has caused a significant decrease in rainfall over the past few decades which has led to the decline or disappearance of some of these important relictual habitats.

Other key threatening processes affecting species within the area include predation, competition, habitat degradation and disease transmission from introduced animals such as pigs, foxes, cats and rabbits; competition from introduced (non-native) plant species; plant diseases such as Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*), animal diseases such as Amphibian Chytrid Fungus Disease causing chytridiomycosis (DBCA, 2019) and fire regimes that cause declines in biodiversity (Threatened Species Scientific Committee (TSSC), 2022).

Particular fire regimes (combinations of fire frequency, intensity, season and type), their landscape patterns and their interactions with other processes such as drought, introduced species, disease, and certain human activities have been identified as a threat to more than 800 native species and 65 ecological communities listed as threatened under Australian legislation as of December 2020 (Department of Agriculture, Water and the Environment (DAWE), 2021).

The WWBB23 recorded valuable information on threatened, rare, priority and common species in the Walpole Wilderness Area, including undocumented populations and occurrences of rare and priority species which we hope will greatly contribute to our understanding and the future management of this unique environment.

Soho Hills looking west out to Mount Frankland.
Photo: M Howe, 9th April 2023

Old growth Rate's Tingle,
Soho block, Trent WA

ABORIGINAL CULTURAL SIGNIFICANCE

After being in the Walpole Wilderness with Noongar Elders and Traditional Custodians and listening to their stories of the area, it is certain this was not considered a 'wilderness' to their people, it was very well-known country to them.

Aboriginal culture and heritage are incredibly important within the Walpole Wilderness. There are many culturally significant areas and features occurring within the area such as rivers, creeks, waterholes '*gnamma*', water trees '*boorn gnamma'* granite shelters, rock outcrops and traditional camp sites as well as important spiritual places of Lore and Custom and food sources of many different trees, plants and animals. There are also several known traditional travel routes throughout the Walpole Wilderness Area.

There is a limited number of registered Aboriginal heritage sites listed within the area, but this should not be taken as an indication of the lack of cultural significance of the area. The area holds great cultural importance to the Noongar people and the whole landscape is significant with many special places throughout with subtle, yet often definitive evidence of Noongar activity and occupation all over this vast area. For example, rock shelters, the placement of stones on granite outcrops and the presence of hollowbutt or scarred trees may be highly significant to the Traditional Custodians which means these features are important to leave undisturbed.

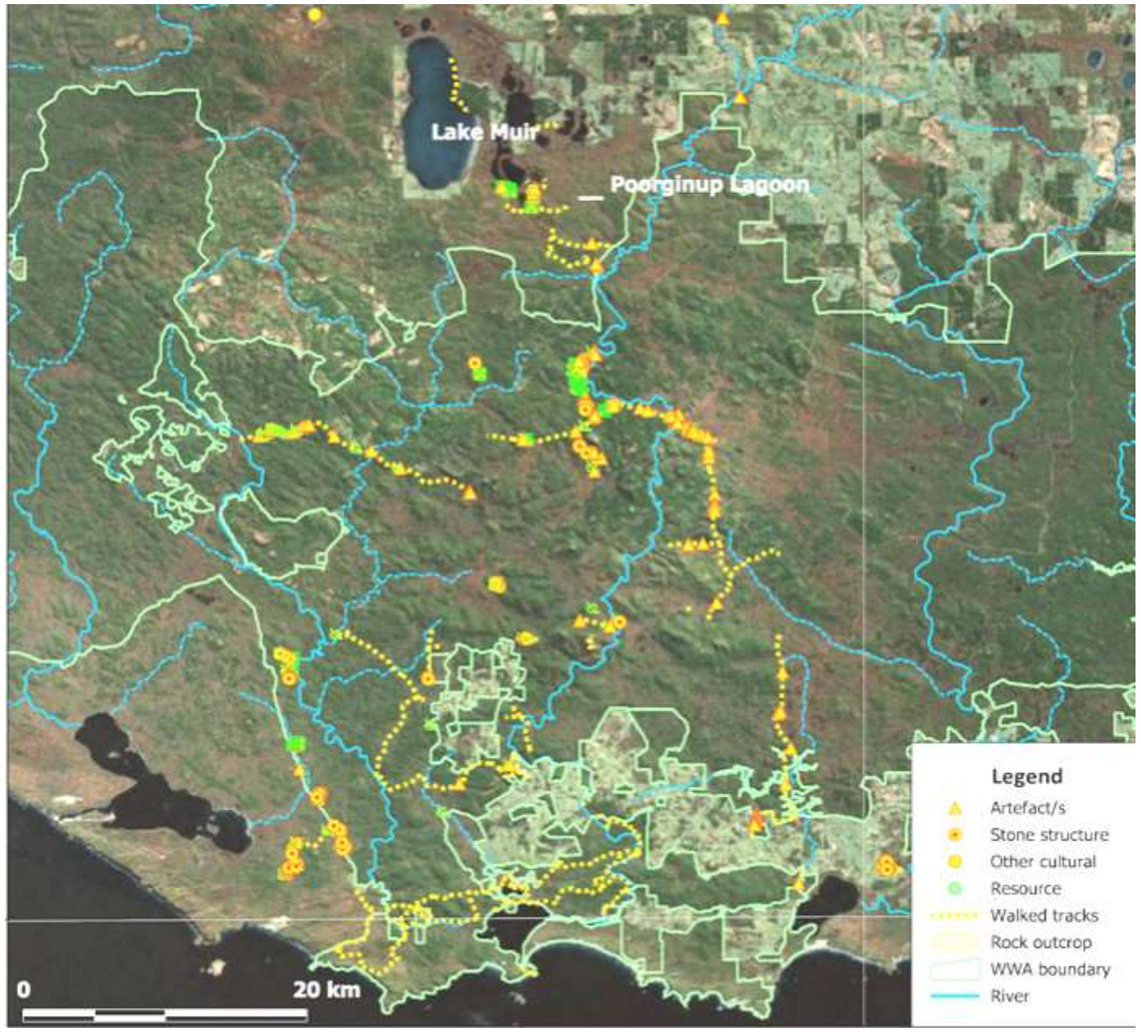
A lack of archaeological evidence of Aboriginal occupation by no means suggests there weren't any Aboriginal people living or moving through the land. There are many limiting factors to obtaining this kind of evidence, including a lack of intensive and extensive regional investigations (Guilfoyle, 2009).

In addition to this, the footprint of Aboriginal living was incredibly light in contrast to modern day living and evidence of their occupation and use of areas may not be recognisable to the untrained eye.

The name of the Frankland River changes about four times as the river flows through different language groups. *Kwakoorillup - Place of the quokka*, is what it is called in the Nornalup area (Guilfoyle, 2009).

Kwakoorillup – Place of the Quokka
Frankland River, Hazelvale WA

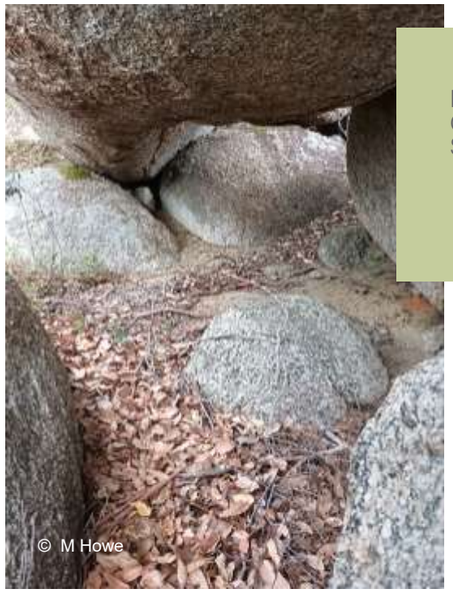
> *"Hundreds of traditional place names are recorded for the area, demonstrating the complex patterns of movement and occupation within this area… The oral history of the [Kwakoorillup/Frankland] river is still passed onto the next generations of Noongar people"* (Guilfoyle, 2009).



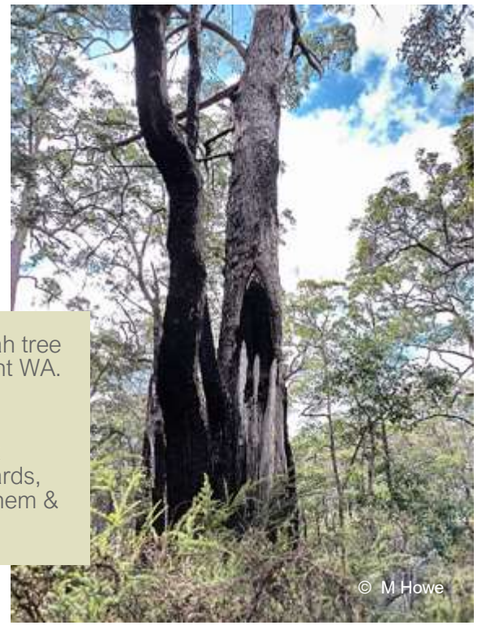
Preliminary outcomes of the cultural features survey relating to the Walpole Wilderness area (Dortch *et al.,* 2013).

Noongar Elders, Traditional Custodians, archaeologists and palaeoecologists have undertaken research and site visits to the Walpole Wilderness and documented numerous cultural values and features that provide for a fuller understanding of patterns of movement and use of the surrounding areas and demonstrates an emerging pattern of the rich, complex archaeological heritage of this region (Guilfoyle, 2009). Some of this research has been documented through a past project with a focus on the last 6,000 years of Noongar land management in the Walpole Wilderness Area (Dortch *et al.,* 2013).

It is hoped in time that more of these areas can be further researched, recognised, acknowledged and understood and that visitation to these places only occurs if appropriate and furthermore, that only respectful and compatible management activities be undertaken where consent is given, or if support is required. This is already happening in the Walpole Wilderness Area with Noongar Elders and Traditional Custodians engaging in cultural activities and providing guidance within the area for Aboriginal Ranger Groups, researchers, landcare practitioners, conservationists and government organisations.



Left:
Granite rock shelter
Soho Hills, Trent WA



Right: Scarred Jarrah tree
in Soho Hills, Trent WA.

Below:
Lizard trap '*karda mia'*: A flat granite rock propped up with a stone to encourage lizards, snakes & other animals to shelter under them & make them easy to catch for a feed.

HISTORICAL CONTEXT OF SOHO HILLS AREA

By Professor Andrea Gaynor
Environmental Historian,
University of Western Australia

This year's WWBB23 encompassed areas in the Soho and London forest blocks – slick and sophisticated names that seem a world away from the forest and woodland of this part of the Walpole Wilderness. The forest block names were selected on the whim of local Forests Department staff. While many names have known provenance, the origins of Soho and London are unknown.

There are also relatively few records of the human history of the area. The Soho hills are part of Pibulmun Noongar country and Noongars were certainly living in the area in the early nineteenth century, though after two hundred years of colonisation, no stories about this specific area have emerged in the public domain [as far as I'm aware anyway]. The party led by Thomas Braidwood Wilson and Mokare exploring the country west of King George's Sound (now Albany) in 1829 passed through part of what is now the Walpole Wilderness. While such expeditions were focused on resource assessment – the capacity of the land to sustain colonial enterprises such as pastoralism and timber-getting – journals of exploration sometimes also reflect aesthetic appreciation. At a point probably not far to the east of Soho, Wilson wrote:

Suffice it to observe, that our present encampment was on the north side of a beautiful valley, of considerable width, extending east and west, as far as the eye could survey; bounded on the south and north by a succession of gently undulating, and very moderately elevated hills, thinly, but sufficiently ornamented by trees, of gigantic form;—the loveliness of the scene being greatly increased, by the golden rays of the departing sun, gradually yielding to the silvery light of the full-orbed moon, and the brilliant evening star.[1]

The journal also records in the vicinity wetlands brimming with black swans and other waterfowl, as well as 'barren scrub', 'miserable and useless country' and 'fine open land' with abundant kangaroos.[2] Further north, they noticed 'several native encampments'. [3]

By the early twentieth century, the area around Denmark was being heavily exploited for timber, and by 1919 the karri and tingle forest around Walpole had been mapped and classified according to its potential for timber production – though this mapping didn't extend as far as the Soho hills.[4] The scenic value of the south coast forests were also recognised at this time: in 1910 an area of 920 acres of karri, marri and tingle forest on the banks of the Frankland River near present -day Nornalup was reserved as a national park.[5] Beyond that area, the government was mainly interested in the potential uses of

[1] T.B. Wilson, Narrative of a *Voyage Round the World* (London: Sherwood, Gilbert & Piper, 1835) 245.
[2] Wilson, 249-51
[3] Wilson, 252.
[4] Summary of jarrah belt: taken from classification plans: shewing present stocking 1919. *Summary of karri belt: shewing present stocking 1919. Summary of tingle belt.* [Map] WAS 2786, cons 6928, FD0409, State Records Office of Western Australia.
[5] Lee Fernie and Geoff Fernie, *In Praise of a National Park: The Origins and History of the Walpole-Nornalup National Park* (Walpole: Lee and Geoff Fernie, 1989) 36.

> The Walpole Wilderness will be recognised as an important component of an international biodiversity hotspot, where natural and cultural values, such as wilderness, tingle forest, a threatened and highly endemic and relictual flora and fauna, threatened ecological communities, old growth forests and wetlands, and our knowledge of them, will be maintained and enhanced for future generations.
> (DEC 2008)

tingle timber and established timber value of karri and jarrah.[6] The Soho Hills, however, were far enough from infrastructure to escape logging.

A brief study of flora and fauna in Soho block – including the first fauna survey in the block by the Forests Department – was undertaken by P. Skinner and A. Annels over a single week in November 1976. They noted that *"Soho block is rather remote and difficult of access, with a consequent dearth of outside reports*", [7] and that there were no signs of past logging. The survey was largely limited to the perimeter of the block, as there were no trafficable roads within it. Skinner and Annels found a suite of species they deemed fairly usual for that kind of country, though with a very high population of bush rats (*Rattus fuscipes*), mainly in the densely vegetated sandy flats and along the creeks. In these areas, the bush rats sprung the traps soon after setting, destroying any chance of capturing quokka or other less common species. There was no evidence of rabbits, evidence of small cat and fox populations only, and possible evidence of a dingo (which had previously been seen within a few miles of Soho). Across the survey, 7 species of skink, 67 species of bird, 4 species of snake and 6 species of native mammal were sighted, trapped or recorded through evidence such as tracks and scats.

Noongar burning regimes for the area are not known to science, but it seems likely that as group settlers moved into the Tingledale and Hazelvale areas from the mid-1920s, clearing fires would have escaped, leading to more frequent severe fires. In 1937 the W.A. Conservator of Forests wrote that the tingle forest '*is deteriorating rapidly owing to the increasing severity of fires resulting probably from closer settlement in the surrounding district'*.[8]

"According to fire history records, Soho hills area has been subject to intentional and wildfire with documented records of wildfire in 1956 and prescribed burning as early as 1957." [WWBB23 Author/ Editor]. (DBCA, 2022)

The site of the 2023 bioblitz is therefore somewhat shrouded in mystery, its remoteness protecting it from exploitation but also leaving few records from which to tell its past. This patchy history makes the WWBB23 all the more valuable.

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[6] See for example Utilization of Red and Yellow Tingle Tingle WAS 3116, cons 934, 1931/1340, SROWA.
[7] P. Skinner and A. Annels, A brief study of flora and fauna in Soho block Walpole district (Perth?: Research Branch, Forests Department Western Australia, November 1976) 8.
[8] WAS 3116, cons 934, 1931/1340, SROWA
[9] Department of Conservation and Land Management GIS Section, 'Tingle Forests & Year of Last Burn', [Map], Department of Conservation and Land Management, January 7 2004.


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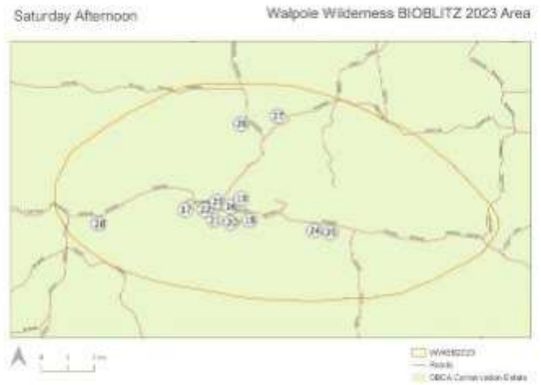

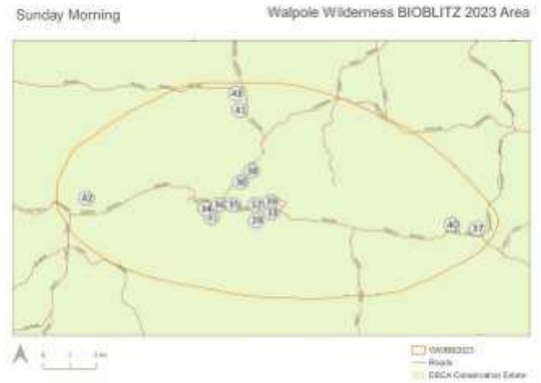

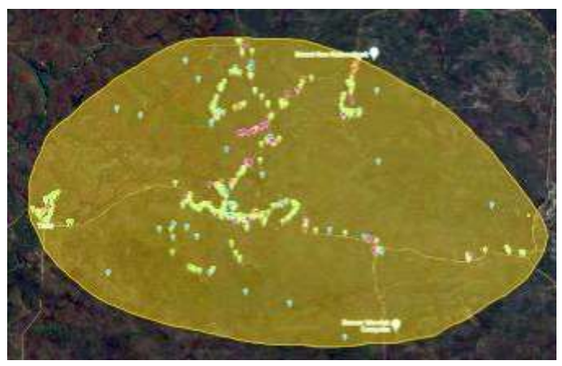

Where did we go?

The WWBB23 covered an area that presented a few more challenges from the point of view of accessibility but the rewards were well worth it. It is an area with a wide range of habitats including wetlands, heath, granite outcrops, waterholes, tall forests and open woodlands.

WWBB23 focussed on the area known as the Soho Hills. The Walpole Wilderness is divided into a series of named forest blocks and the area of the bioblitz covered the forest blocks known as Soho, Thames, London and Crossing. Blocks are bounded by roads and are roughly about 8000 hectares in size. Collectively the area surveyed as part of the WWBB23 was 12,580 hectares.

Fourty-three site locations were planned for the event which covered three basic types of activites – walking, hiking and car-based, all centred around the base camp. Activity levels included basic to experienced walkers, kid friendly activities, morning/afternoon site visits and all day walking.

SURVEYING, RECORDING AND IDENTIFICATION


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The WWBB23 surveys were undertaken by numerous groups of up to 10 individuals in different vegetation and habitat types throughout the Walpole Wilderness. Within each group there was an experienced volunteer, specialist or enthusiast who guided the groups to best capture the presence of flora, fauna and fungi species in the area. Most surveys were about 3 hours duration, but some groups ventured out for an all-day trip.

It is not intended that the WWBB23 be regarded as a formal or comprehensive study of the species occurring within the area. Many species were identified by photographs only and were not collected or vouchered (submitted to specialists for identification). Limited skills and knowledge of some participants may have resulted in some errors in species identifications and many species remain unidentified or unverified.

To counter this, there were experienced plant botanists, mycologists, ecologists and fauna specialists with experience in the region that made efforts to assist with species identifications and curate the data at basecamp or subsequently through the iNaturalist platform. Some flora, fungi and fauna specimens were collected, vouchered and identified following the WWBB23. The project on iNaturalist will stay open and further identifications, corrections and additions can still be made to contribute to the accuracy of the project following this report.

Numerous nocturnal, crepuscular*, vespertine** and cryptic species known to occur in the WWBB23 project area would not have been adequately accounted for, apart from species detected by motion sensor cameras set in place before the WWBB in September 2023.

*Crepuscular animals are most active at dusk and dawn.

**Vespertine behaviour is a special case of crepuscular behaviour; like crepuscular activity, vespertine activity is limited to dusk rather than full darkness. Unlike vespertine activity, crepuscular activity may resume in dim twilight before dawn.


