



# FOUR WINDS BIOBLITZ

NOVEMBER 11/12<sup>TH</sup> 2016



In 2016 the Atlas of Life in the Coastal Wilderness was invited to partner with the Four Winds to undertake an important baseline biodiversity survey to inform their planning of a 1,000 year arboretum. The Four Winds BioBlitz took place on 11/12th November and was much more than a biodiversity survey. The following pages will introduce the reader to what a BioBlitz is and some of the outcomes that this event delivered.

# Four Winds BioBlitz

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## Summary

Four Winds is committed to a long-term rehabilitation of their beautiful Barragga Bay music festival site. They have already begun the long term development of an Arboretum with 1000+ native, local seedlings planted and flourishing.

In 2016 the Atlas of Life partnered Four Winds to co-ordinate a music rich, creative BioBlitz at the Barragga Bay site and in nearby reference habitats. Over two fun-filled, entertaining days, together the Atlas of Life and Four Winds have established a baseline 785 species record from 64 expert led surveys. This information will inform the success of the plantings and other rehabilitation works, as the range and variability of species increases as the ecological communities become established.

BioBlitzes are festivals of science in nature and attract scientists, naturalists and community to work together to explore the biodiversity of an area to discover, identify and record as many kinds of species (e.g. plants, animals, algae and fungi) within a chosen area over a fixed time period - often 2 days. The Four Winds BioBlitz was organised by the Atlas of Life in the Coastal Wilderness (Atlas of Life) in partnership with the Four Winds and held on the 11<sup>th</sup> and 12<sup>th</sup> of November 2016. The event focused on the Four Winds site, but a number of surveys took place on reference sites nearby so that a wider representation of potential biodiversity was recorded.

The primary objectives of this BioBlitz were to:

- Create a foundation biodiversity record of the Four Winds site and nearby reference sites which can be used to compare the developing biodiversity which will be recorded as the arboretum is planted and new habitats and ecological communities develop and become established;
- Offer new ways for the Four Winds supporters and our regional communities to experience their place and improve community awareness of local biodi-

iversity whilst providing opportunities to interact with scientists and engage in a range of surveying techniques;

- Bring new experiences of art and music to a BioBlitz event to engage new audiences and inspire regular participants in new ways.

This BioBlitz formed part of a Four Winds Open Day, showcasing as well as the biodiversity surveys, a range of activities, including master classes in artistic mediums of botanical illustration and creative photography, as well as an afternoon performance by Indie string quartet FourPlay in Nature's Concert Saturday November 12th.

Artists participating in the Four Winds Bermagui Project received briefings from visiting scientists that informed creative works, some that were improvised on the day and others that will contribute to an extensive exhibition "on place" in 2017. This was a great opportunity for participants to see and enjoy the Four Winds site from a different perspective, engage in meaningful scientific endeavour, and help Four Winds vision its future shape within our community.

The BioBlitz included a schools program run in partnership with the Bournda Environmental Education Centre for 120 students, a Basecamp with exhibitions from the Australian Museum, opportunity to view a large range of species during 64 surveys ranging from flora walks, to reptile hunts, searches for peacock spiders, night time moth and possum surveys, motion sensitive camera traps and many other specialist activities. Using the Microeye microscope recently acquired by The Atlas of Life, visitors were invited to view the marvels of the micro world - the scales of a moth's wing, a reptile's skin and the gills on a fungus. There were presentations from experts about their work and the chance to walk with them to see more of the nature of the Four Winds site and nearby areas.

During the two days, 64 surveys were conducted by 24 surveys leaders. These surveys looked at a broad range of habitats including the existing Four Winds site which was until recently dairy farmland, dry coastal forest, leaf litter, dams and

streams and others. Utilising a variety of promotional avenues, the BioBlitz was able to attract over 300 participants to the event including school students who aided in the successful recording of 785 species (present count 11.02.17. total expected to be higher).

A BioBlitz is a complex event and the Four Winds BioBlitz was only successful because of the wide range of support given to the Atlas of Life by individual volunteers - scientists and community, and the great collaboration and input of partner organisations.

This report has been split into two sections. The first discusses the biodiversity data collected during the BioBlitz and the second section discusses participation.

## **Acknowledgements**

As the project coordinator and the author of this report, I would like to extend my sincere thanks to the Four Winds team, Local Land Services, the Atlas of Life in the Coastal Wilderness team, particularly Patricia Daly who is our database manager, Aaron Clausen creator of NatureMapr and the Canberra Nature Map, NSW National Parks and Wildlife Service, Bournda Environmental Education Centre, Bega Valley Shire Council, Eurobodalla Natural History Society (all members of the Sapphire Coast Regional Science Hub), Panboola Wetlands Trust, Streamwatch, NGH environmental consultancy, ANU Environmental Arts, The Australian Museum, the Royal Botanic Gardens Sydney, Biamanga National Park Board of Management, Cardno, and Woolworths. We would also like to thank all those expert survey leaders, some of whom travelled great distances to be with us, volunteers and everyone who put in countless hours of their own time in the lead up to, during and after the BioBlitz.

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## Introduction

Understanding and recording biodiversity on multiple spatial levels is increasingly recognised as being essential to developing an awareness of changes to regional and global ecosystems. Scientific resources are often limited due to lack of funding and personnel, with volunteers and community sourced help often being the backbone of many research projects. However, the information gained from these research projects is often not accessible to all involved. This means that neither party benefits as much as they could, and the understanding of common issues is not being fully comprehended by scientists and community members alike. One kind of event that aims to further develop and establish relationships and understanding between scientists, landholders, natural resource managers and community members is a "BioBlitz".

A BioBlitz comprises a group of scientists, naturalists, 'citizen scientists' and other members of the public, working together to discover, identify and record as many kinds of species (e.g., plants, animals, algae and fungi) within a chosen area over a short time period. The mixture of wildlife experts and community members is central to the BioBlitz concept and creates an event which is both enjoyable and meaningful to scientists, students and community. This enables us to enhance our knowledge of the local species and encourages further observation, learning and valuable data collection of the biodiversity in our communities.

Globally, BioBlitzes have been established and hosted in the United Kingdom and the United States of America over the last decade. Within Australia however, BioBlitzes are a relatively new event. With an increasing awareness of environmental health and human wellbeing, there is interest and energy devoted to expanding and conducting such events and in the last few years we have seen the numbers of these complex but rewarding events being organised.