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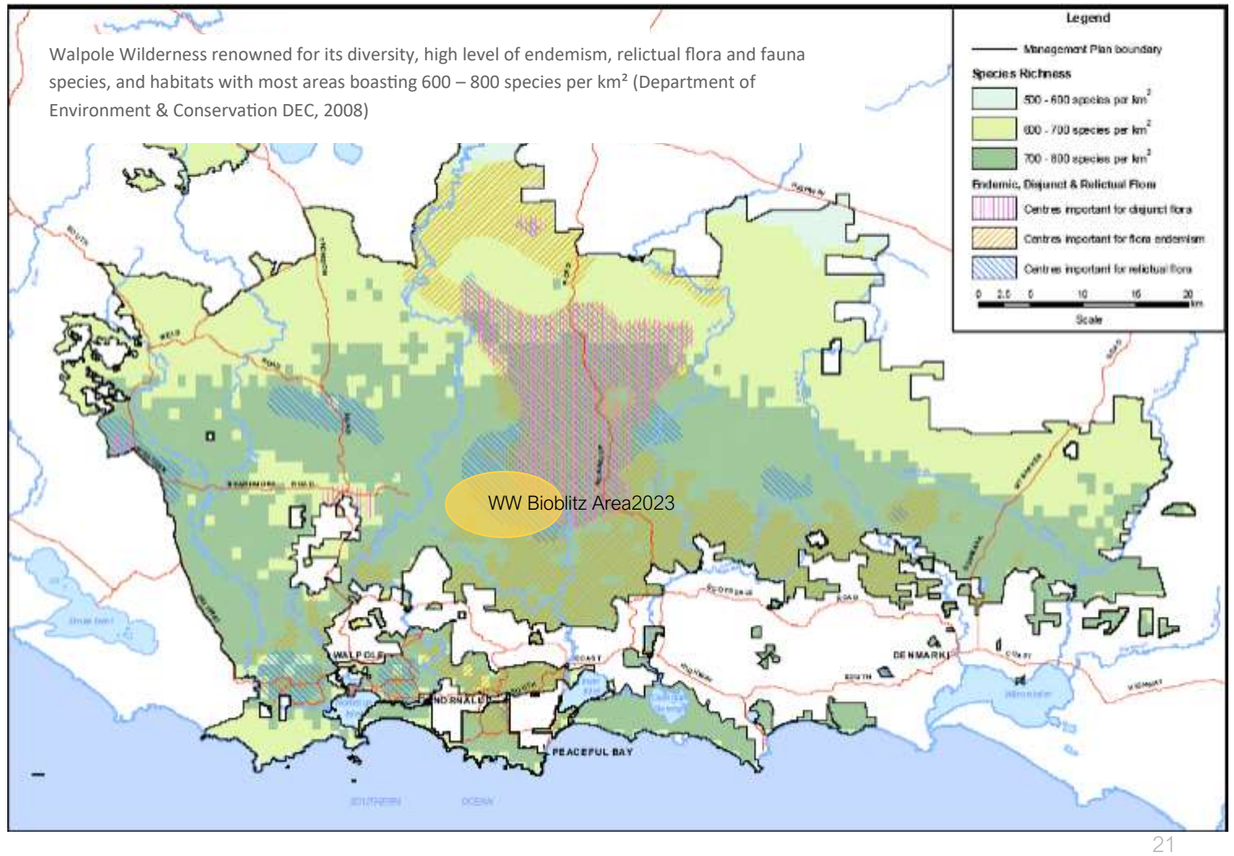
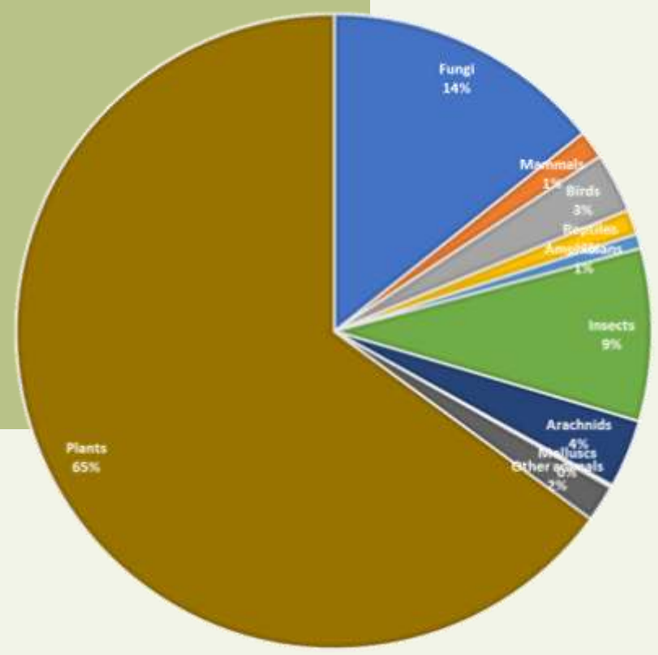


iNaturalist Species Observations

- **700 observations** have been identified to genus or species level
- **3,893 observations** have been made
- **87 observers** uploaded their observations
- **266 identifiers** joined the project to assist



Plants: 450 plants making up 64.94% of species observations

Fungi: 99 fungi making up 14.29% of species observations

Mammals: 10 mammals making up 1.44% of species observations

Birds: 21 bird species making up 3.03% of species observations

Reptiles: 10 reptiles making up 1.3% of species observations

Amphibians: 5 amphibians making up 0.72% of species observations

Arachnids: 24 arachnids making up 3.46% of species observations

Insects: 61 insects making up 8.8% of species observations

Mollusks: 1 species making up 0.14% of species observations

In total, approximately 55.43% of WWBB23 observations have been identified to species level and qualified as research grade (2,158 observations making up 451 species with 81 observers and 174 identifiers).

Approximately 43.77% of observations have been identified to genus or species level but need to be verified by an additional identification and/or to species level (1,704 observations making up 396 species with 79 observers and 174 identifiers).

There were 31 casual observations making up 0.8% of total species observed which were predominantly erroneous and/or had no photo or other evidence provided to verify the observations.

Additional flora (orchids), bird and aquatic fauna species were observed, identified and submitted in individual reports or species lists to the Walpole-Nornalup National Park Association (WNNPA). These species lists are also summarised in the Appendices.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eDNA

One of the emerging technologies available to ecologists is that of environmental DNA (commonly known as eDNA for short). This tool allows you to take a sample of water or soil (and possibly even air) and have it analysed for traces of DNA. In the style of a modern crime drama, theoretically, it can detect the DNA of any species that has left a few cells behind. A possum may merely need to sneeze in the general area and we can find it's DNA in the soil! It does rely on having a reference library of DNA from locally abundant species to compare the results to, which in an area like the Walpole Wilderness, this is often lacking.

Thanks to the Conservation Council of WA we got to test a couple of "do-it-yourself" eDNA kits on a lake in the WWBB23 survey area. The two different kits yielded significantly different results (Appendix 12) as seen on the relevant graphs, but it does go to show the potential for this new method for rapidly surveying an area.

EMPODISMA PEATLANDS: AN ENDANGERED THREATENED ECOLOGICAL COMMUNITY WITHIN THE WALPOLE WILDERNESS

On 7th September 2023, the *Empodisma* peatlands of southwestern Australia were listed as an 'Endangered' threatened ecological community under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (DCCEEW, 2023).

The main factors that make this threatened ecological community eligible for listing in the Endangered category are the very restricted nature of its distribution and ongoing reduction in community integrity coupled with a range of major threats, such as a drying climate, damaging fire regimes and interactions with invasive animals (DCCEEW, 2023). It is recognised that numerous threatened and priority flora and fauna species within the Walpole Wilderness area rely on peatland habitats to persist.

WHAT IS AN *EMPODISMA* PEATLAND?

Climate, stratigraphy and topography play a key role in the formation of *Empodisma* peatlands (Tauss 2000; Semenuik *et al.* 2011; *Winkle et al.* 2021) with occurrences usually linked to seasonal or permanent waterlogging. In areas where rainfall exceeds evapotranspiration and there are suitable geomorphological characteristics, the winter saturated, summer moist habitats that maintain peatlands in south-west Western Australia can form (Semeniuk *et al.* 2011; Winkle *et al.* 2021). In these areas, organic-rich but low nutrient acidic soils (organosols) can accumulate over time forming peatlands. Ages of up to 6,000 years have been recorded thus far (Pemberton 2005, E Edmonds 2021, *pers. comm*).

"The ecological community is the assemblage of plants, animals and other organisms associated with a type of freshwater, peat-based wetland, including within damplands, troughs, paluslopes, palusplains and palusmonts floodplains (Semeniuk, 1987) that is found in the High Rainfall Province of the south-west of Western Australia (Hopper & Gioia 2004; BOM 2022). It is typically a sedgeland to shrubland vegetation complex on peaty substrates that almost always includes the perennial grass-like twig rush *Empodisma gracillimum* (Tanglefoot). *Empodisma* peatlands provide habitat for a diverse range of hydrophilic species, including threatened, regionally endemic, and relictual flora and fauna species (Horwitz 1997; Lyons *et al*. 2000; Tauss 2000; Semeniuk *et al*. 2011)."

Source: Approved Conservation Advice for *Empodisma* peatlands of southwestern Australia (2023).

Empodisma gracillum
©orchidup

Lomandra nigricans
©pimelea

iNaturalist FLORA
Species Observations

- **450 flora** have been identified to genus or species level
- **2,878 observations** have been made
- **75 observers** uploaded their observations
- **121 identifiers** joined the project to assist

Tassel Flower
Leucopogon verticillatus
©orchidup

Total number of flora species observed during the WWBB23

The flora within the Walpole Wilderness Area is renowned for its diversity, with flora species richness up to 800 species per km². It provides centres important for flora endemism, relictual species and disjunct flora (DEC, 2008). The area of shrub, herb and sedgelands and mixed tingle forest between the Shannon River east to Denmark is one of two main species-rich areas within the south-west (Hearn *et al*. 2003).

There are about 1996 native vascular flora taxa representing 197 families and 689 genera recorded in the Walpole Wilderness and adjacent reserves (DEC, 2008) although these statistics have not been revised for some time and new species are still being discovered.

The most dominant plant families occurring within the Walpole Wilderness Area are Fabaceae (pea family), Orchidaceae (orchid family), Myrtaceae (myrtle family), Proteaceae (banksia and grevillea family), Cyperaceae (sedge family) and Ericaceae (heath family) (DBCA, 2023). Major plant genera include *Caladenia, Acacia, Stylidium, Eucalyptus, Drosera, Hibbertia* and *Leucopogon* (DBCA, 2023).

Over two thirds of the 81 vegetation complexes mapped within the Walpole Wilderness and adjacent reserves are known to contain threatened, rare and/or priority flora species (51 vegetation complexes) (Mattiske and Havel, 1998 cited by DEC, 2008).

Walpole Wilderness area is host to numerous threatened and priority (poorly known) flora species and ecological communities as well as endemic species with limited distributions and specific habitat requirements that occur nowhere else on Earth.

Total number of flora species observed during the WWBB23 (Appendix 2)

Most Observed FLORA species

There were 37 observations of Cowslip Orchid (*Caladenia flava*) included in the WWBB23 project. Some of these species were identified as Karri Cowslip Orchid (*Caladenia flava subspecies sylvestris*) which was first collected in Manjimup WA in November 1920 by Max Koch and was later named by Stephen Hopper and Andrew Brown in 2001. It has since been found to be distributed between Bunbury and Albany, growing in coastal heath, woodlands and around the margin of winter-wet swamps.

Karri Cowslip Orchid
Caladenia flava subspecies *sylvestris*

Description
Tuberous, perennial, herb, 0.12-0.3 metres high. Flowers yellow & white, October to December. Dark loamy soils. Karri forests, colonises the trunks of fallen trees.
Source: https://florabase.dbca.wa.gov.au/browse/profile/15350

Cowslip Orchid
Caladenia flava

Description
Tuberous, perennial, herb, 0.05-0.3 metres high. Flowers yellow-white, July to December. Variety of soils, laterite, granite. Coastal woodlands, winter-wet areas, forest areas, granite outcrops, sandplains.
Source: https://florabase.dbca.wa.gov.au/browse/profile/1592

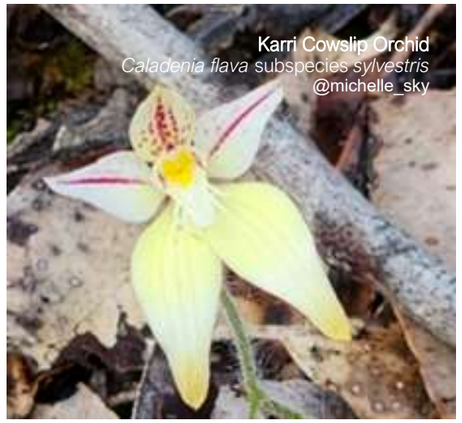
Threatened & Priority Flora Species within the WWBB23

To date, one threatened flora species was observed and identified during the WWBB23, the Dwarf Hammer Orchid (*Drakaea micrantha*). Fifteen priority flora species were observed and identified during the WWBB23.

ENDANGERED (WA) & VULNERABLE (Nationally)

Dwarf Hammer Orchid
Drakaea micrantha

A total of three research grade observations of the Dwarf Hammer Orchid (*Drakaea micrantha*) were observed.


Karri Cowslip Orchid
Caladenia flava subspecies *sylvestris*
@michelle_sky


Cowslip Orchid
Caladenia flava
@ pimelea


Dwarf Hammer Orchid
Drakaea micrantha
©hugo_innes


©hayleydrake

Description:
Tuberous, perennial, herb, 0.15-0.3 m high. Flowers red & yellow, September to October. White-grey sand.
Source:
https://florabase.dbca.wa.gov.au/browse/profile/13635

PRIORITY 1 FLORA
Boronia juncea **subspecies *juncea***

Poorly-known species - known from one or a few locations (on threatened lands).

A total of 4 observations of *Boronia juncea* subspecies *juncea* were observed and identified during the WWBB23 and on a reconnaissance trip before the bioblitz.

Description:
Slender or straggly shrub, pedicels and sepals glabrous. Flowers pink, April. Sand. Low scrub.

PRIORITY 2 FLORA
Poorly-known species known from one or a few locations (some on conservation lands)

- *Andersonia hammersleyana*
- *Aotus franklandii*
- *Calymperastrum latifolium* (Djiriji Moss)
- *Chamelaucium forestii* (Waxflowers)

Andersonia hammersleyana (Priority 2)

Description: Erect to straggling shrub, 0.3-0.8 m high. Flowers blue/blue & white, August to October. Granitic sand, gravelly clay loam. Granite outcrops, slopes.
Source: https://florabase.dbca.wa.gov.au/browse/profile/17644

Aotus franklandii (Priority 2)

Description: Shrub to 1.3 metres high. Flowers orange-yellow, October. Grey humic sand. Flats, lower slopes, swamps.
Source:

https://florabase.dbca.wa.gov.au/browse/profile/31012


Boronia juncea subspecies *juncea*
©kelnat


©adam_rich


Andersonia hammersleyana
@heidinis


Aotus franklandii (Priority 2))

Chamelaucium forestii (Priority 2)
Shrub, 0.3-2 m high. Flowers white-cream-green, September to December. Grey sand or shallow sandy loam. Granite outcrops, rocky crevices, hills.
Source:
https://florabase.dbca.wa.gov.au/browse/profile/49649

PRIORITY 3 FLORA
Poorly-known species known from several locations (some on conservation lands)

- *Adelphacme minima*
- *Anzybas abditus* (Small Helmet Orchid)
- *Chordifex gracilior*
- *Chordifex jacksonii*

Anzybas abditus
Small Helmet Orchid (Priority 3)
First formally described in 1991, the swamp helmet orchid grows in dense vegetation on small mounds in dense winter-wet swamps. It occurs in disjunct populations between Nannup and Esperance.
Source:
https://www.inaturalist.org/taxa/1244803-Corybas-abditus

Chordifex gracilior (Priority 3)
Rhizomatous, erect perennial, herb, 0.3-0.5 m high. Fl. brown, Sep to Dec. Peaty sand. Swamps.
Source: https://florabase.dbca.wa.gov.au/browse/profile/17686

Chordifex jacksonii (Priority 3)
Rhizomatous, erect perennial, herb, 0.4-1 m high. Sand, loamy sand. Seasonally inundated swamps.
Source:
https://florabase.dbca.wa.gov.au/browse/profile/17675

PRIORITY 4 FLORA
Rare, near threatened or other species in need of monitoring

- *Aotus carinata*
- *Banksia serra* (Serrate-leaved Dryandra)
- *Boronia virgata*
- *Eucalyptus brevistylis* (Rate's Tingle)
- *Lysinema lasianthum*
- *Thysanotus isantherus*

Aotus carinata
(Priority 4)

Erect, slender shrub, 0.6-1.5 m high. Fl. orange/yellow & red, Sep to Nov. Sandy soils. Seasonally wet flats.
Source:
https://florabase.wa.gov.au/browse/profile/3685

Banksia serra
Serrate-leaved Dryandra (Priority 4)
Erect, slender, non-lignotuberous shrub, 1-4(-7) metres high. Flowers yellow/cream-green, July to September. Gravel, sand or clay loam over laterite. Hillslopes.
Source:
https://florabase.dbca.wa.gov.au/browse/profile/32084

Boronia virgata (Priority 4)
Slender, erect or sprawling shrub, 0.3-2 metres high. Flowers pink, August to December or January to February. Peaty sand or clay. Swampy or waterlogged places.
Source:
https://florabase.dpaw.wa.gov.au/browse/profile/4447

Lysinema lasianthum (Priority 4)
Spindly shrub, 0.25-0.7 metres high. Flowers white-cream, July to November. Swamps, seasonally wet areas.
Source:
https://florabase.dbca.wa.gov.au/browse/profile/6460

Thysanotus isantherus (Priority 4)
Caespitose perennial, herb (with tuberous roots), to 0.15 m high. Fl. purple, Nov to Dec. Granite.
Source:
https://florabase.dbca.wa.gov.au/browse/profile/1336

A table of conservation codes for native flora and ecological communities can be found in Appendix 1 and a flora species list is presented in Appendix 2.

Five threatened flora and thirty-seven priority flora species were documented as occurring within a 5-kilometre radius of the BioBlitz project area (DBCA, 2023). These species are listed in Appendix 3.

YORGUM

Red-flowering Gum

Corymbia ficifolia

Known as ‘yorgum’ to the Noongar people. It has been communicated to us that yorgum was likely a women’s ‘yorgas’ medicine tree. Another documented Aboriginal name for the tree is ‘bilgie-yutah bunnah’ bilgie = red and blood; yutah = flowers; bunnah = tree (Cunnigham, 1998).

Corymbia ficifolia is one of around 90 eucalypts which were transferred in 1995 to the newly created genus *Corymbia*. Its former scientific name was *Eucalyptus ficifolia.*

Genetic mapping of *Corymbia* and *Angophora* shows species in each genera diverged from each other between 30 to 6 million years before present. The older lineages of *Corymbia* include WA species such as the Red-flowering gum (*C. ficifolia*) and Marri (*C. calophylla*).

Flowering has been recorded in January, February, March, April, May and September with the peak flowering time in mid to late summer. They have bountiful nectar, although some flowering years are more prolific than others and some years more than others. You can even see them on satellite!

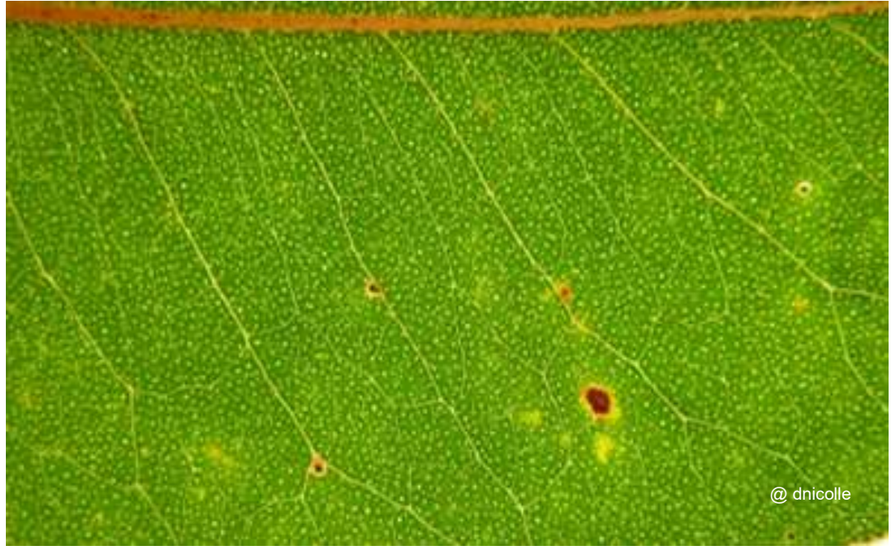
Description: Tree, 2-10 m high, bark rough, short-fibred, longitudinally furrowed. Flowers red-orange, December or January to May. White/grey sand or sandy loam, often with gravel. Hillslopes.

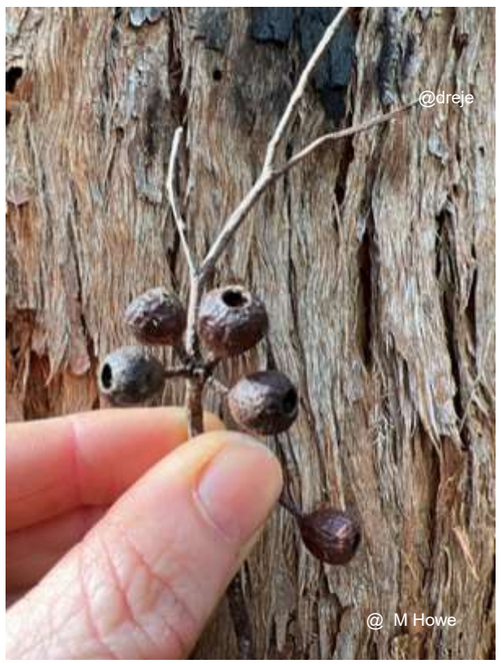
Source:
https://florabase.dbca.wa.gov.au/browse/profile/17103

Corymbia ficifolia Tree Physiology

By Nate Anderson UWA

Researchers from Kings Park, Murdoch University, and UWA-Albany have been monitoring the tree physiology of the iconic Red flowering gum (*Corymbia ficifolia*). Their primary objective was to investigate and compare seasonal variations in plant-water status, and tree function between two distinct populations located near Boronia Rd and Ficifolia Rd. With the support of volunteers during the bioblitz, the researchers completed the final stage of their fieldwork for these comparisons. Together, we measured gas exchange, photosynthetic rates, and leaf water potentials. These measurements will allow comparisons of plant activity based on water availability, which will provide important insights into how Red flowering gum is likely to respond to a warming/drying climate.





Rate's Tingle

Eucalyptus brevistylis

Rate's Tingle is endemic to southwestern Australia, restricted to lowland sites in wet sclerophyll forests. It is the most geographically restricted of the three tingle species which only occur within limited distributions around the Walpole and Nornalup region, with an estimated 2,110 hectares remaining worldwide. Over 90% (1,950 hectares) of the population occurs within the Walpole Wilderness Area with the majority contained within the Walpole-Nornalup National Park.

The name 'tingle' or dtingle' is of Aboriginal origin.

Rate's Tingle was not recognised by early Europeans as a species for many years despite the efforts of Forester Jack Rate. It was finally named and described in 1974 by Ian Brooker from a specimen collected near Walpole by Bruce Maslin in 1971. The scientific name *Eucalyptus brevistylis* is Latin brevis, short and stylis, style.

The species is rare and may have been cut for timber and mistakenly called Yellow Tingle because of wood similarities (EUCLID, 2020).

Description: A medium-sized rough-barked tall tree, 20-50 metres high, bark fibrous to stringy. Flowers white, January to February or April to November. Sandy loam, sand.

Source:
https://florabase.dbca.wa.gov.au/browse/profile/5568


Photo 1
Haemodorum sandifordiae
© D Edmonds


Photo 2
Haemodorum sandifordiae
© D Edmonds

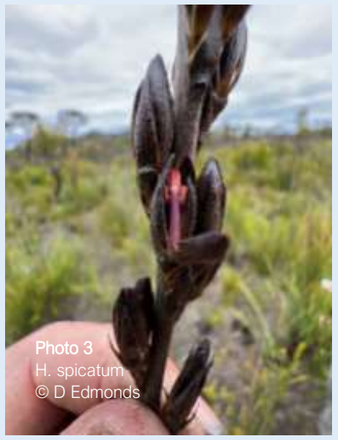


Photo 3
H. spicatum
© D Edmonds

New Species of *Haemodorum*

First discovered after the Northcliffe fires in 2015, this species of Haemodorum is currently being described and will likely be given the name of *Haemodorum sandifordiae*. It is only found in peatlands and appears to flower in the season shortly after a fire. The plant produces a tall single spike of with many black/orange flowers up and down the stem and is similar to the more common species *H. spicatum* which can occur in sandy and forested habitats. It can be easily distinguished from *H. spicatum* by its locations (peat), flowers are produced in pairs with one having a slightly longer stem (pedicel) than the other (Photo 1), orange internal segments (Photo 2) (as compared to *H. spicatum* with purple internal segments – Photo 3). This species was recorded during the summer mini-bioblitz in the peatland below Muppet Rock.


@ dreje


@ dreje


@ dreje


@ dreje

It has been estimated that only 1% of WA's non-vascular flora is formally named and, therefore, their conservation status is largely unknown and may not currently be representative (Brown *et al*. 1998 cited by DEC, 2008; DBCA, 2022).

BRYOPHYTES
Mosses, Liverworts & Hornworts

There are 117 moss species documented in the Warren IBRA Region, with 6 species listed as threatened or priority species. There is one threatened (critically endangered) moss species, four Priority 2 moss species and one Priority 4 moss species listed (DBCA, 2024).

There are 143 moss species documented in the Jarrah Forest IBRA Region, with 3 species listed as priority species. There are no threatened moss species, one Priority 1 moss species, one Priority 2 moss species and one Priority 4 moss species listed (DBCA, 2024).

Numerous moss species documented occur in both the Warren and Jarrah Forest IBRA Regions.

One Priority moss species was listed within a 5km radius of the BioBlitz project area, Floating Hook Moss (*Warnstorfia fluitans*) a Priority 2 flora species, poorly-known species known from one or a few locations (some on conservation lands) (DBCA, 2024).

There are 45 liverwort species documented in the Warren IBRA Region and 50 liverwort species documented in the Jarrah Forest IBRA Region, with numerous species occurring in both regions. None of these are listed as threatened or priority species (DBCA, 2024).


Djiriji Moss
Calymperastrum latifolium
@em_lamond

PRIORITY 2 FLORA

Poorly-known species known from one or a few locations (some on conservation lands)

Djiriji Moss
Calymperastrum latifolium

Description:
This is the sole species in the monotypic moss genus *Calymperastrum*. It is a poorly known moss, having been collected only three times. All three collections were from the trunks of Macrozamia, in the Southwest Botanic Province of Western Australia. It is presumed endemic to the region, making it the only moss genus known endemic to WA.
Source: https://www.inaturalist.org/taxa/1260922-Calymperastrum-latifolium https://florabase.dbca.wa.gov.au/

iNaturalist NON-VASCULAR / CRYPTOGRAM FLORA

Species Observations

MOSSES
Phylum Bryophyta

- 27 species
- 110 observations
- 21 observers
- 18 identifiers

LIVERWORTS
Phylum Marchantiophyta

- 12 species
- 33 observations
- 4 observers
- 7 identifiers

HORNWORTS
Phylum Anthoceratophyta

- No hornworts were documented during the WWBB23

FUNGI & LICHEN

- 99 species
- 385 observations
- 45 observers
- 47 identifiers

MOSSES
Phylum Bryophyta


Bog Clubmoss
Brownsea serpentina
@bushmonger


Bonfire Moss
Funaria hygrometrica
@em_lamond


Joint-toothed Mosses
Racopilum cuspidigerum


Ciliate Hoarmoss
Hedwigia ciliata

LIVERWORTS
Phylum Marchantiophyta


Asterella drummondii
a member of
Complex Thallose Liverworts


Bonfire Liverwort
Marchantia berteroana


Chaetophyllopsis whiteleggei
a member of Leafy Liverworts
@hugo_innes


Goebelobryum unguiculatum
a member of Leafy Liverworts

FUNGI & LICHEN


Orange Spore Fungus
Favolaschia claudopus
(introduced)
@pruedles


Pixie Cup Lichen
Cladonia species
@pruedles


Rhytidenia campyla
@bushmonger


Orange Fan
Anthracophyllum archeri
@_K Syme

Threatened & Priority bryophyte species observed during the WWBB23

To date, no confirmed threatened bryophyte species were known to be observed or identified during the WWBB23. Djiriji Moss (*Calymperastrum latifolium*), a Priority 2 listed species was observed during the WWBB23.

FUNGI & LICHEN

In the South-West province of Western Australia, about 764 species of fungi have been recorded, with 689 species considered native in all of their range, 12 considered alien and 63 species still uncertain as to their origin in the southwest (DBCA, 2024).

There are 345 fungi species documented in the Warren IBRA Region, with 4 species considered alien and 24 species still uncertain as to their origin in the region (DBCA, 2024).

There are 449 fungi species documented in the Jarrah Forest IBRA Region, with 6 species considered alien and 47 species still uncertain as to their origin in the region (DBCA, 2024). Numerous fungi species documented occur in both the Warren and Jarrah Forest IBRARegions.

There are 264 lichen species documented in the Warren IBRA Region with all species considered native within their entire range. (DBCA, 2024). Around 387 lichen species are documented in the Jarrah Forest IBRA Region, with all species considered native within their entire range (DBCA, 2024). Numerous lichen species documented occur in both the Warren and Jarrah Forest IBRA Regions.

In 2008, 434 unnamed fungi species and 61 unnamed fungi genera had been recorded from the Walpole Wilderness Area (Syme, 2004 cited by DEC, 2008). A systematic regional survey of fungi and non-vascular flora has yet to be undertaken.

Total number of fungi & lichen species observed during the WWBB23

Ninety-nine species of fungi, including lichens, were observed during the WWBB23 and identified to species or genus level on iNaturalist. With 57 fungi species currently documented within a 5-kilomtere radius of the WWBB23 project area (DBCA, 2023), this is almost double (42.4%) the number of fungi documented to date.

Opportunistic fungi observations were undertaken within the BioBlitz project area prior to the WWBB23 during reconnaissance site visits between April to October 2023 which enabled a greater diversity of fungi to be documented.

See Appendix 4: Fungi & lichens species

Threatened & Priority fungi & lichen species

In the South-West province of Western Australia, there are currently no fungi or lichen species listed as threatened and 18 fungi and 22 lichen species listed as priority species considered poorly-known or rare, near threatened or other species in need of monitoring (DBCA, 2024).

Within the Warren IBRA Region, five fungi species are listed as priority species. There are two Priority 2 fungi species and three Priority 3 fungi species listed (DBCA, 2024).

Within the Jarrah Forest IBRA Region, nine fungi species are listed as priority species. There are four Priority 2 fungi species and five Priority 3 fungi species listed (DBCA, 2024).

Numerous priority fungi species documented occur in both the Warren and Jarrah Forest IBRA Regions.

Two priority fungi species are listed within a 5-kilometre radius of the BioBlitz project area, and both are known to occur within the Warren and Jarrah Forest IBRA region:

Priority 2
Poorly-known species known from one or a few locations (some on conservation lands)

- *Amanita walpolei*

Priority 3
Poorly-known species known from several locations (some on conservation lands)

- *Amanita drummondii*

There are seven priority lichen species listed within the Warren IBRA Region. There is one Priority 1 lichen species, three Priority 2 lichen species and three Priority 3 lichen species (DBCA, 2024).

Within the Jarrah Forest IBRA Region there are 12 priority lichen species listed. There are four Priority 1 lichen species, six Priority 2 lichen species and two Priority 3 lichen species (DBCA, 2024).

Numerous priority lichen species documented occur in both the Warren and Jarrah Forest IBRA Regions.

One Priority 3 fungi species, *Amanita carniephylla,* was observed and identified during the BioBlitz. To date, no confirmed priority lichen species were known to be observed or identified during the WWBB23.

Knowledge and information of fauna within the Walpole Wilderness area is still very limited, particularly information on the distribution, ecology and conservation status of reptiles, amphibians and invertebrates (DBCA, 2008).

Threatened, Priority & Other Specially Protected Fauna

The Commonwealth's Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 provides a listing of nationally threatened fauna species. All of these species are also listed as threatened under Western Australia's Biodiversity Conservation Act 2016, although may be assessed as having a different category of threat (DBCA, 2022).

Under the Biodiversity Conservation Act 2016, the WA Minister for Environment may list fauna species as threatened or other specially protected fauna under several categories of threat (DBCA, 2022). The WA Threatened Species Scientific Committee is an independent scientific advisory body established by the Minister, which assesses the conservation status of species and makes recommendations to the Minister regarding approval. In addition to this, DBCA also maintains a list of priority fauna species.

See Appendix 1: Conservation codes for Western Australian fauna.

There are 133 threatened and priority fauna species within the Warren region including 78 birds, 24 mammals, 12 invertebrates, 2 amphibians, 4 reptiles (1 terrestrial); 13 fish species (including 7 freshwater species) (DBCA, 2022).

Numerous fauna species have been documented within the Walpole Wilderness Area and adjacent reserves and are listed as threatened, conservation dependent, specially protected, rare, near threatened or other species in need of monitoring (Table 1).

It should be noted that some of the threatened species listed as occurring within the area have not been observed or documented for some time such as the Western Ground Parrot (*Pezoporus flaviventris*), Malleefowl (*Leipoa ocellata*) and Numbat (*Myrmecobius fasciatus*).

There are also several other threatened and priority invertebrate species known or likely to occur within the Walpole Wilderness. This should not be considered to be an exhaustive list of threatened and priority fauna species within the area.

See Appendices 5 through to 10 for fauna species observations lists divided by major group.

Table 1
Walpole Wilderness Area Threatened Fauna
Source: DEC 2008, DBCA 2022

Critically Endangered (WA & Nationally) • Western Ringtail Possum, ngwayir
Critically Endangered (WA only) • Brush-tailed Bettong, woylie (vulnerable nationally) • Western Ground Parrot
Endangered (WA & Nationally) • Australasian Bittern • Australian Sea-lion • Baudin's Cockatoo • Carnaby's Cockatoo • Sub-Antarctic Fur seal • Tingle Pygmy Trapdoor Spider • Walpole Burrowing Crayfish
Endangered (Nationally only) • Sub-Antarctic fur seal (vulnerable WA)
Vulnerable (WA & Nationally) • Balston's Pygmy Perch • Chuditch, Western Quoll • Forest Red-tailed Black-cockatoo • Malleefowl • Numbat • Quokka • Sunset Frog
Conservation Dependent (WA) • South-western Brush-tailed Phascogale, wambenger • Muir's Corella
Priority 2 • Short-nosed Snake
Priority 4 • Quenda, Southwestern Brown Bandicoot • Western False Pipistrelle, Western Falsistrelle


Emu
Dromaius novaehollandiae
@draconis2376

iNaturalist BIRDS
Species Observations

- **43 birds** have been identified to genus or species level
- **58 observations** have been made
- **15 observers** uploaded their observations
- **22 identifiers** joined the project to assist


Splendid Fairywren
Malurus splendens
©draconis2376


Grey Currawong
Strepera versicolor
@draconis2376

There are no endemic bird species exclusive to the Walpole Wilderness Area although numerous species are endemic to the south-west, including threatened species such as Baudin's Cockatoo (*Zanda baudinii*), Carnaby's Cockatoo (*Zanda latirostris*) and the Forest Red-tailed Black-cockatoo and occur within the Walpole Wilderness (DEC, 2008).

See Appendix 5: Bird species observations lists.

Total number of bird species observed during the WWBB23

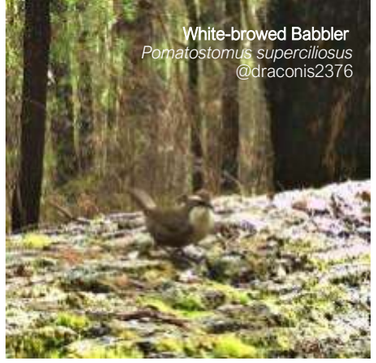
A total of 43 bird species were observed and identified during the WWBB23. Of these, 21 bird species were uploaded to iNaturalist from observations during the BioBlitz as well as bird species captured on fauna motion cameras. In addition, a total of 32 bird species were observed during the BioBlitz with Birdlife WA bird survey sessions and incidental observations, some of which were the same species uploaded to iNaturalist, although included some bird species that were not. These observations have been combined in Appendix 5: Bird species observation list.

Bird surveys were undertaken on both mornings of the BioBlitz. Each survey occurred in different habitat types, including extensive and highly diverse heath, forest, open woodland and swamp heath vegetation, some sections partially inundated with bog and ponds.

All birds detected were recorded on the Birdata app by Dr Rochelle Steven. The 5km area search survey method was chosen given the distance and likely area of detection. Species and abundance were recorded for both surveys.

> *"The WWBB 2023 has provided another catalyst for professional scientists, nature lovers and soon to be nature enthusiasts to connect and share knowledge and passion for the Walpole Wilderness area… Perhaps the most significant outcome of this event being the resulting deeper connection among all participants with the special biodiversity of the Walpole Wilderness area. We look forward to continuing to collaborate on this and other projects in the future."*
>
> Dr Rochelle Steven,
> Murdoch University Lecturer and
> Birdlife WA member


@pruedles


White-browed Babbler
Pomatostomus superciliosus
@draconis2376


Australian Owlet-Nightjar
Aegotheles cristatus
@draconis2376


White-breasted Robin
Eopsaltria georgiana
@draconis2376


Brown Quail
Synoicus ypsilophorus
@draconis2376


Dusky Woodswallow
Artamus cyanopterus
@pimelea


Brown Quail
Synoicus ypsilophorus
@draconis2376


Emu
Dromaius novaehollandiae
@draconis2376

@R.Steven

Threatened & Priority bird species within the Walpole Wilderness

There are 79 threatened or priority bird species, including migratory birds protected by international treaties and other specially protected bird species documented in the Warren region (DBCA, 2022), many of which are known to occur within the Walpole Wilderness and/or adjacent reserves and private properties (DEC, 2008). The records of certain species, such as the Western Ground Parrot and Malleefowl, are historical and have not been observed for many years or decades and are considered locally extinct.

Three Black-cockatoo species are listed as threatened under state and national legislation and are known to occur in the Walpole Wilderness Area. The 'endangered' Baudin's Cockatoo (*Zanda baudinii*) and Carnaby's Cockatoo (*Zanda latirostris*); and 'vulnerable' Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*) have been observed and documented in the area. Their critical habit includes roosting sites, nest trees, hollow-bearing and dead standing trees as well as their food and water sources. The locations of their breeding areas, nesting trees, roosts and other habitat uses are not well documented within the area.

Many of their habitat areas may change with seasonality and over years, although there is evidence to suggest that if a pair raises a chick successfully in a hollow, they will likely try and use the same hollow again next time they nest (Tony Kirkby, *pers. comm*). If the chick does not survive, they will try a different hollow, usually nearby. The competition for these hollows is a major threat to all Black-cockatoo species, as is the rate of attrition of old growth trees with hollows required for nesting through fire and other disturbances within and adjacent to the area.

Threatened bird species observed during the WWBB23

Evidence of the 'endangered' Baudin's Cockatoo (*Zanda baudinii*) and Carnaby's cockatoo (*Zanda latirostris*) and an observation of the 'vulnerable' Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksia naso*) was identified during the WWBB23.

No priority bird species were known to be observed or identified during the BioBlitz.

KARRAK
Forest Red-tailed Black-Cockatoo
Calyptorhyncus banksii naso

Breeding: Studies have revealed hollows large enough for Forest Red-tailed Black-Cockatoo breeding do not begin to appear in eucalypts until they are over 200 years old. Some nest trees used by Black-cockatoos are estimated to be 300–500 years of age (Johnstone *et al*., 2013).

Most nests are in very large and very old, mature Marri (*Corymbia calophylla*), a long-lived endemic tree species, which is the most important nesting tree throughout the FRTBC range. Nest trees of all species had a mean circumference at breast height of 2.79 m, a mean estimated age of 222 years and a mean overall height of 20.24 m. Marri nest trees had a mean circumference at breast height of 2.76 m, a mean estimated age of 220 years (95% confidence limit 209–231 years) and an average overall height of 20.04 m. The rate of fall or loss of nest trees was high, c. 16.6% per decade (Johnstone *et al*., 2013).


@S Rycken

ENDANGERED (WA & Nationally); CRITICALLY ENDANGERED (IUCN Redlist)

NJOOLARK
Baudin's Cockatoo *Zanda baudinii*

Njoolark, Baudin's Cockatoo or Long-billed Black-cockatoo is endemic to south-west Western Australia. It was named after the French explorer, cartographer and naturalist, Nicolas Baudin (1754-1803) who led scientific expeditions of the Australian Coast, including southwest WA from 1800 to 1803.

It is listed as Endangered (WA and nationally) and Critically Endangered (IUCN, 2021) with a population decrease of 90% over the last three generations. The population is now estimated at just 2,500 to 4,000 mature individuals (Kaarakin Black Cockatoo Conservation Centre, 2023).

Baudin's and Carnaby's Cockatoos were considered the same species until 1979 due to their similar appearance, however they have differences in bill shape, call, diet and some habitats.

Description: 50-60 cm in length and weighs between 560–720 grams. It has black feathers edged with a white trim that gives it a scalloped appearance. It has longer black feathers on the top of its head that form a short crest that can be raised and lowered and a distinctive patch of white cheek feathers.

Its tail feathers have a narrow central panel of all black feathers with white bands on the lateral feathers that extend towards the tip.

Males: Black bill, pink eye ring and dusky grey-white ear patches.

Females: Greyish white bill with black tip, grey eye ring and yellowish white ear patches.

Juveniles: Both male and female juveniles have a white beak, grey eye and less white in their tail feathers. Juvenile males resemble adult females until about 3 years old.

Distribution: Humid and sub-humid forests of southwest WA. Baudin's Cockatoos prefer a wetter, more heavily forested habitat compared to Carnaby's Cockatoos, however due to the significant loss of habitats the two groups range may overlap.

Habitat: Jarrah, Marri and Karri forests.

Diet: Seeds of Eucalyptus, Corymbia (primarily Marri), Banksia, Hakea and fruiting apples and pears. Also, nectar buds and flowers. They also eat insects and beetle larvae from under bark and from the wood of live and dead trees.

Lifespan: 25 – 50 years in the wild.

Breeding: Baudin's nest in the hollows of very old Marri, Karri, Wandoo, Tuart and Bullich trees. The female lays one or two eggs in the breeding season, incubating the eggs until hatching. Usually only one chick survives to become a fledgling. The male feeds and protects the females when nesting, and the chick once hatched.

The Baudin's Cockatoo is usually seen in groups of three or small flocks. During the non-breeding season, at sites where food is abundant Baudin's can gather in large flocks up to 300.

Source: https://blackcockatoorecovery.com/cockatoos-and-animals/black-cockatoos/baudins-cockatoo/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MAMMALS

There are at least 27 species of native mammals within the Walpole Wilderness area and adjacent reserves (including marine mammals) with a third of them (9 species) considered endemic to southwest Western Australia (DEC, 2008) and many listed as threatened or priority species.

This represents a relatively high diversity of mammals although many species populations have declined and now exist only as small, isolated populations (How *et al*. 1987 cited by DEC, 2008). The major causes for these population declines are considered to be extensive land clearing and logging since European settlement destroying vital habitat and predation by introduced predators, mainly foxes and cats (DEC, 2008).

Threatened & Priority mammal species within the Walpole Wilderness

Australia has the highest rate of mammal extinctions in the world with a significant proportion of the surviving animals and plants listed as threatened. The major drivers of this decline have been predation by two introduced species, the cat and the red fox, and changed fire regimes (Woinarski *et al*., 2015).

In the Warren region, there are 24 native mammals species listed as threatened, priority or other specially protected species, including 9 marine mammal species protected under state and/or national and international agreements for migratory species (excluded in the list below) (DBCA, 2022).

DBCA keeps a list of Priority species that are considered poorly known, rare, near threatened or other species in need of monitoring and there are five Priority 4 mammal species currently listed in the Warren region (DBCA, 2022).