The far south coast of New South Wales has been the hub for BioBlitzes in Australia and has led the way in the development of such events. Since the initial Bermagui BioBlitz held in Bermagui in 2012, the Atlas of Life in the Coastal Wilderness has successfully organised and run three more BioBlitzes locally including 2014's Mimososa Rocks BioBlitz which was a part of the World Park Congress. These four BioBlitzes have added thousands of sightings to the Atlas of Living Australia and recorded over 2,500 species between Bermagui and Pambula. The Atlas of Life has also advised on a number of other BioBlitzes including the Black Mountain BioBlitz in ACT, the first ReefBlitz and the Sydney Olympic Park BioBlitz. To support more organisations to run these complex events Libby Hepburn and Patrick Tegart led a national working group which in 2015 produced the Australian Guide to running a BioBlitz and since then have run a national workshop hosted by OEH in November 2017 to support and develop the network and community of practice around these events.

## Objectives

To add to the previous four BioBlitzes held on the Sapphire Coast, the Atlas of Life in the Coastal Wilderness (ALCW) was invited to partner with the music and creative organisation and now nature-focused and performance space 'Four Winds', at their permanent site near Bermagui, and brought together a group of partner organisations (see acknowledgements) to run a BioBlitz on and in nearby reference sites to the Four Winds site at Barraga Bay in November 2017.

As the fifth BioBlitz to occur on the far south coast of New South Wales, the Four Winds BioBlitz had the following objectives; to

- Record as many species as possible during the two nominated days;
- Create a baseline species list for the Four Winds site and nearby reference habitats to inform the planning of a long term arboretum on the Four Winds site;

- Engage with management, education and outreach plans for Four Winds community engagement;
- Further establish links and working relationships between scientists, naturalists, environmentally focused organisations and the far south coast community;
- Further promote citizen science along the south coast and attract as many local community members to the event and Regional Science Hub network as possible;
- Offer new experiences to BioBlitz participants and bring the BioBlitz experience to new audiences, with the addition of several arts and music activities as part of this BioBlitz.



## Study Area

The Four Winds site (fig. 1)



The site at Barraga Bay, west of the Bermagui-Tathra road some 10km south of Bermagui, where the Four Winds Festival is celebrated encompasses some 10 hectares of relatively steep hilly land on a substrate of Ordovician meta-sediments.

The infrastructure on the site comprises the outdoor amphitheatre and sound shell, the newly opened Wind Song pavilion, various smaller buildings, roads and areas set aside for parking. A large dam constructed some decades ago occupies much of the floor of the valley that bisects the site.

Prior to clearing two vegetation communities would have dominated the site, a sclerophyll forest of spotted gum (*Corymbia maculata*) with an understorey of bower wattle (*Acacia subporosa*) and burrawangs (*Macrozamia communis*) on the drier ridges to east and west, and a tract of warm temperate rainforest along the valley and its lower slopes with such species as lillipilli (*Syzygium smithii*), mutton wood (*Myrsine howitteana*), cabbage palms (*Livistona australis*).

The site was evidently almost wholly cleared some decades ago, as evidenced by early Festival photographs and the current absence of such local species as *Macrozamia* cycads. Benefitting from the presence of seed sources on adjacent uncleared properties, the site has nevertheless undergone substantial natural regeneration of both rainforest and sclerophyll species over the past 2 decades. Some limited planting of local and exotic species has also occurred during that time.

Some two years ago the Four Winds Board resolved that, to the greatest extent possible, only local native species would be established on the site, which, as well as a performance place, would constitute an Arboretum demonstrating the beauty, diversity and horticultural value of local species. In 2015 a major two-year planting project (approx 2000 plants) commenced, with the primary aim of accelerating the re-establishment of the original diversity of vegetation on the site by planting those species less swift to re-colonise naturally. It is envisaged that in the longer term the site will be open to the public on a regular basis and that efforts will be made to showcase the flora and fauna as a primary attraction.

The rationale for undertaking a thorough survey of the flora and fauna at Four Winds at the 2017 BioBlitz, early in the planting program, is to establish a benchmark for future surveys with which comparisons can be made over the longer term (perhaps on a five yearly cycle). It will then be possible to determine the extent to which and the rate at which diversity is being restored to the site. It was desirable that the surveys were extended to nearby sites with comparable vegetation in an undisturbed state so as to discern 'gaps' in the Four Winds, key and desirable species which are not currently present. The input from the various expert survey leaders and data from all the surveys will help inform future works and planting on the site.

The key surveys that were requested included:

- flora of dry sclerophyll (spotted gum) forest on the site,
- fauna of dry sclerophyll (spotted gum) forest at intact index site(s) nearby,
- flora of warm temperate rainforest on the site,
- fauna of warm temperate rainforest at intact index site(s) nearby,
- nocturnal surveys,
- aquatic flora and fauna in the dam.

Further information about the surrounding habitats was been taken from survey reports of nearby areas such as the Cuttagee Lake Rapid Assessment survey OEH and the Murrah Flora Reserve Survey.

## Part 1: BioBlitz Species Diversity

### Methods

#### Field Surveys

In order to maximise the amount of biodiversity information collected from the targeted areas, 64 surveys (appendix 1) were designed and lead by 24 survey leaders. These surveys started from 6am Friday (32 surveys) and finished at 3pm on Saturday (32 surveys) (see Appendix 1). These surveys spread across the targeted area (fig. 3, fig. 4, fig. 5) and looked at a range of niche habitats, focusing on terrestrial, aquatic, marine and aerial organisms. Outside of the nominated BioBlitz dates a number of preliminary surveys were carried out and camera traps put in place (between October and November 2017). The recordings for these surveys have also been included into the total species count. Methods used for the field surveys were determined by the survey leaders conducting them. When creating the survey, survey leaders ensured that the methods were simple enough to allow for community participation and learning yet effective so that extensive species lists could be developed.

Below is a list of the types of surveys conducted during the BioBlitz (table 1);

Table 1: Summarised list of the surveys types conducted during the BioBlitz and the organisms that were targeted. Note surveys were titled differently on the survey timetable (see Appendix 1).

Group	Survey Method	Target Organisms
Mammals	<ol style="list-style-type: none"> <li>1. Elliot Trap</li> <li>2. Pitfall trap</li> <li>3. Motion activated cameras</li> <li>4. Call playback and spotlighting</li> <li>5. Opportunistic</li> </ol>	<ol style="list-style-type: none"> <li>1. Small mammals</li> <li>2. Small mammals</li> <li>3. All mammals and birds</li> <li>4. Nocturnal mammals and birds</li> <li>5. All mammals</li> </ol>
Reptiles	<ol style="list-style-type: none"> <li>1. Tiles</li> <li>2. Pitfall traps</li> <li>3. Opportunistic</li> </ol>	1,2,3 Snakes, lizards and frogs
Birds	<ol style="list-style-type: none"> <li>1. Call playback</li> <li>2. Opportunistic</li> <li>3. Cone search</li> </ol>	<ol style="list-style-type: none"> <li>1. Nocturnal birds</li> <li>2. All birds</li> <li>3. Black Cockatoos</li> </ol>
Bats	<ol style="list-style-type: none"> <li>1. Anabats</li> </ol>	<ol style="list-style-type: none"> <li>1. Microbats</li> </ol>
Marine (fish, crustaceans, gastropods)	<ol style="list-style-type: none"> <li>1. SCUBA</li> <li>2. Shell Death Assemblage</li> <li>3. Dip netting</li> <li>4. Opportunistic</li> </ol>	<ol style="list-style-type: none"> <li>1. Fish, molluscs, algae</li> <li>2. Gastropods</li> <li>3. Fish, crustaceans, molluscs</li> <li>4. All marine life</li> </ol>
Flora	<ol style="list-style-type: none"> <li>1. Opportunistic <ul style="list-style-type: none"> <li>• Forest, bush and wetland</li> <li>• Coastal Plants</li> <li>• Disturbed forest</li> <li>• Estuary Plants</li> <li>• Fungi</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. All plants (angiosperms, gymnosperms, fungi)</li> </ol>
Invertebrate	<ol style="list-style-type: none"> <li>1. Dip netting</li> <li>2. Sweep netting and leaf litter search</li> <li>3. Light sheets</li> </ol>	<ol style="list-style-type: none"> <li>1. Aquatic macroinvertebrates</li> <li>2. Terrestrial insects</li> <li>3. Moths</li> </ol>

## Species Recording and Identification

During each survey, either a survey leader assistant or a volunteer on the survey was selected to record any survey targeted organisms. The Atlas of Life had in August prior to the BioBlitz event, moved to a new recording platform - NatureMapr which allows images and records to be added in a number of ways - via apps for smart-phones and tablets, from images added to the website, from records without images, and via bulk uploading of spreadsheet from the survey leaders. A survey recording form were created for each individual survey. If an organism found during a survey was not able to be identified by the expert, the organism would either be partially (e.g. plant) or wholly (e.g. insect) collected and taken back to basecamp. If this wasn't possible the organism was photographed and the pictured number was recorded. Participants were encouraged to photograph specimens as a record of what they had observed and a number of NatureMapr surveys were undertaken to help familiarise new users with the new recording platform. Photographs taken not via NatureMapr during surveys were uploaded onto laptops back at the base-camp. A variety of species guides some of which were online or apps, were made available to help identify organisms. (Photo credit Liena Lacey, Four Winds.)



The BioBlitz also gave the opportunity to highlight other biodiversity projects: BVSC



promoted their upcoming Pigmy Possum survey, several surveys were undertaken using the annual Wild Pollinator Count methodology, NPWS shared the progress and sought new volunteers for their Koala surveys, and the Streamwatch team increased the number of people able to

undertake their methods for finding and identification and recording of waterbugs.

(Photo credit Pigmy Possum , Andrew Morrison, BVSC.)

The Waterbug team led by Cecil Ellis and Steve Skinner had fun observing what range of creatures are living in the dam on site and they visited a site on the Murrumbidgee river not far from Four Winds that had been a Reference site in the 1980's. We were delighted to record that the water is still very healthy, with a few of the key target species that indicate the highest level of water quality.

Steve Williams came all the way from Bendigo to see our NSW moths and found a number of species he had never seen before. Steve is particularly interested in the ecology and life cycles of moths and his presentation showed the different kind of moths that need different kinds of habitats. When he took his surveyors out for their night-time survey, he noted that although there were a lot of different moths that came to the light sheets, there would be many more if the habitat was more diverse. As Sheena Bowen (Four Winds Chair) was one of the survey participants, she said this information was a revelation to her and that Four Winds planning will be improved to not just create an arboretum, but also to develop diverse habitats to encourage the widest range of biodiversity in their landscape.

Andrew Claridge and David Jackson showed how to set small mammal traps and Andrew Morrison set camera traps and gave a presentation showing how they recorded a host of creatures - goannas, echidnas, antechinus and a fox, all looking for food near the cameras. Olivia Forge(LLS) gave a presentation about her camera trapping work particularly looking for Potaroos in the region.



## Results

### Field Surveys

Through the combination of survey methods and 64 surveys (not including the schools sessions), 785 different species<sup>1</sup> have been identified to date from the 11th and 12th November during the Four Winds BioBlitz.

### Species information

All details of numbers and species by group can be found on the Atlas of Life website in our [NatureMapr](#) database. There you can see the maps of the BioBlitz site and reference sites and also all record details for those areas November 11/12th. You may also download species lists from the BioBlitz.



## Part 2: Community Involvement

An integral part of BioBlitzes, and citizen science in general is the involvement of the community. The Four Winds BioBlitz aimed to strengthen the bonds and improve the skills of returning participants, and through varied promotional avenues attract new participants to the BioBlitz. The section below outlines how the BioBlitz

f Life online data base.



was promoted, general attendance of the event, and the layout of the school program which took place on Friday 11<sup>th</sup> November.

The Four Winds team were able to showcase a new direction in community involvement for their organisation, offering classes in botanical drawing and wildlife photography and sharing their longer term Art and Environment program. They also treated all participants to a lovely afternoon concert in their magnificent open air amphitheatre at the close of the event.



## Promotion

To attract participants to the BioBlitz, the steering committee and the Four Winds team advertised the event through 5 main avenues (Table 2)

Table 2 total list of advertisement avenues used to promote the Four Winds BioBlitz.

Advertising avenue	Description
<b>Radio</b>	The project coordinator and a number of survey leaders were interviewed by two radio stations; ABC Radio and Power FM over several weeks prior to the event.
<b>Email lists</b>	Utilising the Atlas of Life in the Coastal Wilderness and the Four Winds' extensive email and social media lists, together with an online event site and booking system created through Eventbrite, subscribers were cordially invited to attend the BioBlitz and to register for surveys of their choice.
<b>Blog</b>	Sapphire Coast Tourism and ABC radio wrote several blog stories before and after the BioBlitz and particularly around the potentially new peacock spider identified during the event.
<b>Social Media</b>	<p>The BioBlitz was regularly advertised on the following social media pages;</p> <ul style="list-style-type: none"> <li>- Bega Valley Notice Board</li> <li>- Inspiring Australia</li> <li>- Eden Connect</li> <li>- Atlas of Life in the Coastal Wilderness</li> <li>- Bega Valley Shire Council</li> <li>- Far South Coast Birdwatchers Inc</li> <li>- Panboola</li> <li>- Sapphire Coast Marine Society</li> <li>- Sapphire Coast Tourism</li> <li>- friends Facebook pages</li> </ul>
<b>Newsletter</b>	Bournda Environmental Education Centre sent out several EOIs and newsletters to nearby schools, inviting them to attend the school programme on the Friday of the BioBlitz and surveys on the Saturday. Atlas of Life and Four Winds circulated a number of different invitations.