Critically Endangered (WA and Nationally)
- Western Ringtail Possum, ngwayir

Critically Endangered (WA), Endangered (Nationally)
- Woylie, Brush-tailed Bettong

Endangered (WA and Nationally)
- Numbat, walpurti

Vulnerable (WA & Nationally)
- Quokka
- Chuditch, Western Quoll

Conservation Dependent (WA)
- South-western Brush-tailed
- Phascogale, wambenger

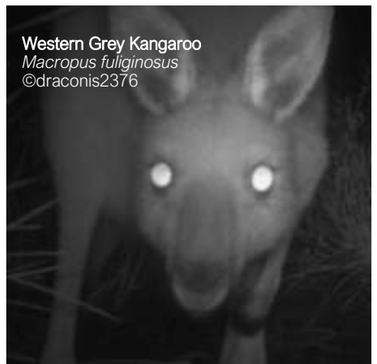
Priority 4 (DBCA Priority list)
- Quenda, Southwestern Brown Bandicoot
- Tammar Wallaby


Common Brush-tailed Possum
Trichosurus vulpecula
@draconis2376


Australian Bush Rat
Rattus fuscipes
@draconis2376

iNaturalist MAMMALS
Species Observations

- **10 mammals** have been identified to genus or species level
- **54 observations** have been made
- **11 observers** uploaded their observations
- **21** identifiers joined the project to assist


Western Grey Kangaroo
Macropus fuliginosus
©draconis2376

- Water-rat, rakali
- Western Brush Wallaby, kwoor
- Western False Pipistrelle, Western Falsistrelle

Three threatened mammals, the quokka (*Setonix brachyurus*) and chuditch (*Dasyurus geoffroii*), listed as 'vulnerable', the 'conservation dependent' South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*; wambenger) and one priority 4 mammal species, the Western False Pipistrelle (*Falsistrellus mackenziei*) are documented as occurring within a 5-kilomtere radius of the WWBB23 project area (DBCA, 2023).

Total number of Mammal species OBSERVED during the WWBB23

In total 10 mammal species were observed or identified from sightings, scats, tracks or other traces such as diggings within the WWBB23 project area, including several mammal species that were identified from fauna motion cameras set up within the area between August and September 2023 and uploaded to iNaturalist as part of the BioBlitz project.

Out of the 10 mammal species identified, 7 were native mammal species and 3 were introduced mammal species were identified including Feral Cat, European Rabbit and Black Rat.

See Appendix 6: Mammal species observations list.

Threatened & Priority Mammal species OBSERVED during the WWBB23

One threatened mammal species, the Quokka (*Setonix brachyurus*) was detected by fauna motion cameras within the WWBB23 area between August and October 2023 with a total of 6 observations. One priority mammal species, South-western Brown Bandicoot or quenda (*Isoodon fusciventer*), listed as Priority 4 fauna, was detected by fauna motion cameras within the Bioblitz project area with a total of 2 observations.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NOOLBENGER
Honey Possum *Tarsipes rostratus*

Honey Possums are only found within the southwest of WA. They are the only mammal in the world, besides some bats, that feed exclusively on nectar and pollen. This means they rely on something to be flowering every day of the year! They are highly specialised in feeding on nectar and pollen with their long-pointed snout and brush-tipped tongue to probe flowers.

Description: They are mouse-sized marsupials with a combined head and body length of approximately 70 mm (males: 65-85 mm; females: 70-90 mm). They have a long-pointed snout, rounded ears and eyes towards the top of the head. They have a very long tail (males: 70-100 mm; females: 75-105 mm). Their fur is light brown or grey above, usually with a central dark stripe flanked by paler bands running lengthwise down the back.

Weight: 7-11 grams (males); 8-16 grams (females)

Habitat: Diverse vegetation communities in limited winter rainfall areas of sandplain heathland rich in plant species of the families Proteaceae such as banksias, hakeas and grevilleas and Myrtaceae such as eucalypts and melaleucas.

Breeding: Closely related to the flowering patterns of the nectar-producing plants they feed on. They nest among leaves in grass tree stems or foliage and even in abandoned birds' nests. Honey possums have the smallest newborns of any mammal, weighing 0.003-0.005 g. Each is about the size of a grain of rice.

Four separate observations of the Honey Possum were recorded within the Walpole Wilderness BioBlitz project area, all by motion sensor cameras located by Dr Karlene Bain between August and October 2023.

NYINGARN
Short-beaked Echidna
Tachyglossus aculeatus

The echidna is one of only two members of an ancient group of mammals known as monotremes, like the platypus. It lays eggs and suckles its young. They are toothless and feed almost exclusively on termites. They break open termite mounds with their strong paws and snouts or by digging into them to extract the termites with their long sticky tongues.

When they are disturbed, they curl into a spiny ball or dig into the ground to protect their soft underside.

Description: Echidnas are slow-moving animals with long spines covering their body with fur in between. They have a bulbous forehead and a long snout to collect their food. Males have a spur on the ankle on the hind leg, but it is not venomous like that of the platypus. They have a long sticky tongue that is approximately 17 centimetres in length beyond the end of their snout.

Distribution: Echidnas are widely distributed throughout Australia, including Tasmania, and although they are not commonly seen the evidence of their diggings at the base of termite or ant mounds can be an obvious indication of their presence in an area.

Habitat: They are found in a variety of habitats from forests and woodlands to mountainous peaks and deserts, wherever there is a good supply of ants and termites. They can hibernate in cold weather and avoid extreme heat by sheltering in burrows or other refuges.

Biology and Breeding: Echidnas are usually solitary, but during the breeding season between July and August they give off a strong smell that may indicate their presence. During this time, several males may follow a single female in a "train" until she is ready to mate. About 2 weeks after mating, a single soft-shelled egg is deposited directly into her pouch and hatches after 10 days. The echidna does not have teats and the baby, known as a "pug", clings to specialised hairs within the pouch where it suckles milk oozing from the mother's mammary glands. They are hairless when born and is covered in short spines by the time it leaves the pouch and is placed in a burrow to which the mother returns every 5-6 days for suckling. It remains here for about 6 months.

There was 1 observation during the WWBB23 captured by a motion sensor camera within the WWBB23 area in September 2023.

MARDO
Yellow-footed *Antechinus flavipes*

The Mardo is a small nocturnal carnivorous mammal that is part of the Dasyurid family, which includes Chuditch, Phascogales and Thylacines. It is the most widespread Antechinus species, occurring from north-eastern Queensland to southwest WA in a range of different habitats from tropical and temperate forests to swamps and dry mulga country. In southwest WA it is found in jarrah, karri and tingle forests, woodlands, heath and coastal vegetation along the southern coast.

Description: In between the size of a mouse and small rat. Distinguished by the change in fur colour from slate-grey head to rufous rump, feet, belly and sides. They have prominent light eye rings and a black-tipped tail. They have pointed heads with dark eyes and large ears. Their feet have small, sharp claws on agile toes. They have darting, erratic movements and can run upside down along branches and rock surfaces at speed.

Diet: Consists mainly of invertebrates but also includes flowers, nectar, small birds, reptiles and mammals, such as mice. It can move quickly to pounce on live prey and may be seen "bulldozing" through leaf litter in search of prey.

Breeding: They only breed once a year, mating in late winter or spring and like phascogales, all males die shortly after mating. They nest in small hollows and crevices. After about 4 weeks gestation, the female gives birth to up to 12 young which are carried in the pouch for up to 5 weeks and weaned after about 3 months. The young share a leafy nest until the following winter when they begin to become more territorial and intolerant of each other's company.

There were 6 observations captured by motion sensor cameras within the WWBB23 area between August and September 2023'

Introduced Mammal species OBSERVED during the WWBB23

Several introduced animals occur within the Walpole Wilderness Area and are known to cause significant damage and degradation to the environmental values of the area through predation on native animals, destruction or modification of habitats or competition for valuable food resources.

Three introduced (non-native) mammals were observed during the WWBB23 including Feral Cat (*Felis catus*), European Rabbit (*Oryctolagus cuniculus*) and Black Rat (*Rattus rattus*). Feral Pig (*Sus scrofa*) and Red Fox (*Vulpes vulpes*) are also known to occur within the Walpole Wilderness Area although they were not documented on iNaturalist by participants during the BioBlitz or on motion sensor cameras set between August and October 2023.

Evidence of substantial damage from Feral pigs was observed by participants within a recently burnt peatland area in Crossing block (David Edmonds, *pers. comm*., 2023; Melissa Howe, observed, 2023).

Most of these introduced species are indicated nationally in key threatening processes under the Commonwealth's EPBC Act 1999 and have threat abatement plans developed for them (DBCA, 2019). They are also declared pests under the Biosecurity and Agriculture Management (BAM) Act 2007 due to their significant adverse impacts on agricultural and environmental values. They are categorised as species that should have some form of management applied that will alleviate their harmful impacts, reduce their numbers or distribution or prevent or contain their spread (DPIRD, 2020). Their management has been identified as a high priority within the Walpole Wilderness and Adjacent Parks and Reserves Management Plan (DEC, 2008).

Foxes and cats have caused the decline of many small to medium-sized species of Australian native mammals, often referred to as 'critical weight range' species, falling within an intermediate body weight range of 35 grams to 5.5 kilograms. Critical weight range species are considered to be most at-risk of being predated on by foxes and cats (Woinarskia *et al*., 2015).

EUROPEAN RABBIT
Oryctolagus cuniculus

Two separate observations of the European Rabbit were recorded within the Walpole Wilderness BioBlitz project area by motion sensor cameras located by Karlene Bain between August and October 2023.

Interestingly, the European Rabbit is considered 'Globally Endangered' in its native habitat within France, Portugal and Spain and is listed on the IUCN Redlist (Villafuerte & Delibes-Mateos, 2019).

Black Rat
Rattus rattus

Two separate research grade observations of the Black Rat were recorded within the Walpole Wilderness BioBlitz project area by motion sensor cameras located by Karlene Bain between August and October 2023.

REPTILES

Reptiles can be found in a variety of habitats within the Walpole Wilderness Area including coastal dunes, flats, swamps, areas of more open vegetation and granite outcrops. Within the Walpole Wilderness area, 32 species of native reptiles have been identified and recorded. Of these, 20 species are skinks, and 6 species are snakes (elapids or front-fanged venomous snakes) (DEC, 2008).

The skinks within the Walpole Wilderness Area have a high level of endemism and 13 out of the 20 skinks recorded (65%) are only found in the south-west of WA (DEC, 2008).

Threatened & Priority reptile species within the Walpole Wilderness

There are three threatened reptile species listed in the Warren region, but they are all marine turtle species. There are no threatened terrestrial reptiles listed as threatened in the Warren region, although there is one Priority 2 listed reptile, being the Short-nosed Snake (Elapognathus minor) (DBCA, 2023), which is endemic to south-west WA (DEC, 2008).

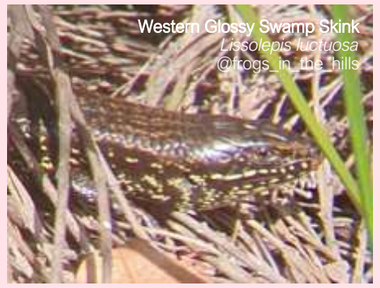
See Appendix 7: Reptile species observations list.

iNaturalist REPTILE Species Observations

- **10 reptiles** have been identified to genus or species level
- **28 observations** have been made
- **18 observers** uploaded their observations
- **20 identifiers** joined the project to assist


Common Southwest Ctenotus
Ctenotus labillardieri
@semky


Southern Marbled Gecko
Christinus marmoratus
@edizzyurid


Western Glossy Swamp Skink
Lissolepis luctuosa
@frogs_in_the_hills


South-western Rock-Skink
Liopholis pulchra
@pimelea

GECKOS GEKKONIDAE FAMILY

There was 1 observation of two Southern Marbled Geckos (*Christinus marmoratus*) documented photographically on iNaturalist on a granite outcrop during the WWBB23 in London block, Trent WA.

SKINKS – SCINCADAE FAMILY

There were 22 observations of Skinks (Scincidae) identifying 7 different species including:

- Lowlands Earless Skink (*Hemiergis peronii)*
- Common South-west Ctenotus (*Ctenotus labillardieri)*
- Western Glossy Swamp Skink - *Lissolepis uctuosa*
- Shingleback Lizard (*Tiliqua rugosa*)
- South-western Rock-Skink (*Liopholis pulchra)*
- South-western Crevice Skink (*Egernia napoleonis)*
- South-western Mulch-Skink (*Hemiergis gracilipes)*

The majority of observations were seen during the WWBB23 weekend, although 2 observations were captured from motion sensor cameras within the project area between August and October 2023. The six species observed represent 35% of skink species known to occur in the Walpole Wilderness Area, many being endemic to southwestern Australia.

Western Glossy Swamp Skink *Lissolepis luctuosa*

Description: A medium-sized semi-aquatic skink with well-delvepoed limbs, each with five digits. Similar to to the King's Skink but with smooth, glossy body scales. Body colour varies from greenish-yellow, yellowish-brown to dark brown with six series of black oblong spots or blotches extending longitudinally from neck to tail. Parts of body marked with yellow or yellowish-brown flecks.

Total length: 34 cm

Distribution: Occurs from Perth to Albany region.

Habitat: In the dense vegetation of sedges, bullrushes and heath surrounding lakes, swamps, rivers and creeks.

General: Solitary and very shy. Becomes nocturnal during hot weather. Can swim with ease. Feeds on invertebrates and bears live young.

Source: Bush *et al*., 2007, Bush *et al.,* 2010.

South-western Rock-Skink . (South-western Spectacled Rock Skink) *Liopholis pulchra*

Description: A medium-sized skink with well-delvepoed limbs, each with five digits. Head and body squarish in cross-section. Body colour pale yellowish-brown to reddish-brown with or without a braod vertebral stripe of similar colour extending from the neck to the base of its tail. The stripe is edged by a broad, dark dorsal stripe enclosing a series of pale dorsal spots. Eyelids distinctly edged with cream. Similar to Bull-headed Skink but more depressed head and lips and ear scales often tinged with orange or pink.

Total length: 30 cm

Distribution: Occurs on the Darling Range south to Albany region.

Habitat: Preferring woodlands and shrublands, usually in association with rock, particularly granite outcrops. Shelters in burrows beneath rocks or fallen logs, or in rock crevices.

General: It is diurnal and terrestrial. Feeds on invertebrates and bears live young.

Source: Bush *et al.,* 2007, Bush *et al*., 2010.

South-western Mulch-Skink
Hemiergis gracilipes

Description: A small, long-bodied skink with short, widely spaced limbs and smooth, glossy scales. Similar to other large mulch skinks, but with spotted sides of the body and five fingers and toes.

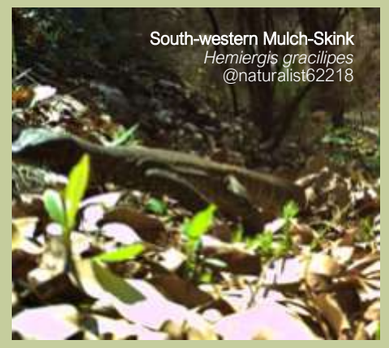
Total length: 18 cm

Distribution: Occurs from Bunbury and Collie south to near Albany in coastal dunes, Karri forest and sand plains with heath and wetlands.

Habitat: They are often found in abandoned stick ant nests.

General: Ovoviviparous, producing young by means of eggs which are hatched within the body of the parent.

Source: Bush *et al.,* 2007.



MONITOR LIZARDS – VARANIDAE FAMILY

Southern Heath Monitor,
Varanus rosenbergi

Description: A moderately large goanna with laterally compressed tail. Body colour dark grey, scattered with pale grey to pale yellow. Top of head almost black. A black line extends through each eye, back towards the neck. Several dark bands on the back of the neck, which curve forward onto sides. Similar to Gould's Sand Monitor (*Varanus gouldii*) but has black transverse bands across its back, with interspaces much wider than bands and a dark tail tip. Its limbs are black, spotted with cream to pale yellow.

Total length: 130 cm

Distribution: In the southwest it occurs north to Perth and Norseman, extending east across the southern Nullabor.

Habitat: In a variety of habitats including woodlands, sandplains and rocky areas such as granite outcrops. Also, on Middle Island in the Archipelago of the Recherche.

General: Spends most of its time on the ground, but if chased, may climb the nearest tree with its sharp claws and powerful limbs. Digs a burrow for shelter or uses the burrows of other animals. Feeds on frogs, reptiles, birds, insects and carrion. They have been observed using termite mounds for laying their eggs.

Source: Bush *et al.,* 2007, Bush *et al.,* 2010.

There was 1 observation of the Southern Heath Monitor documented during the BioBlitz by motion sensor camera.

AUSTRALIAN SNAKES - SUBFAMILY HYDROPHIINAE

Dugite (Spotted Brown Snake)
Pseudonadja affinis subsp. *affinis*

Description: A large, slender to moderately stout snake. Dorsal scales matt to weakly glossy. Body colour is highly variable, pale to dark brown, yellow, reddish-brown, olive, green or black. Often sparsely to heavily marked with irregular black spots or blotches. The head may be paler or darker than the body. Similar to the Gwardar (Western Brown Snake, *Pseudonaja nuchalis*).

Total length: 213 cm

Distribution: Occurs throughout much of the southwest, north to Cervantes, Central Wheatbelt, Goldfields and east to southern Nullabor.

Habitat: Inhabits most habitats including coastal dunes, sandplains, rocky areas, forests and woodlands.

General: Both diurnal and nocturnal according to temperature. Feeds on mice, birds, lizards and snakes, including its own kind. Mating occurs in spring and males may be observed fighting. They lay one or sometimes two clutches of 10-30 eggs between November and February. Hatching occurs from February to May. During summer and early autumn, large numbers of juveniles disperse from hatching sites.

Source: Bush *et al.,* 2007, Bush *et al.,* 2010.

AMPHIBIANS

There are at least 19 frog species within the Walpole Wilderness Area. Substantial areas of swamps, sedgeland, shrubland and forest, such as the Mt Soho and Owingup swamps, support one of the richest areas for frogs in Western Australia (DEC, 2008). The Mt Soho Swamps are considered of national significance and referred to as "the frog swamps of Mount Soho" (Environment Australia, 2001).

Five of the seven (71%) Australian *Geocrinia* species occur only in south-western Australia and four of these are confined to the cooler lower corner (Bush *et al.,* 2007). Five of fourteen (approximately 36%) Australian *Crinia* species occur in the southwest (Bush *et al*., 2007).

All amphibian species identified during the WWBB23 were frogs. Several frog species were observed and have been identified to species or genus level being Quacking Frog (*Crinia georgiana*), Glauert's Frog (*Crinia glauerti*), Ticking Frog (*Geocrinia leai*), Slender Tree Frog (*Litoria adelaidensis*) and an unidentified *Heleioporus* species, a member of Foam-nesting Ground Frogs.

See Appendix 8: Amphibian species observations list.

Threatened & Priority frog species within the Walpole Wilderness

Two threatened or priority frog species are documented in the region and known to occur within the Walpole Wilderness Area and/or in adjacent reserves and private properties:

- Vulnerable (WA), Endangered (Nationally): Sunset Frog
- Priority 4: Nornalup Frog

iNaturalist AMPHIBIANS Species Observations

- **5 amphibians** have been identified to genus or species level
- **37 observations** have been made
- **24 observers** uploaded their observations
- **10 identifiers** joined the project to assist

The Sunset Frog (*Spicospina flammocaerulea*), the Nornalup frog (*Geocrinia lutea*), and the Roseate Frog (*Geocrinia rosea*) are very restricted in their occurrence throughout the Walpole Wilderness Area. The Sunset Frog has a limited extent of occurrence, estimated at approximately 305 km² (Burbidge & Roberts 2001; Roberts *et al*. 1999 cited by DCCEEW, 2024) and its area of occupancy was estimated at 135 hectares (Burbidge & Roberts 2001; Roberts *et al*. 1999 cited by DCCEEW, 2024).

The Sunset Frog is only found in the isolated relictual peat swamps on the Frankland, Bow and Kent River catchments, north and east of Walpole. Due to its small distribution and the imposing threats to it and its habitat, it is currently listed as 'vulnerable' under state and national environmental legislation (DPAW, 2015 assessed by TSSC, 2019). The Sunset Frog was originally recognised as an 'endangered' species but in 2019, the conservation status of the sunset frog was downgraded by the Australian Government to the lesser status of 'vulnerable', mainly because of lack of evidence of population declines (DPAW, 2015 assessed by TSSC, 2019).

Threats to the Sunset Frog include predation and destruction of habitat by native and non-native species, particularly feral pigs, amphibian chytrid fungus disease, impacts of a drying climate and fire impacts on peat swamps. Due to these ongoing impacts, it is inferred that there will be a continuing decline in the area, extent and/or quality of habitat (DPAW, 2015 assessed by TSSC, 2019).

Over the last few decades, the peatland areas of the Sunset Frog and other species restricted to these habitats, have been subject to numerous wildfires and prescribed burns that have decimated much of their habitat, as well as allowing the easier access of feral pigs into these areas.

Ticking Frog
Geocrinia leai

Description: Similar to granular-bellied and other smooth-bellied frogs but with a smooth belly and more squat body.

Total length: Males – 24 mm; Females – 29 mm

Distribution: The most widespread species in the southwest. Occurs from Dandaragan south and east to Two People's Bay.

Habitat: In densely vegetated streams and swamps. Sometimes found beneath logs and rocks adjacent to watercourses.

General: Lays egg clumps on reeds or sedges above the water, whereby tadpoles emerge and fall into the water pool below.

Call: A slow repeated 'chic… chic…chic' or 'tk…tk…tk'

Source: Bush *et al.,* 2007, Bush *et al.*, 2010.

There were 2 observations during the WWBB23.

Quacking Frog
Crinia georgiana

Description: Similar to other granular-bellied frogs but has a red groin area and red or gold patches on the upper eyelids.

Total length: Males – 42 mm; Females – 43 mm. Males have powerful forearms.

Distribution: Occurs throughout the cooler southwest from Gingin east to Cape Le Grand National Park.

Habitat: In swamps, streams and on granite outcrops. Anywhere with plenty of shallow water in winter, such as roadside puddles and drains. Sometimes found beneath logs and rocks.