Eventbrite was chosen as the event management and registration website for Four Winds BioBlitz. Advertisements, social media and promotional avenues directed interested community members initially to either the Four Winds webpage or Atlas of Life webpage, and from these to the Eventbrite registration page.

Figure 2 below charts viewings of the BioBlitz event website. There are notable peaks coinciding with promotional activities:

- as the website went live and the Atlas of Life circulated a promotional email to its subscribers (18<sup>th</sup> October),
- immediately after Four Winds circulated a newsletter email to its subscribers which included the BioBlitz as 'coming up' (25-27<sup>th</sup> October),
- 3<sup>rd</sup> November, and
- in the week prior to the event, when Four Winds circulated a promotional email focused on the BioBlitz and its free concert, and additional emails were sent to registered event participants through the Eventbrite site.

The event website viewing profile suggest that emails circulated to Atlas of Life and Four Winds general subscribers and Facebook seem to have been effective in promoting the event in the community, with spikes in page views aligning with the release dates.

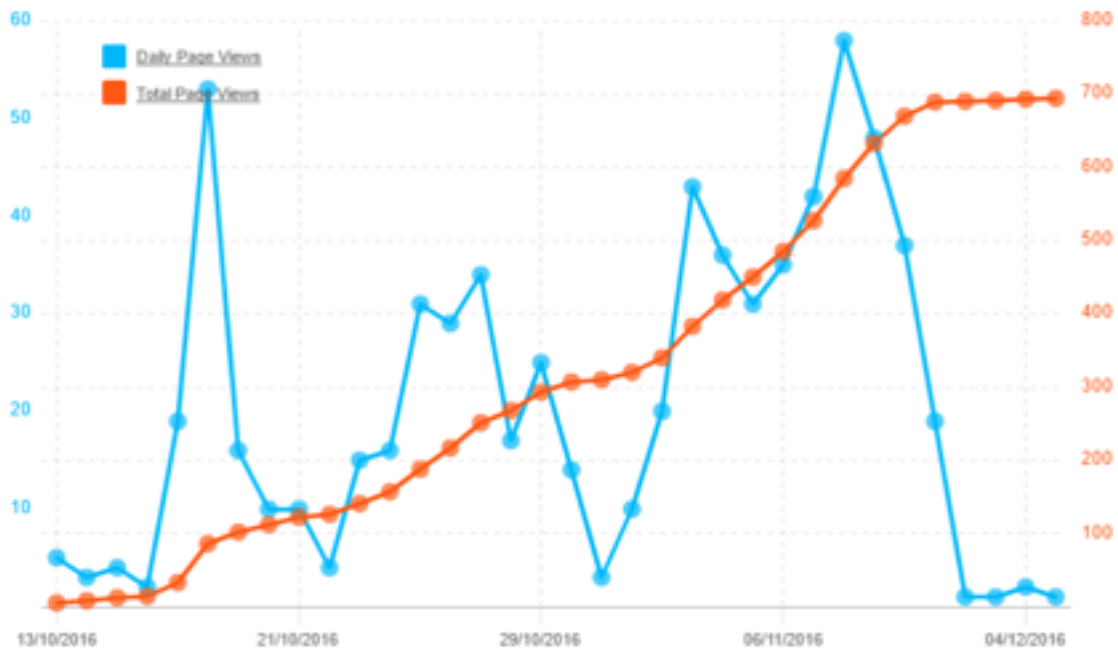


Figure 2 exported graph from the Eventbrite registration website. While the registration page was live, page views were sporadic with peaks occurring when the event was advertised through different avenues.

A total of 770 tickets (survey spots) were available to register for prior to the event, via the Eventbrite site. This was a large offering compared to previous BioBlitz events, for example Wallagoot Catchment BioBlitz in December 2015 offered 493 survey places, with 285 pre-filled through online bookings. Of the 770 tickets available at Four Winds BioBlitz, 343 were pre-filled from on line registrations (45%). During the event, a number of people who attended without prior online registration also choose to register on-site to join surveys with places still free.

### Community Participation

During the two days over 200 community members took part in surveys. With the survey leaders, volunteers and school students, not counting the free concert attendees, this gave over 320 participants at the BioBlitz. The majority of participants travelled from 10 to 30 kilometres away from the Four Winds site (fig. 7a). However, some participants came from much greater distances such as Ballarat, Sydney, and Canberra.

## Organisation Collaboration

The Four Winds BioBlitz was able to succeed through the collaboration of eighteen different groups. These groups aided the event in a number of ways; Basecamp set-up, project management, provision of equipment and volunteer time. Below is a list of the groups;

- Atlas of Life in the Coastal Wilderness
- Four Winds
- SE NSW Local Land Services
- Bournda Environmental Education Centre
- Bega Valley Shire Council
- Panboola Wetlands Trust
- National Parks & Wildlife Service NSW
- Biamanga National Park Board of Management
- Nature MapR and Canberra Nature Map
- Australian Museum
- Streamwatch
- Royal Botanic Gardens Sydney
- Eurobodalla Natural History Society
- Nature Coast Marine Society
- ANU Art & the Environment
- NGH Environmental
- Cardno
- Woolworths

## Schools Program

As at previous Sapphire Coast BioBlitzes, students from local schools were invited to attend a workshop/survey program for Friday 11<sup>th</sup> November, that was created by the Bournda Environmental Education Centre. The program looked to provide stu-

dents with diverse practical and theoretical skills through four, 1 hour and 10 minute sessions (Figure 3). Staff from the Bournda Environmental Education Centre, Australian Botanical Gardens, and Local Land Services worked together and led separate sessions at various locations (Figure 4).

Figure 3 BioBlitz timetable created by the Bournda Environmental Education Centre staff for students attending the BioBlitz as part of the school program, which was held on the Friday.

<b>Four Winds BioBlitz – Friday 11<sup>th</sup> November – Schools Program and Supervision Roster</b>						
0945 Arrive at Four Winds Basecamp for registration, 0950 – 1005 Welcome to Country – Gadhu Dancers						
1005 - 1015 Safety Briefing/Site orientation						
1015 Move to activity locations	Group 1 Bermagui PS (12 students)	Group 2 Bermagui PS (13 students)	Group 3 Bermagui PS (12 students)	Group 4 Bermagui PS (13 students)	Group 5 Wolumia PS (15 students)	Group 6 Wolumia PS + Eden MHS (10 +4 to 8)
Fruit break/drink (All staff)						
Session 1: 1020-1130	Aquatic Life Bioblitz (BEEC- Bob)  Bob Harris	Basecamp Displays and Activities (Various)  Ally Smith	Terrestrial Invertebrate Bioblitz (BEEC – Luke)  Luke Brown	Art, Science and Nature 1 (Atlas)  Brendan Constable	Art, Science and Nature 2 (Four Winds)  Joy Mackley	NatureMapr - Plants (Atlas)  Nikki Challman
Fruit break/drink (All staff)						
Session 2: 1140-1250	Art, Science and Nature 1 (Four Winds)  Christina Potts	Aquatic Life Bioblitz (BEEC – Bob)  Ally Smith	NatureMapr Plants (Atlas)  Brendan Constable	Terrestrial Invertebrate Bioblitz (BEEC-Luke)  Luke Brown	Basecamp Displays and Activities (Various)  Joy Mackley	Nikki Challman
Lunch (All staff)						
Session 3: 1320-1430	NatureMapr Plants (Atlas)  Christina Potts	Art, Science and Nature 1 (Four Winds)  Ally Smith	Art, Science and Nature 2 (Four Winds)  Nikki Challman	Basecamp Displays and Activities (Various)  Brendan Constable	Terrestrial Invertebrate Bioblitz (BEEC – Luke)  Joy Mackley	Aquatic Life Bioblitz (BEEC – Bob)  Bob Harris
1430 - Return to Basecamp – Conclusion/Evaluation						
1440 Depart Basecamp						

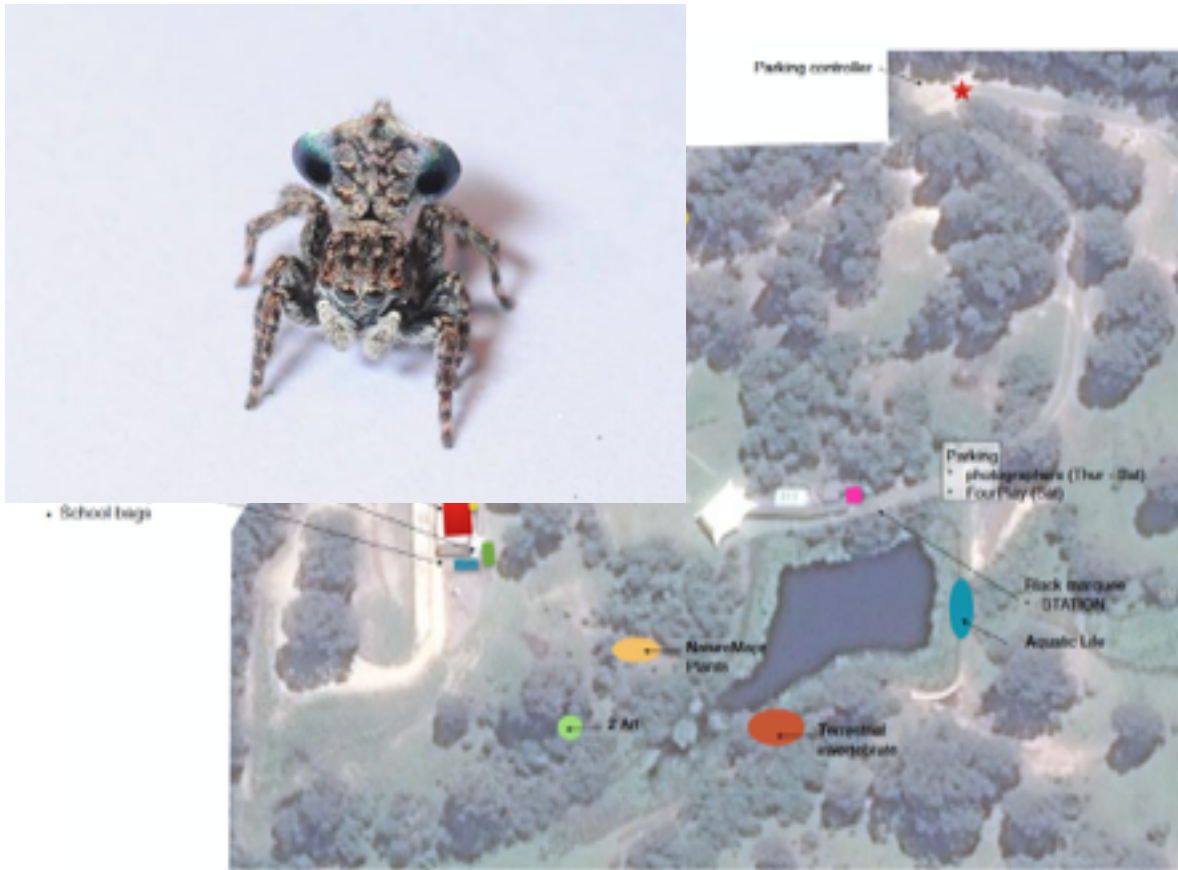
Figure 4. Four winds BioBlitz Schools survey locations

## Feedback

### Stories from Four Winds BioBlitz

One of the survey leaders who attended Four Winds BioBlitz, as he has done at several previous south coast BioBlitzes, was Stuart Harris. Stuart is a citizen scientist with a remarkable story, as told by the ABC, and captured in the film 'Maratus', di-





irected by Simon Cunich. Stuart is an expert on peacock spiders (jumping spiders of the genus *Maratus*), an interest triggered by the chance discovery of, and long search to confirm the identity of, a previously unknown species of peacock spider – *Maratus harrisi*. During a survey of the leaf litter at Four Winds BioBlitz led by Stuart Harris, what appears to be another new species of *Maratus* was found by survey participant Helen Ransom. (Photo credits Stuart Harris.)

Four Winds BioBlitz had the power to change the perspective, perhaps even worldview of participants, leading to





changes in our sense of place and the way we relate to our surroundings . Many of the Four Winds board and employees attended the event and participated in a range of surveys. Sheena Boughen, Chair of Four Winds at the time, was blown away by the presentation and moth survey led by Steve Williams from Ballarat that she attended on the Friday night. On Saturday she spoke with Libby Hepburn, Chair of the Atlas of Life, saying that she had realised that Four Winds shouldn't just be aiming to create an arboretum, but more diverse habitats to encourage the highest high level of biodiversity across the site. Sheena was inspired by the words of moth survey leader Steve Williams who said if there were a bigger variety of vegetation we could expect to find a much wider range of moths to record.