General: Small clusters of eggs are laid singly in shallow water.

Call: A short and loud 'quack… quack…quack' similar to a duck and almost like laughter.

Source: Bush *et al.,* 2007, Bush *et al.*, 2010.

There were 5 observations during the WWBB23.

Threatened amphibian species observed during the WWBB23

Sunset Frog
Spicospina flammocaerulea

VULNERABLE
(WA & NATIONALLY)

One of the oldest frogs in WA only recently discovered.

The sunset frog (*Spicospina flammocaerulea*) is one of the oldest WA frogs, estimated to have diverged from its closest relatives (Uperoleia spp.) at least 30 million years old. It is quite distinct from other Australian frogs and was only discovered by Dr Pierre Horwitz of Edith Cowan University in 1994 and described in 1997 (Roberts *et al.* 1997).

Chytrid fungus
(Amphibian Chytrid Fungus Disease)

Chytridiomycosis is an infectious disease that affects amphibians worldwide. It is caused by the chytrid fungus (Batrachochytrium dendrobatidis), a fungus capable of causing sporadic deaths in some amphibian populations and 100 per cent mortality in others. The disease has been implicated in the mass die-offs and species extinctions of frogs since the 1990s. However, its origin and true impact on frog populations remains uncertain and continues to be investigated.

Chytrid fungi typically live in water or soil, although some are parasites of plants and insects. They reproduce asexually and have spores that 'swim' through the water. Only the amphibian chytrid fungus is known to infect vertebrate species. Individual frogs are thought to contract the disease when their skin comes into contact with water containing spores from infected animals.

Proper hygiene and handling protocols for the control of chytrid fungus in amphibians is extremely important to prevent the transmission or spread of the chytrid fungus within and among amphibian populations.

A national abatement plan aims to prevent amphibian populations or regions that are currently chytridiomycosis-free from becoming infected by preventing further spread of the amphibian chytrid within Australia and to decrease the impact of infection with the amphibian chytrid fungus on populations that are currently infected. (Department of Environment and Energy 2016, Department of Sustainability, Environment, Water, Population & Communities 2013.)

iNaturalist INVERTEBRATES
Species Observations

- **Arachnids:** 24 species, 68 observations, 24 observers, 24 identifiers
- **Insects:** 61 species, 169 observations, 43 observers, 65 identifiers
- **Crustaceans:** 6 species, 17 observations, 9 observer, 9 identifiers
- **Molluscs:** q genera (potentially >1 species), 5 observations, 5 observers, 5 identifiers

INVERTEBRATES

The invertebrate fauna in the forests and wetlands of the Warren bioregion is highly endemic (Hearn *et al*., 2003). The peatlands and organic wetlands are home to relictual and other aquatic invertebrates.

Collectively, 98 invertebrate species were observed and documented to genus, species or lowest order identifications during the WWBB23.

There are 1,188 records of invertebrate species recorded within a 5-kilometre radius of the Bioblitz project area (DBCA, 2023).

See Appendix 9: Invertebrate species observations list.

Threatened & Priority invertebrate species within the Walpole Wilderness

There are 12 threatened or priority invertebrate species documented in the Warren region (DBCA, 2022), many of which are known to occur within the Walpole Wilderness and/or adjacent reserves and private properties:

Endangered (WA & Nationally)
- Tingle Pygmy Trapdoor Spider
- Walpole Burrowing Crayfish

Endangered (WA only)
- Western Australian Pill Millipede

Vulnerable (WA & Nationally)
- Carter's Freshwater Mussel

Vulnerable (WA only)
- Main's Assassin Spider

Priority 2 (DBCA Priority list)
- Poorginup Swamp Watermite
- Mystical Pygmy Trapdoor Spider
- A non-marine Harpacticoid copepod (Muirillup Rock)
- Doeg's Watermite

Priority 3 (DBCA Priority list)
- Western Pygmy Trapdoor Spider
- A copepod (Northcliffe)
- A water flea (Karri forests)


Australian House Centipede
Allothereua maculate
@russula

INSECT

Australian House Centipede
Allothereua maculata

Distribution: *Allothereua maculata* is the most common scutigeromorph centipede across southern Australia, occurring from Western Australia to Queensland.

Description: The body of *Allothereua maculata* is made up of 15 segments and bears 15 pairs of long legs. The body is pale brown with dark markings, and grows to 20 –25 millimetres long. It bears one pair of antennae on the head and a similarly long pair of caudal appendages at the tail end. These organisms have a lot of small hairs and spindle-like bodies.

Ecology: *Allothereua maculata* lives in urban areas and woodland. Its occurrence in houses indicates that it prefers dampness and a lack of ventilation. It is a predator of insects and other arthropods, but is generally considered harmless.


Southern Velvet Worm
Kumbadjena
@em_lamond


Crane Flies
(Infraorder Tipulomorpha)
@em_lamond


Thynnid Flower Wasp
Elrone sp.
@russula


Complex
Chrysopasta elegans
@is-zy


Forester Moths
Pollanisus sp.
@pimelea


Bothriembryon sp.
@pimelea


Bothriembryon sp.
@bushmonger


Diphucephala sp.
@pimelea


Arsipoda sp.
@diana_rodzi


Transverse Ladybird
Coccinella transversalis
@swampdiva


Eurymutilla sp.?
@pimelea


Camponotus sp. ?
@dreje


Meriphus sp. ?
@pimelea


Subfamily
Chrysomelinae ?
@em_lamond

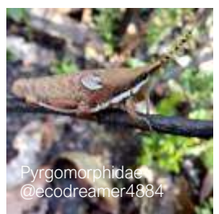

Callococcus sp.?
@mark-1955

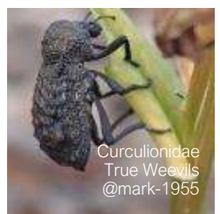

Araneus sp.?
@pimelea


Nicodamus sp.?
@swampdiva


Salsa sp.
@pimelea


Geloptera sp.
@pimelea


Pyrgomorphidae
@ecodreamer4884


Curculionidae
True Weevils
@mark-1955

AQUATIC FAUNA – FISH & DECAPOD CRUSTACEANS

The aquatic fauna of the Warren bioregion is highly endemic (Trayler *et al*. 1996 cited by Hearn *et al*., 2003). The freshwater cray genus Engaewa is endemic to the bioregion.

Aquatic ecologists, Dr Mark Allen from the Harry Butler Institute (Murdoch University) and Mr Cecil Ellis, a Masters student at the University of Western Australia, led three groups of citizen scientists on surveys during the WWBB23. The aim was to collect species presence records to contribute to the overall WWBB23 survey and to present information showcasing the significance of the region's aquatic fauna and the survey methods used to document these species.

FRESHWATER FISH

There are 10 threatened or priority fish species, including three marine species documented in the Warren region (DBCA, 2022), many of which are known to occur within the Walpole Wilderness and/or adjacent reserves and private properties.

The 7 known freshwater fish known to occur within the Walpole Wilderness Area are listed below by their conservation status:

Endangered (WA), Critically Endangered (Nationally)
- Western Trout Minnow, Western Spotted Galaxias


WWBB23 site 37A
©M Howe

Endangered (WA only)
- Salamanderfish
- Black-stripe Minnow, Blackstriped Dwarf Galaxias
- Little Pygmy Perch

Vulnerable (WA & Nationally)
- Balston's Pygmy Perch

Vulnerable (WA only)
- Mud Minnow, Western Dwarf Galaxias

Priority 3 (DBCA Priority list)
- Pouched Lamprey

See Appendix 10 and 11: Aquatic Fauna

Total number of aquatic fauna species OBSERVED during the WWBB23

A total of five freshwater fish species and two decapod crustacean species were recorded across the five WWBB23 sample sites, including two fish species that are listed as 'vulnerable' under the Western Australian Biodiversity Conservation Act 2016 and/or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Other participants elsewhere on the WWBB23 also recorded three additional fish and decapod species: Walpole Burrowing Crayfish (*Engaewa walpolea*), Salamanderfish (*Lepidogalaxias salamandroides),* and Blackstriped Dwarf Galaxias (*Galaxiella nigrostriata*). These observations were significant as all three species are listed as Endangered under the Biodiversity Conservation Act 2016 and the latter two have not been recorded from the Walpole area since the early 1980s (Christensen, 1982).

Overall, the diversity of fishes and decapods recorded during the WWBB23 was representative of nearly the entire fauna known historically from the area; the Pouched


Smooth Marron
Cherax cainnii
@semky

Lamprey (*Geotria australis*) being the only notable absentee (Allen and Ellis, 2023).

> *"It was a fantastic opportunity for us to promote the often unheralded but globally important freshwater biodiversity that is native to this part of the world and afforded us a valuable first opportunity to publicly promote our new research project on the biodiversity conservation value of artificial aquatic refuges to a highly engaged audience. We would most definitely welcome the opportunity to be involved in any future BioBlitz events."* Dr Mark Allen,

Technically, the observations of the Walpole Burrowing Crayfish were found by WWBB23 participants after the WWBB23 and outside the project area, but they are very worthy of inclusion as they may occur in the BioBlitz project area. This was an excellent instance of local knowledge and specialists working in the field networking together to find and document an 'endangered' species and, hopefully, will achieve some outstanding outcomes in scientific research to contribute to biodiversity conservation.

AQUATIC FAUNA – MACROINVERTEBRATES

Aquatic macroinvertebrates were sampled at three WWBB23 survey sites (Site 2, 24 & 37) using a dipnet that was swept along a 10-metre section of the margin of each pool. The contents of the net were emptied into trays for sorting and identification to order/family level before being returned alive to their original place of capture (Allen and Ellis, BioBlitz report, 2023).

For more information about the fire water points project and aquatic fish, macroinvertebrates, waterbugs and opportunities to conduct citizen science sampling events, please refer to the 'Fire Water Points' website (www.firewaterpoints.net.au) and the National Waterbug Blitz (www.waterbugblitz.org.au). The Waterbug App v2.0 (thewaterbugapp.com) also allows you to complete a Waterbug Survey which is incorporated into the National Waterbug Blitz


Male Salamanderfish
© G Allen

ENDANGERED (WA)
Salamanderfish
Lepidogalaxias salamandroides

Description: A slender, cylindrical-bodied fish, which spends most of its time on the substrate. It has a greenish to greyish to light-brown body, usually with dark patches along the sides and back, and flecked with silver markings. The belly is silver to pinkish. Males (up to 50 mm) are typically smaller than females (up to 80 mm).

It is a unique species that has the ability to bend its neck to the sides at right-angles, compensating for eyes that aren't able to move independently. It can be distinguished from the galaxids by the presence of scales. Breeding takes place from May to August. Their life span is about 3-5 years.

Distribution: Common within its restricted range in near-coastal wetlands between Augusta & Albany. It can occur in flowing streams within this range, however only generally in low abundance.

Habitat: Primarily found in highly acidic, shallow, temporary pools & swamps in coastal heathland.

Biology: Fish survive drying through summer months by burrowing into the substrate where they aestivate. They will remain in the damp sandy soils until rains re-submerge the habitat the following year.

Diet: Diet consists mainly of microcrustaceans and insect larvae.


Balston's Pygmy Perch
© G Allen

VULNERABLE (WA & NATIONALLY)
Balston's Pygmy Perch
Nannatherina balstoni

Description: Also known as the King River Perchlet. It is a small freshwater fish up to 90 mm long (commonly 60 mm long). They have a brownish back and a silvery belly, usually with a prominent brown middle stripe running along its side and a series of vertical brown bars, giving it a cross-hatched pattern.

They can live up to 3 years, but the majority of individuals live for 1 year and die after their first spawning season.

Distribution: The species has disappeared from river systems and wetlands north of the Margaret River and is now only found in drainage systems and wetlands between Margaret River and Two People's Bay.

Habitat: Their habitat is acidic and tannin-stained freshwater pools, streams and lakes in sandy areas within 30 km of the coast. Usually found in shallow water amongst tall sedge thickets.


Western Dwarf Galaxias
@em_lamond

VULNERABLE (WA)
Western Dwarf Galaxias
Galaxiella munda


© M Allen


Western Pygmy Perch
Nannoperca vittate
© Allen & Ellis 2023


© M Howe


Western Dwarf Galaxias
Galaxiella munda
© Allen & Ellis 2023


Walpole Burrowing Crayfish
Engaewa walpolea
© Allen & Ellis 2023


Koonac *Cherax preissii*
© Allen & Ellis 2023

MEDIA

AUSTRALIAN GEOGRAPHIC

The WWBB23 received excellent media coverage from Australian Geographic (published in January 2024 edition). Journalist Victoria Laurie and photographer Finn MacKay joined the team and took part in the WWBB23. Special thanks to the media for reporting on this fantastic event.

2023 STATE FINALIST

The WWBB23 was also a 2023 State Finalist for Environmental Sustainability in the Walpole Tidy Towns submission for the Keep Australia Beautiful Tidy Towns competition. WNNPA representatives attended the awards ceremony where bioblitz was well received, inspiring other regional communities.

https://www.australiangeographic.com.au/topics/science-environment/2024/01/people-

2023 Tidy Towns
State Finalist
for Environmental Sustainability
https://www.wa.gov.au/system/files/2023-11/2023-tidy-towns-winners-book.pdf

MINI - BIOBLITZ

Three mini-bioblitzes were undertaken after the 2023 Bioblitz in November 2023, April 2024 and June 2024 to account for the seasonality of different species and capture more observations.

SUMMER

Sunday 25th November 2023

At the first seasonal Mini-Bioblitz, approximately a dozen participants resurveyed the western edge of the Bioblitz area from Caldyanup Bridge, walking through areas of peatland, heathland and some jarrah -marri forest and up to Muppet Rock, a large granite outcrop located in Crossing block. All sites were 12 months post-fire and relatively open for walking. There was evidence of extensive disturbance and damage to the peatlands by pigs.

AUTUMN

Saturday 6th - Sunday 8th April 2024

The second seasonal Mini-Bioblitz occurred over a two-day session and was a resurvey of Muppet Rock granite outcrop walking through peatlands and heathlands.

Saturday 6th April - resurvey of Muppet Rock

Participants walked from Caldyanup Bridge and although this area was already surveyed during previous events, we were able to see how the long period of drought and heatwave events had a significant impact on the granite vegetation. We got a good perspective of the extent of the impacts that had occurred and documented some of the loss and responses of different species and vegetation throughout the area.

Sunday 7th April 2024

In the morning participants revisited some of the survey sites near the original base camp. Participants split into two groups and walked through a peatland and up to a population of Rate's Tingle (Priority 4 flora) amongst granite outcrops. The second group went to Crossing Peat to install cameras and surveyed the area.


Muppet Rock with a view to Mount Frankland
© M Howe


Mini-Bioblitz participants head towards a Moodjar tree (WA Christmas Tree/*Nuytsia floribunda*)
© M Howe


Extensive damage to peatland by pigs
© M Howe


Surveying 'Wiggles' site
© C Young


'Black Pea Swamp'
© C Young


Group gathering for Winter Mini-Bioblitz
© C Young

Middle Road Complex Bushfire April 24 2024

There was a recent bushfire in the Walpole Wilderness that appeared to be the work of an arsonist. The fire was ultimately contained to about 14 000 hectares covering the majority of the Soho and Trent forest blocks with some fire damage in London, Thames and Collis blocks, heavily impacting the area of the 2023 Walpole Wilderness Bioblitz.

It appears that nearly half of the 2023 Walpole Wilderness Bioblitz area was burned during the fire. The data collected by the WWBB23 will contribute to a pre-fire baseline dataset.

There are grave concerns for some of the species and ecosystems that have been affected, as in the lead up to the fire the area had also experienced nearly 6 months without significant rain and there was a lot of evidence of drought stress and tree deaths.

It is estimated that 75-80% of the world's population of Rate's Tingle Tree (*Eucalyptus brevistylis*) has been burned in this fire. Combined with the wildfire (escaping from a prescribed burn in December 2022) in the adjacent Crossing forest block, it appears that 92 -95% of the total population has now been burned within two years. The recovery of these trees after such a prolonged period of drought stress is unknown and will be monitored.

The burn area also covers much of the Red Flowering Gum (*Corymbia ficifolia*) population. This population was vulnerable because of the drought and was already showing the negative impacts from the cumulative effect of recent fires (over the last few decades).

It is known that at least four sunset frog populations with a number of peat systems have been burnt. The status of these populations will not be able to be assessed until next breeding season in late 2024. The PEAT project lost one of the rain collectors and a WNNPA consultant ecologist lost one of their remote sensor cameras in the fire that had been out since the recent WWBB23.

The WNNPA extends its gratitude and appreciation to the team at Frankland District DBCA – their local knowledge and experience in fighting fire in dense forest were integral in the bushfire response. We also thank the teams from other regions and local volunteer firefighters for all of their hard work, local businesses and community support.

WINTER MINI-BIOBLITZ Saturday 8th June, 2024

Due to the recent fire, the winter Mini-Bioblitz was held in early June 2024 to assess the area and look for fire ephemeral species.

Over 30 volunteers from the southwest region joined the event. As a group they revisited sites #12 Black Pea Swamp and a nearby exposed granite, plus #40 Capped Gnamma Granite and #38 Wiggles site. Observations have been recorded on the iNaturalist WWBB23 project.

Despite the devasting loss, participants were heartened to discover some fire ephemeral species, especially those in the fungi world, and witness the post fire activity of many invertebrates.

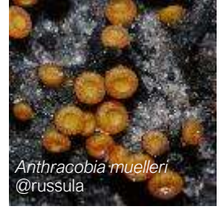
Post-fire monitoring will be ongoing by experts, government agencies and local community.


Black Pea Swamp
@dreje


Calliphora sp.
Bluebottle Flies
@plut3us


Hemiergis peronii
Lowlands Earless Skink
@em_lamond


Kingia australis
Bullanock
@em_lamond


Anthracobia muelleri
@russula


Campylopus sp.
@plut3us


Eublepharis hapoleonis
Southwestern Crevice Skink
@em_lamond


Family Scutigerellidae
@em_lamond


Pseudolaureola wilsmorei
@em_lamond


Metopochetus
@russula


Heterotermes sp.
@russula


Pterostylis vittata
Banded Greenhood
@em_lamond


Eucalyptus sp.
@dreje


Macropus fuliginosus
Western Grey Kangaroo
@plut3us


Fungi
@naturalist62218


Buddelundia sp.
@em_lamond


Drosera pulchella
Pretty Sundew
@dreje


Eucalyptus megacarpa
Bullich
@pimelea


Brachyulus pusillus
@russula


Eucalyptus sp.
@dreje


Adenanthos obovatus
@dreje


Melaleuca preissiana
@dreje


Fungi
@dreje


Drosera tubaestylis
@dreje


Callococcus sp.
@mark-1955


Capped Gnamma Granite
@pruedles


Banksia ilicifolia
@dreje


Anarthria scabra
@dreje


Andersonia caerulea
@dreje


Frog
@em_lamond


Melaleuca preissiana
@em_lamond


Petrosperianthes lophantha
Plume Albizia
@naturalist62218

CONCLUSION

The third Walpole Wilderness Bioblitz is widely considered a great success. Participants, both through formal and informal feedback, expressed that it was highly enjoyable and a positive activity for conservation.

The WWBB23 has collected a wealth of new scientific data, significantly enhancing our understanding of the local environment. This information will be made available online for future research and management through:

iNaturalist (https://www.inaturalist.org/projects/walpole-wilderness-bioblitz-2023)

Atlas of Living Australia (https://www.ala.org.au/)

WWBB website (www.walpolewilderness.org).

As this is our third event, we are continually learning how to manage an event of this scale. We have identified both the strengths and weaknesses and have set goals to improve it each year. The high level of enthusiasm demonstrated by participants highlights the importance of events like these for the community. There is a strong desire from the broader community to learn about the wilderness, engage with the environment, and take positive actions to protect and conserve it.

There are a lot of people to thank for the enormous amount of work that went into the WWBB. To all of the organisers, WNNPA members, sponsors, volunteers, participants, identifiers, cooks, babysitters and more – the WNNPA committee extend our heartfelt thanks for helping to make this event such a success. Please feel proud of the contribution you have given back to the environment.

See you at the WWBB24!

"I know of no pleasure deeper than that which comes from contemplating the natural world and trying to understand it."

Sir David Attenborough, English broadcaster, biologist, natural historian and author.

WALPOLE WILDERNESS BIOBLITZ

@ E Edmonds

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APPENDIX 1

Conservation codes for Western Australian flora, fungi, lichen & ecological communities

WA THREATENED & SPECIALLY PROTECTED FLORA & FAUNA SPECIES DEFINITIONS	
CRITICALLY ENDANGERED	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".
ENDANGERED	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".
VULNERABLE	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines".
EXTINCT	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines.
EXTINCT IN THE WILD	Species that "is known only to survive in cultivation, incaptivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form". Currently there are no fauna or flora species listed as extinct in the wild.
SPECIALLY PROTECTED SPECIES	Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as threatened species (critically endangered, endangered, or vulnerable) or extinct species under the BC Act cannot also be listed as specially protected species.
MIGRATORY SPECIES PROTECTED UNDER AN INTERNATIONAL AGREEMENT	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines, excluding species that are listed as Threatened species.
CONSERVATION DEPENDENT	Species of special conservation need that are dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines.
OTHER SPECIALLY PROTECTED	Species otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines.

WA PRIORITY FLORA AND FAUNA SPECIES DEFINITIONS	
PRIORITY 1	Poorly-known species known from one or a few locations (on threatened lands)
PRIORITY 2	Poorly-known species known from one or a few locations (some on conservation lands)
PRIORITY 3	Poorly-known species known from several locations (some on conservation lands)
PRIORITY 4	Rare, Near Threatened and other species in need of monitoring
PRIORITY 5	Conservation Dependent ecological communities

Note: Priority is not a listing category under the Biodiversity Conservation (BC) Act 2016.