## **Discussion**

As the fifth BioBlitz to occur along the South East coast of Australia, the Four Winds BioBlitz was a success on many levels. The multifaceted approach to collecting biodiversity data and engaging with the community provided the ideal platform for local residents to join and record 785 species and help establish a significant species list for the area. This species list will support future strategies for the Four Winds ecological development program and can be built on over time to map site development and changes.

The functionality and success of surveys are to a large extent determined by the leaders conducting them. Ecological and biological expertise is an essential ingredient in creating a successful survey program. In addition, strong communication skills and passion are essential for a survey leader to demonstrate when conducting a survey with community members involved. The Atlas of Life has developed strong working relationships with both professional scientists and expert naturalists and has found both make the key contribution to community engagement and the success of BioBlitz events. The enjoyment and learning experience that comes out of a survey is heavily based on how well the survey leader is able to convey his/her expertise and passion to participants. This was identified early by the BioBlitz manage-

ment team, with all survey leaders providing fulfilling and attractive surveys for participants. However, survey leader confidence going into a survey and the survey is essential as well. This was highlighted during the Panboola BioBlitz in 2014. To ensure survey leaders felt confident, understood the wider aims of the event and were aware of their responsibilities on the day, a number of communications were circulated and discussion were valuable with most of the survey leaders. Not only did this provide survey leaders with important information about the site, emergency plans and recording data, but also provided a platform for them to network with each other.

Scientists can often be restricted by funding, with remote and regional areas across Australia often having limited research conducted due to this reason. Snapshot studies like BioBlitzes, have been shown to supply scientists and the organisations they are affiliated with, unprecedented access to biodiversity data. In addition to this, BioBlitzes also provide a network platform for many smaller community based groups to work with larger environmentally focused groups. These networking opportunities can lead to new, ongoing projects starting or gaining strength, either via funding, resources or new volunteers. Results of the surveys and an exhibition of images from the BioBlitz have been shared with participants through email updates and presentations at the Atlas of Life's Christmas dinner event in December, and in March 2017 the first of several exhibitions of the Four Winds BioBlitz will take place at Bermagui.

During the planning process the survey program can often take the highest priority focus, however, the activities and workshops within the Basecamp are also carefully thought out and planned, and this year there were a range of other activities which added different dimensions to the whole event. The BioBlitz Basecamp in the fantastic Windsong Pavilion provided opportunities for everyone, including young and less able-bodied participants to be engaged with the BioBlitz and help contribute to the data recorded. In addition to providing a space for basic refreshments and re-

cuperation, the Basecamp also provided opportunities for networking, community engagement and ongoing learning through discussion, presentations and workshops. Some workshops had simple aims, such as teaching participants how to correctly identify different organisms. For example, waterbug workshops were created to show participants the different insect families and the characteristics that determine what family a specimen fits into (e.g. wings, number of legs, habitat it is found in). Other workshops focused on more technical, equipment-based skills such as photography and microscopy.

A number of survey leaders gave presentations of their work to school students and community participants at Basecamp. Andrew Morrison (BVSC) shared fantastic images from some of the camera traps set around the site earlier and Olivia Forge (LLS) showed the methods of camera trapping and results from her long term Potaroo surveys. Steve Williams gave a presentation about the cornucopia of moths and their different habitats. Chris Allen talked about his Koala surveys seeking to identify the remnant populations of Koala in the region. Providing this additional level of participant education and engagement alongside the surveys also promotes community discussion and highlights the value of the BioBlitz and community engagement with biodiversity recording within the community.

Throughout the BioBlitz, the Basecamp also showcased the Australian Museum "Museum in a Box" service, which takes the form of a number of "Boxes" filled with themed specimens and interpretive material. The topics of the boxes that were used during the BioBlitz event were chosen to complement the range of surveys being undertaken. These displays were very popular and provided additional material for survey leaders and particularly school surveys to reference, discuss and experience with their groups.

We had our wonderful "Microeye" microscope, recently acquired by the Atlas of Life, freely available to help show and identify specimens found during the BioBlitz,



and participants were invited to use it to view their chosen specimens projected at large at high resolution and significant microscopic scale.

Feedback from the previous year's Wallagoot Catchment BioBlitz had noted that more workshops should be provided before and during the BioBlitz to either better prepare participants or further cement their learning. Taking this into account, the Four Winds BioBlitz had a greater number and wider scope of extra learning opportunities. This was deemed a success from the feedback we received.

One event that is recommended that should occur at all BioBlitzes is a 'Welcome to Country'. This serves to focus everyone's attention on the great history and the importance of sensitive interaction with nature and the intimate understanding of the traditional inhabitants of this land. The Four Winds BioBlitz had the traditional Welcome to Country, and a local and much respected Aboriginal Elder, Iris White also spent time telling traditional stories to the school students and community members.

In conclusion, the Four Winds BioBlitz was a great success for the area. Being the fifth BioBlitz in the region, it has made large contributions to biodiversity data recording, demonstrating well our new recording platform NatureMapr, attracting new scientists to the area, and generating strong community involvement. It was also a great demonstration of the benefits gained from the collaboration of groups with different focuses - Four Winds with their strong music and arts direction, and the Atlas of Life with its biodiversity focus. This collaboration resulted in the creation of an enriched community festival of science and the arts, that engaged a wide range of community members in nature-interaction, the creative arts and collecting significant biodiversity data.

A big thanks to all Survey Leaders and Volunteers and everyone who joined us to participate and who made the event such fun. Together we are building a significant species list of what lives here now and we will return from time to time to see how the biodiversity has increased as the Four Winds planting program adds to the mix of habitats on their site.

## Appendix

### Appendix 1: Four Winds BioBlitz Survey Timetable

Friday November 11th 2016

Survey Key (location not on Four Winds site)						
Plants	Beach/Shells/ Rock pools	Birds	Mammals	Reptiles/ Amphibians	Insects	Freshwater/ Waterbugs/Riparian

No.	Survey	Time	Survey leader	Survey description
1	Bush Birds	7.00-8.00 am	Julie Morgan	Join the morning chorus in the Four Winds local habitat to identify birds by song and sighting.
2	Lone Lookers	Own time	Self	Explore the beautiful Four Winds site and take photos or what you see. Come to Base Camp and get registered with NatureMapr and download the app. Or take photos with your camera and learn how to add a sighting to our Atlas of Life database.
3	Small Mammal Survey	8.00-9.00 am	Andrew Claridge	Join experts to observe animals trapped during the night along a set of trap lines.
4	NatureMapr Walk	9.30-10.30 am	Patricia Daly / Liz Allen / Mandi Stevenson	A guided walk to observe and record all species of interest using the new NatureMapr platform. Using smartphones, tablets or cameras you will be shown how to take and upload images into the Atlas of Life identification database back at Base Camp.
5	Shore Bird Survey	9.30-11.30 am	tbc	An extended walk around Cuttagee Beach/Lake to observe shorebirds and others.