SOURCE WEBSITES:
https://www.dbca.wa.gov.au/wildlife-and-ecosystems/plants/list-threatened-and-priority-flora
https://www.dbca.wa.gov.au/wildlife-and-ecosystems/animals/list-threatened-and-priority-fauna

WA THREATENED & PRIORITY ECOLOGICAL COMMUNITIES

An ecological community is a naturally occurring assemblage of organisms that occurs in a particular habitat. Ecological communities may comprise various life forms including plants, animals and microorganisms.

Assessment of the conservation status of ecological communities is carried out in accordance with the Biodiversity Conservation (BC) Act 2016 listing criteria and the requirements of Ministerial Guidelines that adopt the use of the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Categories and Criteria.

WA THREATENED & PRIORITY ECOLOGICAL COMMUNITIES' DEFINITIONS	
COLLAPSED ECOLOGICAL COMMUNITIES	An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time — (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover — (i) its species composition or structure; or (ii) its species composition and structure.
CRITICALLY ENDANGERED	A critically endangered ecological community faces an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.
ENDANGERED	A threatened ecological community faces a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines.
VULNERABLE	A vulnerable ecological community faces a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines.
PRIORITY ECOLOGICAL COMMUNITIES	Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the priority ecological community list under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological communities that are adequately known and are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened list, are placed in priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in priority 5.

SOURCE WEBSITE:
https://www.dbca.wa.gov.au/wildlife-and-ecosystems/threatened-ecological-communities/list-threatened-ecological-communities

CONSERVATION DEFINITIONS FOR EPBC ACT 1999 THREATENED & SPECIALLY PROTECTED FLORA, FUNGI, LICHEN, FAUNA & ECOLOGICAL COMMUNITIES

Threatened & Specially Protected Flora and Fauna

Threatened fauna and flora may be listed under Section 178 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) in any one of the following six categories:

- Critically endangered
- Endangered
- Vulnerable
- Conservation dependent
- Extinct in the wild
- Extinct

The list of migratory species established under the EPBC Act comprises:

Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, an environmental treaty under the United Nations Environment Program

Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA)

Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Threatened Ecological communities

Threatened ecological communities under the EPBC Act are listed in three categories:

- Critically endangered
- Endangered
- Vulnerable

SOURCE WEBSITES:
https://www.dcceew.gov.au/environment/biodiversity/threatened
https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

APPENDIX 2

Flora species, including bryophytes observations list.

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
1	*Acacia alata*	Winged Wattle
2	*Acacia divergens*	Sail-boat Wattle
3	*Acacia extensa*	Wiry Wattle
4	*Acacia hastulata*	Prickly Swamp Wattle
5	*Acacia pentadenia*	Karri Wattle
6	*Acacia pentadenia syntoma*	
7	*Acacia pulchella*	Prickly Moses
8	*Acacia pulchella goadbyi*	
9	*Acacia stenoptera*	Narrow-winged Wattle
10	*Acianthus species*	Mosquito Orchids
11	*Acidonia microcarpa*	
12	*Actinotus omnifertilis*	
13	*Adelphacme minima* ***P3***	
14	*Adenanthos cuneatus*	Coastal Jugflower
15	*Adenanthos obovatus*	Jugflower
16	*Agonis theiformis*	
17	*Aira species*	Hair Grass
18	*Allocasuarina fraseriana*	Western Sheoak
19	*Amperea simulans*	
20	*Anarthria prolifera*	
21	*Anarthria scabra*	
22	*Andersonia caerulea*	Foxtails
23	*Andersonia hammersleyana* ***P2***	
24	*Andersonia sprengelioides*	
25	*Anigozanthos flavidus*	Tall Kangaroo Paw
26	*Anzybas abditus P3*	Small Helmet Orchid
27	*Aotus carinata* ***P4***	
28	*Aotus franklandii* ***P2***	
29	*Aotus passerinoides*	
30	*Aotus sp. Scott River*	
31	*Aphelia cyperoides*	
32	*Asplenium aethiopicum*	Ethiopian Spleenwort
33	*Asplenium flabellifolium*	Necklace Fern
34	*Astartea glomerulosa*	
35	*Asterella drummondii*	
36	*Banksia armata*	Prickly Dryandra
37	*Banksia attenuata*	Candlestick Banksia
38	*Banksia dallanneyi*	Couch Honeypot
39	*Banksia gardneri*	Prostrate Banksia
40	*Banksia grandis*	Giant Banksia
41	*Banksia ilicifolia*	Holly-Leaved Banksia
42	*Banksia littoralis*	Swamp Banksia
43	*Banksia occcidentalis*	Red Swamp Banksia
44	*Banksia quercifolia*	Oak-Leaved Banksia
45	*Banksia serra* ***P4***	Serrate-leaved Banksia
46	*Banksia sphaerocarpa*	Round-fruit Banksia

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
47	*Billardiera laxiflora*	
48	*Boronia crenulata*	Aniseed Boronia
49	*Boronia gracilipes*	Karri Boronia
50	*Boronia heterophylla*	Kalgan Boronia
51	*Boronia juncea*	
52	*Boronia juncea juncea* P1	
53	*Boronia megastigma*	Scented Boronia
54	*Boronia molloyae*	Tall Boronia
55	*Boronia spathulata*	
56	*Boronia stricta*	
57	*Boronia virgata* P4	
58	*Borya species*	Pincushions
59	*Bossiaea eriocarpa*	Common Brown Pea
60	*Bossiaea linophylla*	Yellow Bossiaea
61	*Bossiaea ornata*	Broad Leaved Brown Pea
62	*Brachyscome iberidifolia*	Swan River Daisy
63	*Braunia imberbis*	Hoarmoss Family
64	*Brownseya serpentina*	Clubmosses and Firmosses
65	*Bryum species*	Joint-toothed Mosses
66	*Burchardia congesta*	Milkmaids
67	*Burchardia monantha*	
68	*Burchardia multiflora*	Dwarf Burchardia
69	*Caladenia brownii*	Karri Spider Orchid
70	*Caladenia ensata*	Stumpy Spider Orchid
71	*Caladenia flava*	Cowslip Orchid
72	*Caladenia flava sylvestris*	Cowslip Orchid
73	*Caladenia latifolia*	Pink Fairies
74	*Caladenia longiclavata*	Clubbed Spider Orchid
75	*Caladenia macrostylis*	Leaping Spider Orchid
76	*Calaldenia magniclavata*	Big Clubbed Spider Orchid
77	*Caladenia nana*	Little Pink Fan Orchid
78	*Caladenia plicata*	Crab-Lipped Spider Orchid
79	*Caleana nigrita*	Flying Duck Orchid
80	*Calectasia demarzii*	Demarz's Tinsel Lily
81	*Callistachys lanceolata*	Native Willow/Wonnich
82	*Calochilus uliginosus*	Swamp Beard Orchid
83	*Calymperastrum latifolium* **P2**	Djiriji Moss
84	*Campylopus appressifolius*	Joint-toothed Mosses
85	*Campylopus bicolor*	Joint-toothed Mosses
86	*Campylopus clavatus*	Joint-toothed Mosses
87	*Campylopus introflexus*	Heath Star-moss
88	*Campylopus kirkii*	Joint-toothed Mosses
89	*Cassytha racemosa*	Dodder Laurels
90	*Centrolepis aristata*	Pointed Centrolepis
91	*Centrolepis drummondiana*	
92	*Centrolepis strigosa*	Hairy Centrolepis
93	*Cephaloziella*	Leafy Liverworts
94	*Ceratodon purpureus*	Redshank
95	*Chaetophyllopsis whiteleggei*	Leafy Liverworts

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
96	*Chamaescilla corymbosa*	Blue Stars
97	*Chamelaucium forrestii* **P2**	
98	*Cheilanthes austrotenuifolia*	Rock Fern
99	*Cheilanthes sieberi*	Cloak Fern
100	*Chlorophyta*	Green Algae
101	*Chordifex gracilior* P3	
102	*Chordifex jacksonii* **P3**	
103	*Chorizema ilicifolium*	Holly Flame Pea
104	*Chorizema rhombeum*	Scarlet Flame Pea
105	*Comesperma calymega*	Blue Spike Milkwort
106	*Comesperma ciliatum*	
107	*Comesperma flavum*	
108	*Comesperma virgatum*	Milkwort
109	*Commersonia corniculata*	
110	*Conospermum caeruleum*	Blue Brother
111	*Conostylis laxiflora*	
112	*Conostylis pusilla*	
113	*Conostylis serrulata*	
114	*Conostylis setigera*	Bristly Cottonhead
115	*Corybas recurvus*	Western Helmet Orchid
116	*Corymbia calophylla*	Marri
117	*Corymbia ficifolia*	Red-flowering gum
118	*Corysanthes recurva*	Common Helmet Orchid
119	*Cosmelia rubra*	
120	*Craspedia variabilis*	Common Billy buttons
121	*Crassula species*	Stonecrops
122	*Crowea angustifolia*	Waxflower
123	*Crowea angustifolia angustifolia*	
124	*Cryptostylis ovata*	Slipper Orchid
125	*Cyanicula sericea*	Silky Blue Orchid
126	*Cyathochaeta species*	
127	*Cyrtostylis huegelii*	
128	*Cyrtostylis robusta*	Large Gnat-orchid
129	*Dampiera ?trigona*	
130	*Dampiera hederacea*	Karri Dampiera
131	*Dampiera leptoclada*	
132	*Dampiera linearis*	Common Dampiera
133	*Darwinia oederoides*	
134	*Darwinia vestita*	Pom-pom Darwinia
135	*Dasypogon bromeliifolius*	Drumsticks
136	*Daviesia cordata*	Bookleaf
137	*Daviesia flexuosa*	
138	*Daviesia horrida*	
139	*Daviesia inflata*	
140	*Desmocladus fasciculatus*	
141	*Dicranoloma diaphanoneuron*	
142	*Disa bracteata**	Bract Disa
143	*Disceliaceae*	Joint-toothed Mosses
144	*Ditrichum difficile*	Joint-toothed Mosses
145	*Diuris jonesii*	Dunsborough Donkey Orchid
146	*Diuris longifolia*	Purple Pansy Orchid

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
147	*Dodonaea ceratocarpa*	Horny Hop Bush
148	*Drakaea glyptodon*	King-in-his-carriage
149	*Drakaea macrantha* EN	Dwarf Hammer Orchid
150	*Drakaea thynniphila*	Narrow-lipped Hammer Orchid
151	*Drosera collina*	
152	*Drosera drummondii*	Drummond's Sundew
153	*Drosera erythrogyne*	
154	*Drosera erythrorhiza*	Red Ink Sundew
155	*Drosera glanduligera*	Pimpernel sundew
156	***Drosera macrantha***	**Bridal Rainbow**
157	*Drosera microphylla*	Golden Rainbow
158	*Drosera modesta*	Modest Rainbow
159	*Drosera myriantha*	Star Rainbow
160	*Drosera pallida*	Pale Rainbow
161	*Drosera platypoda*	Fan-leaved Sundew
162	*Drosera platystigma*	Black-eyed Sundew
163	*Drosera pulchella*	Pretty Sundew
164	*Drosera purpurascens*	
165	*Drosera roseana*	
166	*Drosera rosulata*	
167	*Drosera stelliflora*	
168	*Drosera sulphurea*	Sulphur-flowered Sundew
169	*Drosera tubaestylis*	
170	*Elythranthera brunonis*	Purple Enamel Orchid
171	*Empodisma gracillimum*	Tanglefoot
172	*Enigmella thallina*	
173	*Eriochilus scaber*	Pink Bunny Orchid
174	*Eriochilus tenuis*	Slender Bunny Orchid
175	*Eucalyptus brevistylis* **P4**	Rate's Tingle
176	*Eucalyptus diversicolor*	Karri
177	*Eucalyptus marginata*	Jarrah
178	*Eucalyptus megacarpa*	Bullich
179	*Eucalyptus patens*	Yarri
180	*Eutaxia myrtifolia*	Egg and Bacon Plant
181	*Eutaxia parvifolia*	
182	*Eutaxia virgata*	
183	*Evandra aristata*	
184	*Evandra pauciflora*	
185	*Ficinia marginata*	Common Annual Clubrush
186	*Fissidens taylorii*	
187	*Fossombronia species*	Frillworts
188	*Frullania species*	Scaleworts
189	*Funaria hygrometrica*	Bonfire Moss
190	*Gahnia decomposita*	Saw-sedge
191	*Gahnia trifida*	Coastal Saw-sedge
192	*Gastrolobium brownii*	
193	*Gastrolobium melanopetalum*	
194	*Goebelobryum unguiculatum*	
195	*Gompholobium capitatum*	
196	*Gompholobium confertum*	
197	*Gompholobium ovatum*	

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
198	*Gompholobium polymorphum*	Twining Gompholobium
199	*Gompholobium preissii*	
200	*Goodenia eatoniana*	
201	*Goodenia micrantha*	
202	*Goodenia trinervis*	Common Velleia
203	*Grevillea diversifolia*	Variable-leaved Grevillea
204	*Grevillea manglesioides*	
205	*Grevillea occidentalis*	
206	*Grevillea pulchella*	Beautiful Grevillea
207	*Grevillea quercifolia*	Oak-leaf Grevillea
208	*Grevillea trifida*	
209	*Grimmia laevigata*	Grimmia Dry Rock Moss
210	*Gymnoschoenus anceps*	
211	*Haemodorum* sp. East northcliffe	
212	*Hakea amplexicaulis*	Prickly Hakea
213	*Hakea ceratophylla*	Horned Leaf Hakea
214	*Hakea falcata*	Sickle Hakea
215	*Hakea lasianthoides*	
216	*Hakea ruscifolia*	Candle Hakea
217	*Hakea undulata*	Wavy-leaved Hakea
218	*Hakea varia*	Variable-leaved Hakea
219	*Hedwigia ciliata*	Ciliate Hoarmoss
220	*Hemigenia incana*	
221	*Hemigenia pritzelii*	
222	*Hibbertia cunninghamii*	
223	*Hibbertia depressa*	
224	*Hibbertia microphylla*	
225	*Hibbertia perfoliata*	
226	*Hibbertia pilosa*	
227	*Hibbertia semipilosa*	
228	*Hibbertia stellaris*	
229	*Hibbertia trichocalyx*	
230	*Histiopteris incisa**	Water Fern
231	*Homalosciadium homalocarpum*	
232	*Homalospermum firmum*	
233	*Hovea chorizemifolia*	Holly-Leaved Hovea
234	*Hovea elliptica*	Tree Hovea
235	*Hovea trisperma*	Common Hovea
236	*Hydrocotyle alata*	
237	*Hydrocotyle callicarpa*	Tiny Pennywort
238	*Hydrocotyle diantha*	
239	*Hydrocotyle scutellifera*	Western Shield Pennywort
240	*Hypocalymma scariosum*	
241	*Hypocalymma strictum*	Pink Myrtle
242	*Hypochaeris glabra**	Smooth Cat's Ear
243	*Hypochaeris radicata**	Common Cat's-ear
244	*Hypolaena exsulca*	
245	*Isopogon formosus*	Rose Cone Flower
246	*Isopogon sphaerocephalus*	Drumstick Isopogon
247	*Isotoma hypocrateriformis*	Woodbridge Poison
248	*Jacksonia spinosa*	

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
249	*Johnsonia acaulis*	
250	*Johnsonia lupulina*	Hooded Lily
251	*Juncus planifolius*	Flat-leaved Rush
252	*Kennedia coccinea*	Coral Vine
253	*Kingia australis*	Bullanock
254	*Kunzea sulphurea*	
255	*Kurzia compacta*	
256	*Lagenophora huegelii*	Coarse Bottle-daisy
257	*Lagenophora platysperma*	
258	*Lasiopetalum floribundum*	Velvet Bush
259	*Latrobea diosmifolia*	
260	*Laxmannia species*	
261	*Lechenaultia expansa*	
262	*Lepidosperma effusum*	Riverside sword-sedge
263	*Lepidosperma elatius*	Tall Sword-sedge
264	*Lepidosperma hopperi*	
265	*Lepidosperma tetraquetrum*	
266	*Leporella fimbriata*	Hare Orchid
267	*Leptoceras menziesii*	Rabbit Orchid
268	*Leptomeria scrobiculata*	
269	*Leptomeria squarrulosa*	
270	*Lethocolea pansa*	
271	*Leucopogon australis*	Spike Beard-heath
272	*Leucopogon capitellatus*	
273	*Leucopogon distans*	
274	*Leucopogon glabellus*	
275	*Leucopogon gracilis*	
276	*Leucopogon obovatus*	
277	*Leucopogon obovatus revolutus*	*Leucopogon obovatus revolutus*
278	*Leucopogon reflexus*	
279	*Leucopogon sp. Southern Forests*	Beard-heath
280	*Leucopogon verticillatus*	Tassel Flower
281	*Levenhookia pusilla*	Tiny Stylewort
282	*Lindsaea linearis*	Screw Fern
283	*Liparophyllum latifolium*	
284	*Lobelia anceps*	Punakuru
285	*Lobelia rhombifolia*	
286	*Lomandra caespitosa*	
287	*Lomandra drummondii*	
288	*Lomandra nigricans*	
289	*Lophocolea semiteres*	Southern Crestwort
290	*Lyginia imberbis*	
291	*Lysinema ?pentapetalum*	
292	*Lysinema conspicuum*	
293	*Lysinema lasianthum* P4	Lysinema lasianthum
294	*Machaerina acuta*	
295	*Machaerina juncea*	Tussock Swamp Twig Rush
296	*Macromitrium species*	Joint-toothed Mosses
297	*Macrozamia riedlei*	Zamia Palm
298	*Marchantia berteroana*	Bonfire Liverwort
299	*Melaleuca crispii*	

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
300	*Melaleuca glauca*	Swamp Bottlebrush
301	*Melaleuca preissiana*	Modong
302	*Melaleuca sparsa*	
303	*Melaleuca thymoides*	Sand Wattle Myrtle
304	*Melaleuca transversa*	
305	*Melaleuca violacea*	
306	*Melanostachya ustulata*	
307	*Mesomelaena tetragona*	Semaphore Sedge
308	*Microtis alba*	White Mignonette Orchid
309	*Microtis media*	Common Mignonette Orchid
310	*Millotia tenuifolia*	Soft Millotia
311	*Millotia tenuifolia tenuifolia*	
312	*Mirbelia dilatata*	Holly-leaved Mirbelia
313	*Monopsis debilis**	Devil Oneye
314	*Monotaxis occidentalis*	
315	*Morelotia octandra*	
316	*Neurachne alopecuroidea*	Foxtail Mulga Grass
317	*Nuytsia floribunda*	Western Australian Christmas Tree
318	*Olax benthamiana*	
319	*Opercularia hispidula*	
320	*Orianthera serpyllifolia*	
321	*Orianthera serpyllifolia serpyllifolia*	
322	*Ornduffia albiflora*	
323	*Ornduffia parnassifolia*	
324	*Orthodontium lineare*	Cape Thread-moss
325	*Paraserianthes lophantha*	Plume Albizia
326	*Parentucellia latifolia*	Broadleaf Glandweed
327	*Patersonia occidentalis*	Purple Flag
328	*Patersonia umbrosa umbrosa*	
329	*Pauridia occidentalis*	
330	*Pelargonium drummondii*	
331	*Pentapeltis silvatica*	
332	*Pericalymma crassipes*	
333	*Persoonia elliptica*	Spreading Snottygobble
334	*Persoonia longifolia*	Snottygobble
335	*Petrophile acicularis*	
336	*Petrophile diversifolia*	
337	*Philydrella pygmaea*	
338	*Philydrella pygmaea pygmaea*	
339	*Phlebocarya ciliata*	
340	*Phyllangium paradoxum*	
341	*Phylloglossum drummondii*	Pygmy Clubmoss
342	*Pigea debilissima*	
343	*Pimelea angustifolia*	Narrow-Leaved Pimelea
344	*Pimelea clavata*	
345	*Pimelea hispida*	Bristly Pimelea
346	*Pimelea imbricata*	
347	*Pimelea longiflora*	
348	*Pimelea preissii*	
349	*Pimelea suaveolens*	Scented Banjine
350	*Pimelea sylvestris*	Wood Pimelea