No	Survey	Time	Survey leader	Survey description
6	Reptile Search	9.30-11.30 am	Ross Bennett	Join herpetologist Ross Bennett to search under logs, rocks and leaf litter for inactive resident reptiles, as well as conduct transects for active reptiles and analyse pitfall traps
7	Koala survey	9.30-11.30 am	Chris Allen	Join local koala expert Chris Allen to re-visit existing survey sites in the Murrah Flora Reserve.
8	Flora walk	10.00-11.00am	Rachel Anderson	A walk through various local habitats to identify as many flora species as possible.
9	Wetland Vegetation Survey	10.00-11.00 am	Stephen Skinner	Join expert Stephen Skinner to survey local riparian aquatic vegetation.
10	Wild Pollinators Count	10.00-11.00 am	Christine Polec	Identify and count insect pollinators as they visit flowering plants. These may include beetles, bees, wasps, flies, butterflies and moths.
11	Camera trap	10.30-11.30 am	Andrew Morrison	View and analyse local fauna images collected by infra red motion sensitive camera traps.
	image			
	analysis			
12	Flora walk - Coastal	10.30 am - 12.00 pm	David Maynard	A 'random meander' through coastal areas around Barragga Bay to identify flora species.
13	Microeye Microscope session	11.00-11.30 am	ALCW	Explore the small stuff. Bring your own special things or see some specimens we have collected using our very special microscope Microeye. We can show the images on the big screen so you can see minuscule things at high resolution and great size. Change the way you see the world!
14	NatureMapr Walk	11.00 am - 12.00 pm	Patricia Daly / Liz Allen / Mandi Stevenson	A guided walk to observe and record all species of interest using the new NatureMapr platform. Using smartphones, tablets or cameras you will be shown how to take and upload images into the Atlas of Life identification database back at Base Camp.

No	Survey	Time	Survey leader	Survey description
15	Freshwater Ecology/ Waterbugs Survey	11.30 am - 12.30 pm	Cecil Ellis & Stephen Skinner	Join Steven Skinner, phycologist at Royal Botanic Gardens & Cecil Ellis, aquatic ecologist at Nature Navigation, to learn about the diverse creatures that inhabit our freshwater dams and streams. Learn how 'waterbugs' can be used as indicators of waterway health.
16	Wild Pollinators Count	12.00-1.00 pm	Christine Polec	Identify and count insect pollinators as they visit flowering plants. Insects seen could include beetles, bees, wasps, flies, butterflies and moths.
17	Flora walk - Coastal	1.30-3.00 pm	David Maynard	A 'random meander' through the Murrah Flora Reserve to identify vegetation species.
18	Koala survey	1.30 - 3.30 pm	Chris Allen	Join local koala expert Chris Allen to re-visit existing survey sites in the Murrah Flora Reserve.
19	Flora walk	2.00-3.00 pm	Rachel Anderson	A walk through various local habitats to identify as many flora species as possible.
20	NatureMapr Walk	2.00-3.00 pm	Patricia Daly / Liz Allen / Mandi Stevenson	A guided walk to observe and record all species of interest using the new NatureMapr platform. Using smartphones, tablets or cameras you will be shown how to take and upload images into the Atlas of Life identification database back at Base Camp.
21	Freshwater Ecology/ Waterbugs Survey	2.00-3.00 pm	Cecil Ellis & Stephen Skinner	Join Steven Skinner, phycologist at Royal Botanic Gardens & Cecil Ellis, aquatic ecologist at Nature Navigation, to learn about the diverse creatures that inhabit our freshwater dams and streams. Learn how 'waterbugs' can be used as indicators of waterway health.
22	Reptile Search	2.00-3.30 pm	Ross Bennett	Join herpetologist Ross Bennett to search under logs, rocks and leaf litter for inactive resident reptiles, as well as conduct transects for active reptiles and analyse pitfall traps.



No	Survey	Time	Survey leader	Survey description
23	Microeye Microscope session	2.30-3.00 pm	ALCW	Explore the small stuff. Bring your own special things or see specimens we have collected using our very special microscope Microeye. We can show the images on the big screen so you can see minuscule things at high resolution and great size. Change the way you see the world!
24	Macro-invertebrate Survey	2.30-3.30 pm	Kim Pullen	Discover the world of invertebrates, insects and arthropods with expert Kim Pullen. Take photos for identification and look at small creatures under our Microeye microscope at Base Camp.
25	Bird Survey	3.00-4.00 pm	Peter Marsack	Walk with leader Peter Marsack to identify as many bird species as possible through song and sighting
26	Peacock Spider Search	3.00-4.30 pm	Stuart Harris	Search through the leaf litter and undergrowth with leader Stuart Harris for the elusive and beautiful peacock spiders and other invertebrates.
27	Small Mammal Survey	4.00-5.00 pm	Andrew Claridge	Join expert Andrew Claridge with David Jackson to observe animals trapped along a set of traplines
28	Bush Birds	5.00-6.00 pm	Julie Morgan	An early evening walk through the Four Winds local habitat to identify birds by song and sighting.
29	Wild Pollinators Count	5.00-6.00	Christine Polec	Identify and count insect pollinators as they visit flowering plants. These may include beetles, bees, wasps, flies, butterflies and moths.
30	Nocturnal fauna	7.00-8.30 pm	Andrew Morrison	A nocturnal fauna survey. Spotlighting and call playback techniques will be used to discover active night animals, eg possums, bats, birds and frogs.
	Spotlighting Survey			
31	Moth survey (part 1)	7.30-8.30 pm	Steve Williams, Kim Pullen	A white sheet and bright lights will attract moths and other insects for participants to observe, photograph and record. Further identification will take place at a Saturday morning's session.

No	Survey	Time	Survey leader	Survey description
32	Moth survey (part 2)	8.30 pm – late	Steve Williams, Kim Pullen	A white sheet and bright lights will attract moths and other insects for participants to observe, photograph and record. Further identification will take place at a Saturday morning's session.

No.	Survey	Time	Survey leader	Survey description
33	Bush Birds	7.00- 8.00 am	Julie Morgan	Join the morning chorus to identify birds by song and sighting.
34	Small Mammal Survey	8.00- 9.00 am	Andrew Claridge	Join expert Andrew Claridge with David Jackson to observe animals trapped during the night along a set of traplines.
35	Reptile Search	9.00-11.30 am	Ross Bennett	Join herpetologist Ross Bennett to search under logs, rocks and leaf litter for inactive resident reptiles, as well as conduct transects for active reptiles and analyse pitfall traps
36	Lone Lookers	Own time	Self	Explore the beautiful Four Winds site and take photos or what you see. Come to Base Camp and get registered with NatureMapr and download the app. Or take photos with your camera and learn how to add a sighting to our Atlas of Life database.
37	Moth survey (part 2)	9.00-10.00 am	Steve Williams & Kim Pullen	Experts will help identify moths from your photographs taken either in the field this morning, or the night before.
38	NatureMapr Walk	10.30 – 11.30 am <b>NOTE UPDATED TIME</b>	Patricia Daly / Liz Allen / Mandi Stevenson	A guided walk to observe and record all species of interest using the new NatureMapr platform. Using smartphones, tablets or cameras you will be shown how to take and upload images into the Atlas of Life identification database back at Base Camp
39	Mammal Trapping Methods Demonstration	9.30-10.30 am	Andrew Claridge	A demonstration of various trapping techniques used to observe small mammals.
40	Wetland Vegetation Survey	9.30-10.30 am	Stephen Skinner	Join expert Stephen Skinner to survey local riparian flora.

No.	Survey	Time	Survey leader	Survey description
41	Peacock Spider Search	9.30-11.00 am	Stuart Harris	Search through the leaf litter and undergrowth with leader Stuart Harris for the elusive and beautiful peacock spiders and other invertebrates.
42	Shore Bird Survey	9.30-11.30 am	tbc	Join survey leaders for an extended walk around Cuttagee Beach/Lake to observe shorebirds and others.
43	Koala survey	9.30-11.30 am	Chris Allen	Join local koala expert Chris Allen to re-visit existing survey sites in the Murrumbidgee Flora Reserve.
44	Microeye Microscope session	10.00-10.30 am	ALCW	Explore the small stuff. Bring your own special things or see specimens we have collected using our very special microscope Microeye. We can show the images on the big screen so you can see minuscule things at high resolution and great size. Change the way you see the world!
45	Flora walk	10.00-11.00 am	Rachel Anderson	A walk through various local habitats to identify as many flora species as possible.
46	Wild Pollinators Count	10.00-11.00 am	Christine Polec	Identify and count insect pollinators as they visit flowering plants. These may include beetles, bees, wasps, flies, butterflies and moths.
47	Freshwater Ecology/Waterbugs Survey	10.00-11.00 am	Cecil Ellis & Stephen Skinner	Join Steven Skinner, phycologist at Royal Botanic Gardens & Cecil Ellis, aquatic ecologist at Nature Navigation, to learn about the diverse creatures that inhabit our freshwater dams and streams. Learn about 'waterbugs' as indicators of waterway health.
48	Camera trap	10.30-11.30 am	Andrew Morrison	View and analyse local fauna images collected by infra red notion sensitive camera traps.
	image			
	analysis			
49	Flora walk - Coastal	10.30 am-12.00 pm	David Maynard	A 'random meander' around Armand's Bay to identify flora species. Starting from Kullaroo Road.
50	Microeye Microscope session	11.00-11.30 am	ALCW	Explore the small stuff. Bring your own special things or see specimens we have collected using our very special microscope Microeye. We can show the images on the big screen so you can see minuscule things at high resolution and great size. Change the way you see the world!
51	NatureMapr Walk	11.00 am - 12.00 pm	Patricia Daly / Liz Allen / Mandi Stevenson	Join a guided walk to observe and record all species of interest using the new NatureMapr platform. Using smartphones, tablets or cameras you will be shown how to take and upload images into the Atlas of Life identification database back at Base Camp.
52	Rock Pool Survey	11.00 am - 1.00 pm	Jenny Edwards	Identify and describe the abundance of species that live on the rock platforms of Mill Beach.

## Saturday November 12th

No.	Survey	Time	Survey leader	Survey description
53	Freshwater Ecology / Waterbugs Survey	11.30 am – 12.30 pm	Cecil Ellis & Stephen Skinner	Join Steven Skinner, phycologist at Royal Botanic Gardens & Cecil Ellis, aquatic ecologist at Nature Navigation, to learn about the diverse creatures that inhabit our freshwater dams and streams. Learn about 'waterbugs' as indicators of waterway health.
54	Wild Pollinators Count	11.30 am – 12.30 pm	Christine Polec	Identify and count insect pollinators as they visit flowering plants. Insects seen could include beetles, bees, wasps, flies, butterflies and moths.
55	Bird survey	12.00 - 1.00 pm	Peter Marsack	Walk with leader Peter Marsack to identify as many bird species as possible through song and sighting.
56	Beach survey 'The Spell of the Shell'	1.00 - 2.30 pm	Alan Scrymgeour & David Denczuk	Fossick through the shell assemblage on Cuttagee Beach, assess, identify and record shell identities. This activity is suitable for families with school age children, shell collectors, shell admirers, beach scruffers and beach ecologists.
57	Flora walk – dry shrub and estuarine	1.30 - 3.00 pm	David Maynard	A 'random meander' through Murrah Flora Reserve and towards Cuttagee Lake to identify vegetation species. Starting from the fire-trail off Murrah River Road.
58	Koala survey	1.00 - 3.00 pm	Chris Allen	Join local koala expert Chris Allen to re-visit existing survey sites in the Murrah Flora Reserve.
59	NatureMapr Walk	1.30 - 2.30 pm	Patricia Daly / Liz Allen / Mandi Stevenson	Join a guided walk to observe and record all species of interest using the new NatureMapr platform. Using smartphones, tablets or cameras you will be shown how to take and upload images into the Atlas of Life identification database back at Base Camp.
60	Wild Pollinators Count	1.30 - 2.30 pm	Christine Polec	Identify and count insect pollinators as they visit flowering plants. Insects seen could include beetles, bees, wasps, flies, butterflies and moths.
61	Flora walk	2.00 - 3.00 pm	Rachel Anderson	A walk through various local habitats to identify as many flora species as possible.
62	Reptile Search	2.00 - 3.00 pm	Ross Bennett	Join herpetologist Ross Bennett to search under logs, rocks and leaf litter for inactive resident reptiles, as well as conduct transects for active reptiles and analyse pitfall traps.
63	Peacock Spider Search	2.00 - 3.00 pm	Stuart Harris	Search through the leaf litter and undergrowth with leader Stuart Harris for the elusive and beautiful peacock spiders and other invertebrates.



A selection of images from the BioBlitz







No.	Survey	Time	Survey	Survey description







Saturday 12<sup>th</sup> November