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
351	*Platysace filiformis*	
352	*Platytheca galioides*	
353	*Podocarpus drouynianus*	Emu Bush
354	*Poranthera huegelii*	
355	*Prasophyllum brownii*	Christmas Leek Orchid
356	*Prasophyllum cucullatum*	Hooded Leek Orchid
357	*Prasophyllum elatum*	Tall Leek Orchid
358	*Prasophyllum fimbria*	Fringed Leek Orchid
359	*Prasophyllum hians*	Yawning Leek Orchid
360	*Prasophyllum regium*	King Leek Orchid
361	*Pseudognaphalium luteoalbum*	Jersey Cudweed
362	*Pteridium esculentum*	Austral Bracken
363	*Pterostylis barbata*	Bird Orchid
364	*Pterostylis erubescens*	Red-sepaled Snail Orchid
365	*Pterostylis karri*	Karri Snail Orchid
366	*Pterostylis microphylla*	Small Rosette Snail Orchid
367	*Pterostylis pyramidalis*	Tall Snail Orchid
368	*Pterostylis recurva*	Jug Orchid
369	*Pterostylis saxosa*	Granite Bird Orchid
370	*Pterostylis turfosa*	Bearded Bird Orchid
371	*Pterostylis vittata*	Banded Greenhood
372	*Ptychostomum capillare*	Capillary Thread-moss
373	*Pultenaea aspalathoides*	
374	*Pultenaea reticulata*	
375	*Pyrorchis forrestii*	Pink Beaks
376	*Pyrorchis nigricans*	Red Beaks
377	*Quinetia urvillei*	
378	*Racopilum cuspidigerum*	
379	*Rhacocarpus purpurascens*	Royal Rock Moss
380	*Rhaphidorrhynchium amoenum*	
381	*Rhodanthe citrina*	
382	*Riccardia crassa*	Simple Thalloid Liverworts
383	*Rorippa species*	Yellowcresses
384	*Rosulabryum billardierei*	Joint-toothed Mosses
385	*Rosulabryum campylothecium*	Joint-toothed Mosses
386	*Rytidosperma species*	Wallaby grasses
387	*Scaevola calliptera*	Royal Robe
388	*Scaevola filifolia*	Thread-leaved Diaspasis
389	*Scaevola microphylla*	Fanflower
390	*Scaevola striata*	Royal Robe
391	*Schizaea fistulosa*	Narrow Comb Fern
392	*Schoenus species*	Bogrushes
393	*Selaginella gracillima*	Spikemoss Family
394	*Sematophyllum homomallum*	Bronze Moss
395	*Senecio glomeratus*	Cutleaf Burnweed
396	*Senecio hispidulus*	Hill Fireweed
397	*Sida hookeriana*	Mallow and Hibiscus Family
398	*Siloxerus humifusus*	Procumbent Siloxerus
399	*Siloxerus multiflorus*	Small Wrinklewort
400	*Sphaerolobium alatum*	
401	*Sphaerolobium drummondii*	

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
402	*Sphaerolobium grandiflorum*	
403	*Sphaerolobium rostratum*	
404	*Sphaerolobium vimineum*	Leafless Globe-pea
405	*Sphenotoma capitata*	
406	*Sphenotoma gracilis*	
407	*Stackhousia monogyna*	Creamy Candles
408	*Stylidium acuminatum*	
409	*Stylidium acuminatum meridionalis*	
410	*Stylidium adnatum*	
411	*Stylidium androsaceum*	
412	*Stylidium assimile*	Book Triggerplant
413	*Stylidium calcaratum*	Bronze-leaved Triggerplant
414	*Stylidium despectum*	Book Triggerplant
415	*Stylidium diversifolium*	Small Triggerplant
416	*Stylidium ecorne*	Touch-me-not
417	*Stylidium guttatum*	Foot Triggerplant
418	*Stylidium junceum*	Dotted Triggerplant
419	*Stylidium luteum*	Reed Triggerplant
420	*Stylidium perpusillum*	
421	*Stylidium piliferum*	Tiny Triggerplant
422	*Stylidium pulchellum*	Common Butterfly Triggerplant
423	*Stylidium repens*	Thumbelina Triggerplant
424	*Stylidium scandens*	Matted Triggerplant
425	*Stylidium schoenoides*	Climbing Triggerplant
426	*Stylidium spinulosum spinulosum*	Cow Kicks
427	*Stylidium squamosotuberosum*	Rhizomatous Reed Triggerplant
428	*Stypandra glauca*	
429	*Styphelia inframediana*	Nodding Blue Lily
430	*Styphelia pallida*	
431	*Styphelia pendula*	Kick Bush
432	*Synaphea ?polymorpha*	
433	*Synaphea petiolaris*	
434	*Taxandria conspicua*	
435	*Taxandria fragrans*	
436	*Taxandria linearifolia*	
437	*Taxandria marginata*	
438	*Taxandria parviceps*	
439	*Tayloria octoblepharum*	Fine Tea Tree
440	*Tetratheca filiformis*	Austral Poop Moss
441	*Tetratheca hispidissima*	
442	*Thelymitra antennifera*	
443	*Thelymitra benthamiana*	Lemon-scented sun orchid
444	*Thelymitra cornicina*	Leopard Orchid
445	*Thelymitra flexuosa*	Lilac Sun Orchid
446	*Thelymitra tigrina*	Twisted Sun-orchid
447	*Thelymitra vulgaris*	Tiger Orchid
448	*Thomasia paniculata*	Common Sun Orchid
449	*Thomasia rhynchocarpa*	
450	*Thomasia sp. Vasse*	
451	*Thuidiopsis sparsa*	Thomasias
452	*Thysanotus isantherus* P4	Sparse Fern Moss

FLORA - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
453	*Thysanotus patersonii*	Thysanotus isantherus
454	*Tortula species*	Twining Fringe-lily
455	*Trachymene grandis*	Joint-toothed Mosses
456	*Trachymene pilosa*	
457	*Tremandra diffusa*	Native Parsnip
458	*Tremandra stelligera*	
459	*Tribonanthes australis*	
460	*Tricoryne elatior*	
461	*Tripterococcus brunonis*	Yellow Rush-lily
462	*Trymalium ledifolium*	Winged Stackhousia
463	*Trymalium odoratissimum*	Southern Tiurndin
464	*Utricularia multifida*	Karri Hazel
465	*Utricularia simplex*	Pink Petticoats
466	*Utricularia volubilis*	Bluecoats
467	*Veronica species*	Twining Bladderwort
468	*Viminaria juncea*	Speedwells (Hebe)
469	*Wurmbea species*	Native Broom
470	*Xanthorrhoea preissii*	Spikelilies
471	*Xanthosia candida*	Balga
472	*Xanthosia huegelii*	
473	*Xanthosia rotundifolia*	Heath Xanthosia
474	*Xanthosia singuliflora*	Southern Cross
*Introduced (non-native) flora species		

APPENDIX 3

Threatened & Priority flora species within 5km of the Bioblitz Project Area

Threatened and priority flora species known to occur within a 5-kilometre radius of the Bioblitz project area include:

CRITICALLY ENDANGERED (WA)

- *Rhacocarpus rehmannianus* var. *webbianus*

ENDANGERED

- *Drakaea micrantha* (Dwarf Hammer Orchid) (endangered WA; nationally vulnerable)
- *Sphenotoma drummondii* (Mountain Paper Heath (endangered WA & nationally)
- *Verticordia fimbrilepis* subsp. *australis* (Shy Featherflower) (endangered WA & nationally)

VULNERABLE

- *Kennedia glabrata* (Northcliffe Kennedia) (vulnerable WA & nationally)

PRIORITY 2

- *Andersonia redolens*
- *Aotus franklandii*
- *Hypocalymma verticillare*
- *Lepyrodia extensa*
- *Leucopogon* sp. *Southern Granite*
- *Rorippa cygnorum*
- *Sphaerolobium benetectum*
- *Warnstorfia fluitans*

PRIORITY 3

- *Adelphacme minima*
- *Alexgeorgea ganopoda*
- *Andersonia auriculata*
- *Andersonia sp. Amabile*
- *Andersonia sp. Mitchell River*
- *Andersonia sp. Virolens*
- *Astartea granitica*
- *Chordifex gracilior*
- *Chordifex jacksonii*
- *Cyathochaeta teretifolia*
- *Grevillea papillosa*
- *Lambertia rariflora subsp. lutea*
- *Lasiopetalum sp. Denmark*
- *Leucopogon alternifolius*
- *Pimelea rosea subsp. annelsii*
- *Stirlingia divaricatissima*
- *Synaphea intricata*

PRIORITY 4

- *Aotus carinata*
- *Banksia serra* (Serrate-leaved Banksia)
- *Boronia virgata*
- *Eucalyptus brevistylis* (Rate's Tingle)
- *Gonocarpus pusillus*
- *Gonocarpus simplex*
- *Lysinema lasianthum*
- *Myriophyllum trifidum*
- *Ornduffia submersa*
- *Pleurophascum occidentale*
- *Stylidium leeuwinense*
- *Xanthosia eichleri*

Source: DBCA, 2023

APPENDIX 4

Fungi & lichen species observations lists

FUNGI - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
1	*Aleuria aurantia*	Orange Peel Fungus
2	*Aleurina ferruginea*	
3	*Amanita arenaria*	
4	*Amanita carneiphylla* P3	
5	*Amanita* Sect. Roanokenses	
6	*Amanita xanthocephala*	Vermilion Amanita
7	*Anthracobia muelleri*	
8	*Anthracophyllum archeri*	Orange Fan
9	*Armillaria luteobubalina*	Australian Honey Fungus
10	*Austroboletus occidentalis*	
11	*Boletus tasmanicus*	
12	*Caloplaca species*	Firedots
13	*Cladia aggregata*	Common Cladia
14	*Cladonia capitellata*	
15	*Cladonia cariosa*	Split-peg Lichen
16	*Cladonia verticillata*	Ladder Lichen
17	*Clavulina species*	
18	*Clavulinopsis amoena*	
19	*Clavulinopsis sulcata*	Flame Fungus
20	*Clitocybe species*	Funnels
21	*Clitocybula species*	
22	*Coltricia species*	
23	*Coltriciella dependens*	
24	*Coprinellus species*	
25	*Cordyceps tenuipes*	
26	*Cortinarius fibrillosus*	
27	*Cortinarius globuliformis*	
28	*Cortinarius kula*	
29	*Cortinarius sinapicolor*	
30	*Cortinarius vinaceolamellatus*	
31	*Crepidotus species*	Oysterlings
32	*Dacrymyces corticioides*	
33	*Deconica coprophila*	Dung-loving Deconica
34	*Descolea species*	
35	*Entoloma species*	Pinkgills
36	*Favolaschia claudopus**	Orange Pore Fungus
37	*Fistulinella species*	
38	*Fuscoporia species*	
39	*Galerina species*	Moss Bells
40	*Gymnopilus allantopus*	
41	*Hohenbuehelia species*	
42	*Hydnum species*	Hedgehog Mushrooms
43	*Hygrocybe polychroma*	
44	*Hymenoscyphus species*	
45	*Hypholoma lateritium*	Brick Cap
46	Hypogymnia species	Tube Lichens
47	*Hypomyces chrysospermus*	Bolete Mould
48	*Inocybe species*	Fiber Caps

FUNGI - Documented in iNaturalist		
NO.	**SCIENTIFIC NAME**	**COMMON NAME**
49	*Inonotus species*	
50	*Laccaria lateritia*	
51	*Lactarius eucalypti*	
52	*Lecidella stigmatea*	Rock Disk Lichen
53	*Lichenomphalia chromacea*	Yellow Navel
54	Lycoperdaceae (Family - lowest order ID)	Puffballs
55	*Mycena carmeliana*	
56	*Mycena sanguinolenta*	Bleeding Bonnet
57	*Mycena subgalericulata*	
58	*Mycena yirukensis*	
59	*Nidularia deformis*	Amorphous Bird's Nest Fungus
60	*Nothocastoreum species*	
61	Pezizaceae (Family - lowest order ID)	Pezizas, Desert Truffles, & Allies
62	*Phaeohelotium baileyanum*	Yellow Earth Buttons
63	*Phellinus species*	
64	*Phellodon niger*	Black Tooth
65	*Phlebiopsis crassa*	
66	*Pholiota multicingulata*	
67	*Pilobolus species*	
68	*Pisolithus species*	
69	*Podoserpula pusio*	Pagoda Fungus
70	*Poronia erici*	Dung Button
71	*Porpoloma species*	
72	*Postia species*	
73	*Protostropharia semiglobata*	Dung Roundhead
74	*Pseudobaeospora species*	
75	*Pseudocyphellaria species*	Specklebelly Lichens
76	Pucciniales (Order - lowest order ID)	Rust Fungi
77	*Ramaria capitata ochraceosalmonicolor*	
78	*Ramaria lorithamnus*	
79	*Ramboldia species*	
80	*Rhodocybe species*	
81	*Rhodofomitopsis species*	
82	*Rickenella fibula*	Orange Moss Navel
83	*Russula clelandii*	
84	*Russula neerimea*	
85	*Russula persanguinea*	
86	Sarcosomataceae (Family - lowest order ID)	
87	*Scleroderma species*	Earthballs
88	*Scutellinia species*	Eyelash cups
89	*Stereum hirsutum*	Hairy Curtain Crust
90	*Tephrocybe species*	Greylings
91	*Thelephora species*	
92	*Thysanothecium scutellatum*	
93	*Trametes coccinea*	Southern Cinnabar Polypore
94	*Trichoderma gelatinosum*	
95	*Tricholoma eucalypticum*	
96	*Tricholomopsis species*	
97	*Truncospora ochroleuca*	
98	*Usnea scabrida*	
99	*Xanthoparmelia conspersa*	Peppered Rock-shield
*Introduced (non-native) fungi species		

BIRDS - Documented on iNaturalist &/or 2023 Walpole Wilderness Bioblitz Bird Survey report (Stevens, 2023)		
NO.	**COMMON NAME**	**SCIENTIFIC NAME**
1	Australian Owlet-nightjar	*Aegotheles cristatus*
2	Australian Ringneck	*Barnardius zonarius*
3	Baudin's Cockatoo EN	*Zanda baudinii*
4	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
5	Brown Falcon	*Falco berigora*
6	Brown Quail	*Synoicus ypsilophorus*
7	Carnaby's Cockatoo EN	*Zanda latirostris*
8	Dusky Woodswallow	*Artamus cyanopterus*
9	Emu	*Dromaius novaehollandiae*
10	Fan-tailed Cuckoo	*Cacomantis flabelliformis*
11	Gilbert's Honeyeater	*Melithreptus chloropsis*
12	Grey Currawong	*Strepera versicolor*
13	Grey Fantail	*Rhipidura albiscapa*
14	Grey Shrikethrush	*Colluricincla harmonica* ssp. *rufiventris*
15	Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*
16	Inland Thornbill	*Acanthiza apicalis*
17	Jacky Winter	*Microeca fascinans*
18	Laughing Kookaburra*	*Dacelo novaeguineae*
19	New Holland Honeyeater	*Phylidonyris novaehollandiae*
20	Purple-crowned Lorikeet	*Parvipsitta porphyrocephala*
21	Red-eared Firetail	*Stagonopleura oculata*
22	Red-tailed Black-Cockatoo VU	*Calyptorhynchus banksii naso*
23	Red-winged Fairywren	*Malurus elegans*
24	Rufous Treecreeper	*Climacteris rufus*
25	Rufous Whistler	*Pachycephala rufiventris*
26	Shining Bronze-Cuckoo	*Chrysococcyx lucidus*
27	Silvereye	*Zosterops lateralis*
28	South-western Spotted Scrubwren	*Sericornis maculatus* ssp. *maculatus*
29	Square-tailed Kite	*Lophoictinia isura*
30	Striated Pardalote	*Pardalotus striatus*
31	Swamp Harrier	*Circus approximans*
32	Tree Martin	*Petrochelidon nigricans*
33	Wedge-tailed Eagle	*Aquila audax*
34	Weebill	*Smicrornis brevirostris*
35	Western Gerygone	*Gerygone fusca*
36	Western Rosella	*Platycercus icterotis*
37	Western Spinebill	*Acanthorhynchus superciliosus*
38	Western Splendid Fairywren	*Malurus splendens* ssp. *splendens*
39	Western Thornbill	*Acanthiza inornata*
40	Western Wattlebird	*Anthochaera lunulata*
41	Western Whistler	*Pachycephala fuliginosa*
42	White-breasted Robin	*Eopsaltria georgiana*
43	White-browed Babbler	*Pomatostomus superciliosus*
*Introduced (non-native) bird species		

APPENDIX 6

Mammal species observations list

MAMMALS - Documented on iNaturalist			
NO.	**COMMON NAME**	**SCIENTIFIC NAME**	**FAMILY**
1	Australian Bush Rat	*Rattus fuscipes*	Muridae
2	Black Rat*	*Rattus rattus*	Muridae
3	Common Brushtail Possum	*Trichosurus vulpecula*	Phalangeridae
4	Domestic Cat*	*Felis catus*	Felidae
5	European Rabbit*	*Oryctolagus cuniculus*	Leporidae
6	Honey Possum	*Tarsipes rostratus*	Tarsipedidae
7	Quokka	*Setonix brachyurus*	Macropodidae
8	Short-beaked Echidna	*Tachyglossus aculeatus*	Tachyglossidae
9	Western Grey Kangaroo	*Macropus fuliginosus*	Macropodidae
10	Yellow-footed Antechinus	*Antechinus flavipes*	Dasyuridae
***Introduced (non-native) species**			

APPENDIX 7

Reptile species observations list

REPTILES - Documented on iNaturalist			
NO.	**COMMON NAME**	**SCIENTIFIC NAME**	**FAMILY**
1	Common South-west Ctenotus	*Ctenotus labillardieri*	Scincidae
2	Dugite	*Pseudonaja affinis*	Elapidae
3	Lowlands Earless Skink	*Hemiergis peronii*	Scincidae
4	Southern Heath Monitor	*Varanus rosenbergi*	Varanidae
5	Southern Marbled Gecko	*Christinus marmoratus*	Gekkonidae
6	South-west Shingleback Lizard	*Tiliqua rugosa rugosa*	Scincidae
7	South-western Crevice Skink	*Egernia napoleonis*	Scincidae
8	South-western Mulch-Skink	*Hemiergis gracilipes*	Scincidae
9	South-western Rock-Skink	*Liopholis pulchra*	Scincidae
10	Western Glossy Swamp Skink	*Lissolepis luctuosa*	Scincidae

APPENDIX 8

Amphibian species observations list

AMPHIBIANS - Documented on iNaturalist			
NO.	**SCIENTIFIC NAME**	**COMMON NAME**	**FAMILY**
1	Ticking Frog	Crinia leai	Myobatrachidae
2	Quacking Frog	*Crinia georgiana*	Myobatrachidae
3	Glauert's Froglet	*Crinia glauerti*	Myobatrachidae
4	A Burrowing Frog	*Heleioporus species*	Myobatrachidae
5	Slender Tree Frog	*Litoria adelaidensis*	Hylidae
6	Sunset Frog	*Spicospinosa flammocaerulea*	Myobatrachidae

INVERTEBRATES - Documented on iNaturalist

NO	COMMON NAME	SCIENTIFIC NAME	CLASS
1	*Araneus species*	Angulate and Roundshouldered Orbweav-	Arachnida
2	*Artoriopsis species*	Striped Wolf Spiders	Arachnida
3	*Austracantha minax*	Christmas Jewel Spider	Arachnida
4	*Australomisidia species*	Crab Spiders	Arachnida
5	*Badumna species*	House Spiders	Arachnida
6	*Chenistonia species*	Wishbone Spiders	Arachnida
7	*Dolophones species*	Wrap-around Spiders	Arachnida
8	*Leucauge dromedaria*	Silver Orb Spider	Arachnida
9	Lycosinae (Subfamily - lowest order ID)	Wolf Spiders	Arachnida
10	*Maratus cuspis*	Peacock Spider	Arachnida
11	*Maratus karrie*	Peacock Spider	Arachnida
12	*Maratus pavonis*	Common Peacock Spider	Arachnida
13	*Miturga agelenina*	Southern Prowling Spider	Arachnida
14	*Namandia species*	Long-jawed Red Desids	Arachnida
15	*Neosparassus diana*	Badge Huntsman Spider	Arachnida
16	*Nicodamus species*	Red and Black Spiders	Arachnida
17	*Nunciella karriensis*	Triaenonychid Harvestmen	Arachnida
18	*Nyssus coloripes*	Spotted Ground Swift Spider	Arachnida
19	*Plebs cyphoxis*	Western Bush Orbweaver	Arachnida
20	*Salsa species*	Typical Orbweavers	Arachnida
21	*Sidymella hirsuta*	Hairy Crab Spider	Arachnida
22	Trachycosmidae (Family - lowest order ID)	Scorpion Flat Spiders	Arachnida
23	Trombidiidae (Family - lowest order ID)	True Velvet Mites	Arachnida
24	Zodariidae (Family - lowest order ID)	Zodariid spiders	Arachnida
25	*Allothereua maculata*	Australian House Centipede	Chilopoda
26	*Cormocephalus species*	Common Centipedes	Chilopoda
27	Henicopidae (Family - lowest order ID)	Stone Centipedes	Chilopoda
28	Lumbricidae (Family - lowest order ID)	Earthworms	Clitellata
29	*Atelomastix species*	Forest Millipedes	Diplopoda
30	*Acanthomima rhipheus*	Spiny-thorax Stick Insect	Insecta
31	Anisolabidinae (Subfamily - lowest order ID)	Epidermapteran Earwigs	Insecta
32	*Arniscus humeralis*	Stink Bugs	Insecta
33	*Arsipoda species*	Flea Beetles	Insecta
34	Auchenorrhyncha Suborder - lowest order	True Hoppers	Insecta
35	*Calliphora species*	Bluebottle Flies	Insecta
36	*Callococcus species*	Scale insects	Insecta
37	*Camponotus species*	Carpenter Ants, Typical Sugar Ants & Al-	Insecta
38	Cantharidae (Family - lowest order ID)	Soldier Beetles	Insecta
39	*Carenum laevipenne*	Snout and Bark Beetles	Insecta
40	*Catasarcus species*	Snout and Bark Beetles	Insecta
41	*Chrysopasta elegans*		Insecta
42	*Coccinella transversalis*	Small Transverse Ladybird Beetle	Insecta
43	*Coranus species*	Assassin Bugs	Insecta
44	*Coryphistes ruricola*	Bark-mimicking Grasshopper	Insecta
45	*Dictyotus roei*	Stink Bugs	Insecta
46	*Diphucephala species*	June Beetles	Insecta

INVERTEBRATES - Documented on iNaturalist

NO	COMMON NAME	SCIENTIFIC NAME	CLASS
47	*Diplacodes species*	Perchers	Insecta
48	*Eirone species*	Thynnid Flower Wasps	Insecta
49	*Eleale species*	Checkered Beetles	Insecta
50	*Euomus scorpio*	True Weevils	Insecta
51	*Eurymutilla species*	Velvet Ants	Insecta
52	*Geloptera species*	Leaf Beetles	Insecta
53	*Goniaea species*	Gumleaf Grasshoppers	Insecta
54	Gryllidae (Family - lowest order ID)	True Crickets	Insecta
55	*Heterotermes species*	Subterranean Termites	Insecta
56	*Iridomyrmex species*	Rainbow, Tyrant, and Meat Ants	Insecta
57	*Kawanaphila ?mirla*	Nectar-feeding Katydids	Insecta
58	*Laphria species*	Bee-mimic Robber Flies	Insecta
59	Lauxaniidae (Family - lowest order ID)	Lauxaniid Flies	Insecta
60	*Laxta species*	Giant Cockroaches	Insecta
61	*Meriphus species*	True Weevils	Insecta
62	*Metaballus species*	Shieldback Katydids	Insecta
63	*Monistria discrepans*	Common Pyrgomorph	Insecta
64	*Myrmecia analis*	Bull and Dinosaur Ants	Insecta
65	*Myrmecia gulosa*	Gulosa-group Bull Ants	Insecta
66	*Myrmecia imaii*	Bull and Dinosaur Ants	Insecta
67	*Myrmecia regularis*	Bull and Dinosaur Ants	Insecta
68	*Myrmecia swalei*	Bull and Dinosaur Ants	Insecta
69	Myrmicinae (Subfamily - lowest order ID)	Myrmicine Ants	Insecta
70	Nedubini (Tribe - lowest order ID)	Shieldback Katydids	Insecta
71	*Neoscleropogon species*	Robber Flies	Insecta
72	*Nerthra species*	Toad Bugs	Insecta
73	*Omyta species*	Stink Bugs	Insecta
74	*Paraoxypilus tasmaniensis*	Southern Boxer Bark Mantis	Insecta
75	*Parapsilocephala species*	Stiletto Flies	Insecta
76	*Paratettix australis*	Pygmy Grasshoppers	Insecta
77	*Paropsis blandina*	Leaf Beetles	Insecta
78	*Paropsisterna debilis*	Leaf Beetles	Insecta
79	*Phasmodes ranatriformis*	Kings Park Stick Katydid	Insecta
80	*Philobota xanthastis*	Concealer Moths	Insecta
81	*Pollanisus species*	Forester Moths	Insecta
82	*Psapharus species*	Broad-nosed Weevils	Insecta
83	Psychidae (Family - lowest order ID)	Bagworm Moths	Insecta
84	*Rhytidoponera species*	Pony Ants	Insecta
85	Sciapodinae (Subfamily - lowest order ID)	Long-legged Flies	Insecta
86	Scirtidae (Family - lowest order ID)	Marsh Beetles	Insecta
87	Staphylinidae (Family - lowest order ID)	Rove Beetles	Insecta
88	Tabaninae (Subfamily - lowest order ID)	Horse Flies	Insecta
89	Tipulomorpha (Infraoder - lowest order ID)	Crane Flies	Insecta
91	*Trichomesia newmani*	Round-necked Longhorn Beetles	Insecta
92	*Trigonidium albovittatum*	Trigs and Sword-tailed Crickets	Insecta
93	Amphipoda (Order - lowest order ID)	Amphipods	Malacostra-
94	*Cherax cainii*	Smooth Marron	Malacostra-
95	*Cherax preissii*	Koonac	Malacostra-
96	*Pseudolaureola wilsmorei*	Wilsmore's False Triumphant Pill Wood-	Malacostra-
97	Styloniscidae (Family - lowest order ID)	Woodlice and Pillbugs	Malacostra-
98	*Kumbadjena species*	Velvet Worm	Ony-
99	*Fletchamia species*	Land Planarians	Tricladida

AQUATIC FAUNA: FRESHWATER FISH - Documented on iNaturalist & by Murdoch University & Edith Cowan University			
NO.	**SCIENTIFIC NAME**	**COMMON NAME**	**FAMILY**
1	*Bostockia porosa*	Nightfish	Actinopterygii
2	*Galaxias occidentalis*	Western Galaxias	Actinopterygii
3	*Galaxiella munda* **Vulnerable (WA)**	Western Dwarf Galaxias	Actinopterygii
4	*Galaxiella nigrostriata* **Endangered (WA & National)**	Blackstriped Dwarf Galaxias	Actinopterygii
5	*Lepidogalaxias salamandroides* **Endangered (WA & National)**	Salamanderfish	Actinopterygii
6	*Nannatherina balstoni* **Vulnerable (WA & National)**	Balston's Pygmy Perch	Actinopterygii
7	*Nannoperca vittata*	Western Pygmy Perch	ActAinopterygii

AQUATIC FAUNA: FRESHWATER INVERTEBRATES - Documented on iNaturalist & by Murdoch University & Edith Cowan University			
NO.	**SCIENTIFIC NAME (LOWEST ORDER ID)**	**COMMON NAME**	**FAMILY**
1	Acarina (Order)	Mites	Water mites
2	Amphipoda (Class)	Amphipods	
3	*Cherax cainii*	Smooth Marron	Decapoda (Order)
4	*Cherax preissii*	Koonac	Decapoda (Order)
5	Coleoptera (Order)	Beetles	Diving beetles. Adults & larvae
6	Diptera (Order)	True Flies	Various Midge larvae
7	*Engaewa walpolei*	Walpole Burrowing Crayfish	Outside WWBB23 area
8	Epiproctopphora (Suborder) Odonata (Order)	Dragonflies	Predatory larvae
9	Hemiptera (Order)	True Bugs	Toad bugs
10	Leptoceridae (Order)	Caddisflies	One individual
11	Zypgotera (Suborder) Odonata (Order)	Damselflies	Predatory larvae

Narrative report for the Walpole-Nornalup National Parks Association

Aquatic fauna surveys - Walpole Wilderness Bioblitz (September 30 - October 1, 2023)

Mark Allen (Harry Butler Institute, Murdoch University)
Cecil Ellis (The University of Western Australia)

Introduction

Aquatic ecologists Dr Mark Allen from the Harry Butler Institute (Murdoch University) and Mr Cecil Ellis, a Masters student at The University of Western Australia, led three groups of citizen scientists on surveys during the Walpole Wilderness Bioblitz 2023. The aim was to collect species presence records to contribute to the overall Bioblitz survey and to present information showcasing the significance of the region's aquatic fauna and the survey methods used to document these species.

Methods

Fish and decapod crustaceans were sampled at five different locations during the survey (Figure 1). The flowing stream site ("Stream") is a tributary of the Bow River and lies outside of the official Bioblitz survey area. This site was surveyed to maximise the number of species that we could exhibit to the registered participants, as the diversity of aquatic species at the official Bioblitz aquatic survey sites was expected to be low. Sites "Stream", 24 and 37 were surveyed using a double-winged fyke net (2 mm woven mesh, 5 m wings, 1.2 x 0.8 m opening, 5 m long pocket with two non-return funnels) set overnight and retrieved and cleared the next day. Sites 24 and 37 were also sampled with a 5 m long seine net constructed from 1 mm woven mesh with a 1.8 m drop that was dragged between two people along a 5-10 m section of the bank. Sites 2 and 37A were sampled with the 5 m seine net only. All fish and decapod crustaceans were immediately released alive at the point of capture, except a small number of representative specimens that were kept alive in an aerated aquarium for exhibition to the Bioblitz participants and later released alive at their original place of capture.

Aquatic macroinvertebrates were also sampled at the three official Bioblitz survey sites (2, 24 & 37) using a dipnet with dimensions 30 x 30 cm head and 250 µm mesh that was swept along a 10 m section of the margin of each pool. The contents of the net were emptied into trays for sorting and identification to order/family level before being returned alive to their original place of capture.

Results

A total of five freshwater fish species and two decapod crustacean species were recorded across the five sample sites, including two fish species that are listed as Vulnerable under the Western Australian Biodiversity Conservation Act 2016 and/or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (Table 1). Other participants elswehere on the Bioblitz also recorded three additional fish and decapod species: Walpole Burrowing Crayfish (*Engaewa walpolea*), Salamanderfish (*Lepidogalaxias salamandroides*), and Blackstriped Dwarf Galaxias (*Galaxiella nigrostriata*). These observations were significant as all three species are listed as Endangered under the Biodiversity Conservation Act 2016 and the la er two have not been recorded from the Walpole area since the early 1980s (see Christensen, 1982). Overall, the diversity of fishes and decapods recorded during the Bioblitz was representative of nearly the entire fauna known historically from the area; the Pouched Lamprey (*Geotria australis*) being the only notable absentee.

The sites sampled were depauperate in diversity of aquatic macroinvertebrates. Understanding that the sites sampled were constructed dams helps explain the lack of habitat diversity required to support a higher diversity of aquatic macroinvertebrates. Only one individual of the three orders of sensitive taxa, Leptoceridae (Caddisflies) was found at Site 37.

For more information about aquatic macroinvertebrates, Waterbugs, and opportunities to conduct citizen science sampling events, please refer to the National Waterbug Blitz (www.waterbugblitz.org.au/).

Figure 1. Map of sites surveyed for aquatic fauna during the Walpole Wilderness Bioblitz 2023.

Table 1. List of fish and decapod crustacean species recorded at sites during the Walpole Wilderness Bioblitz 2023. BC – Biodiversity Conservation Act 2016 (WA); EPBC – Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).

Species	Conservation Status	Stream	Site 2	Site 24	Site 37	Site 37A
Galaxias occidentalis		✓		✓		
Galaxiella munda	Vulnerable (BC)	✓				✓
Nannoperca vittata		✓				
Nannatherina balstoni	Vulnerable (BC, EPBC)	✓				✓
Bostockia porosa		✓		✓	✓	
Cherax cainii		✓				
Cherax preissii		✓		✓	✓	✓

Table 2. Taxonomic list of aquatic macroinvertebrates recorded during the Walpole Wilderness Bioblitz 2023.

Taxonomy	Common Name	Presence	Comment
Order - Acarina	Mites	✓	Water mites
Class - Amphipoda	Amphipods	✓	
Order - Coleoptera	Beetles	✓	Diving beetles. Adults and larvae
Order - Leptoceridae	Caddisflies	✓	One individual
Order - Decapoda	Crayfish	✓	Koonacs
Order - Odonata Suborder - Epiproctopphora	Dragonflies	✓	Predatory larvae
Order - Odonata Suborder - Zypgotera	Damselflies	✓	Predatory larvae
Order - Hemiptera	True Bugs	✓	Toad bugs
Order - Diptera	True Flies	✓	Various Midge larvae

Acknowledgements

Firstly, we wish to acknowledge the Traditional Custodians of the lands and waters upon which we were so fortunate to be working: the Pibelmen and Minang people of the Noongar nation and pay our respects to their Elders both past and present. We were extremely privileged to take part in the Walpole Wilderness Bioblitz and would like to sincerely thank the volunteers from the Walpole-Nornalup National Parks Association and especially David and Liz Edmonds for their organisation of this event. It was a fantastic opportunity for us to promote the often unheralded but globally important freshwater biodiversity that is native to this part of the world and afforded us a valuable first opportunity to publicly promote our new research project on the biodiversity conservation value of artificial aquatic refuges to a highly engaged audience. We would most definitely welcome the opportunity to be involved in any future Bioblitz events.

We thank all the Bioblitz participants that sacrificed their weekend in the name of citizen science and are especially grateful for the assistance of Melissa Howe in leading our survey groups. Finally, our participation in the Bioblitz would not have been possible without the support and resources of the Harry Butler Institute (Murdoch University), the University of Western Australia and the generous financial support of The Ian Potter Foundation.

Reference

Christensen, P., 1982. The distribution of *Lepidogalaxias salamandroides* and other small fresh-water fishes in the lower south-west of Western Australia. J. R. Soc. West. Aust. 65, 131–141.

Figure 2. Stream site on Middle Road surveyed with a double winged fyke net. This tributary of the Bow River housed Western Galaxias (*Galaxias occidentalis*), Western Dwarf Galaxias (*Galaxiella munda*), Western Pygmy Perch (*Nannoperca vittata*), Balston's Pygmy Perch (*Nannatherina balstoni*), Nightfish (*Bostockia porosa*), Smooth Marron (*Cherax cainii*), and Koonac (*Cherax preissii*). Photo: Mark Allen.

Figure 4. Bioblitz site 24 on Boronia Road, a fire water point on the edge of a peat swamp in the Nile Creek/Kent River catchment. This site housed Western Galaxias (*Galaxias occidentalis*), Nightfish (*Bostockia porosa*), and Koonac (*Cherax preissii*). Photo: Mark Allen.

Figure 3. Bioblitz site 2 on Boronia Road, a fire water point in the headwaters of a tributary of the Frankland River. Aquatic ecologist Cecil Ellis uses a fine mesh sweep net to sample aquatic macroinvertebrates. This site did not house any fish or decapod crustaceans and the diversity of waterbugs was low, but the abundance of frogs and tadpoles was very high. Photo: Mark Allen.

Figure 5. Bioblitz site 37 on Boronia Road, a fire water point on the edge of a peat swamp in the Nile Creek/Kent River catchment. Aquatic ecologist, Dr Mark Allen explains the operation of a double winged fyke net to a group of Bioblitz participants. This site housed Nightfish (*Bostockia porosa*) and Koonac (*Cherax preissii*). Photo: Cecil Ellis.

Figure 6. Bioblitz site 37A, a drainage ditch on Boronia Road in the middle of a peat swamp in the Nile Creek/Kent River catchment. This site was a nursery for larvae and young juveniles of Balston's Pygmy Perch (*Nannatherina balstoni*), Western Dwarf Galaxias (*Galaxiella munda*) and Koonac (*Cherax preissii*). Photo: Melissa Howe.

Figure 8. Bioblitz participants sorting and identifying macroinvertebrates collected at site 37. Photo: Mark Allen.

Figure 9. Bioblitz participants were given an opportunity to familiarise themselves with the macroinvertebrate survey methods that are used in the National Waterbug Blitz, an ongoing Australia-wide citizen science project. Photo: Cecil Ellis.

Figure 7. Fish and decapod crustacean species recorded during the Bioblitz (clockwise from top left): Balston's Pygmy Perch (*Nannatherina balstoni*); Western Galaxias (*Galaxias occidentalis*) and Nightfish (*Bostockia porosa*); Smooth Marron (*Cherax cainii*); Walpole Burrowing Crayfish (*Engaewa walpolea*); Western Pygmy Perch (*Nannoperca vittata*); Western Dwarf Galaxias (*Galaxiella munda*); Salamanderfish (*Lepidogalaxias salamandroides*); and Koonac (*Cherax preissii*). Blackstriped Dwarf Galaxias (*Galaxiella nigrostriata*) was also recorded by Pierre Horwitz. Photos: Annan Bishop, Cecil Ellis & David Edmonds.

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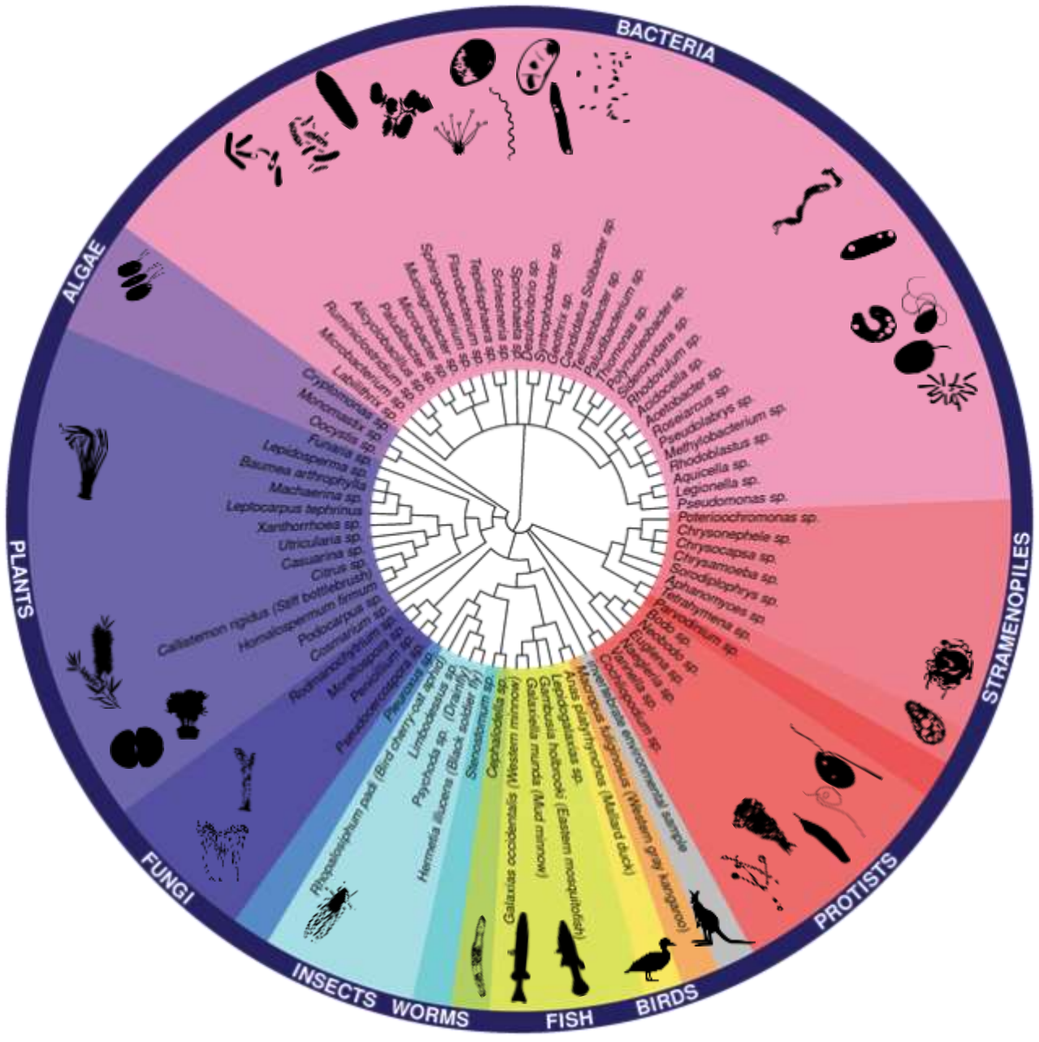
Job number: 605664



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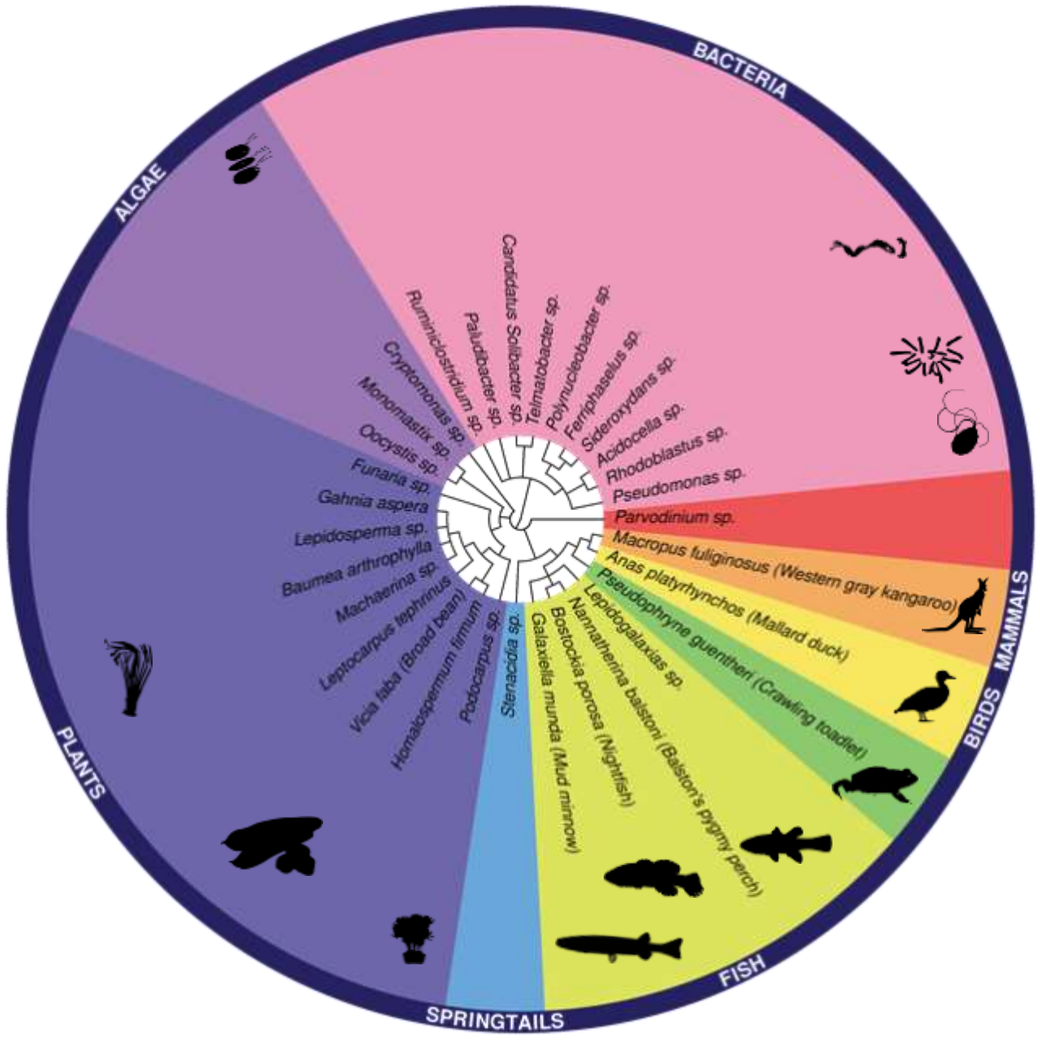

Sample number: 100467 (soil sample)
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