

Paul Flemons & Daniel Adams.

FrogID: We're putting Australia's frogs on the map!

Frogs are good indicators of the health of the environment, as they are highly sensitive to changes on land and in the water. Many of Australia's wetlands and waterways are under threat, in part because of climate change and biodiversity loss.

FrogID is Australia's first national citizen scientist frog research project – developed to help protect threatened species of frogs across the country. This is the first time major museums from each State and Territory across Australia have worked in partnership on a national Citizen Science research project.

Launched in Nov 2017 the FrogID app and related website, social media and community events, enable people of all ages and backgrounds to track, record and help identify frog species across the country, by submitting audio recordings of frog calls via the FrogID app.

The Australian Museum's free FrogID app, developed in partnership with IBM, empowers everyone to join in the national count by helping to locate and identify frogs by their unique calls. The FrogID app will accurately map frog species through their "audio DNA", without the need to handle these sensitive animals.

FrogID also contains information about frog habitats, images and calls of different frog species.

FrogID will provide distribution and trend data for Australia's 240 species of frogs. This data will fuel scientific research into the size and health of frog populations, and identify which species are at risk, to help safeguard them and their environment.

Daniel Adams.

Using social media & digital coms to build a national citizen science project - FrogID

Social media is a powerful tool for reaching audiences all over Australia. We've built a network of networks to help establish the FrogID research and build a broad supporter-base of citizen scientists all over Australia.

FrogID is Australia's first national citizen scientist frog research project – developed to help protect threatened species of frogs across the country. This is the first time major museums from each State and Territory across Australia have worked in partnership on a national Citizen Science research project.

The FrogID app and related website, social media and community events, has enabled people of all ages and backgrounds to track, record and help identify frog species across the country, by submitting audio recordings of frog calls - matching frog calls with weather data and GPS location.

Since the launch of FrogID in November 2017, we've built a supporter database with various levels of supporter engagement and multiple access points for supporters to get further involved – from joining us on social media, downloading the FrogID app, utilising the website, forming an online group or hosting a local event.

The FrogID project has used social media, videos, hashtags and user-created content to reach new audiences and engage supporters into becoming citizen scientists, event registrations and even donors.

Attendees will build understanding of how to build online networks and develop an engaged online supporter base.

EUROPEAN BIOBLITZ NETWORK: ECSA AND DITOS NETWORKING AND CAPACITY BUILDING FOR BIODIVERSITY CONSERVATION

Oral presentation

Field-based citizen science; Partnerships & collaborations

Gaia Agnello, DITOs project officer

European Citizen Science Association

Abstract

Since 2016, the European Citizen Science Association (ECSA) started its involvement in 'Doing It Together Science' (DITOs). This pan-European project aims at communicating Citizen Science and Do-It-Yourself approaches to the public and policy makers in order to build institutional and policy foundation for public engagement in science. ECSA has an important role in facilitating networking and capacity building among CS practitioners and policy makers.

Special efforts are currently made with BioBlitzes, acknowledged for their potential to make a contribution to public engagement, science and environmental management. Participants of a BioBlitz are involved in a process whereby the knowledge gained creates sustained awareness and lead to change in attitudes and behavior towards biodiversity. Data collected can be used to update species lists of an area, to inform decision-making processes and to support monitoring and reporting of environmental legislations. With BioBlitz becoming more and more popular, it is crucial enhancing applicability of this approach in different context and further developing its potential with regards to citizens, scientists and policy makers priorities.

ECSA promotes and coordinates the establishment of a Europe-wide network of BioBlitz practitioners with the aim to increase cross-boundary exchange of knowledge and foster international and interdisciplinary collaboration in biodiversity conservation. A collaborative process engaged members of the network, including practitioners from US and Australia, in the development of a policy brief aimed at informing on the potential of BioBlitzes to achieve a number of biodiversity targets and resulted in a series of recommendations to increase impact of this methodology.

Biography

Gaia Agnello works at ECSA as project officer for DITOs. She is responsible for policy engagement and acts as the chair of the European BioBlitz Network. She is interested in exploring strategies to influence humans' attitudes and perceptions towards biodiversity.

A citizen science project commencing in July 2017 aims to use measurements of water colour to understand changes in water quality. Water colour is a very informative indicator of the ecological state of marine and fresh-waters. Until recently, it has only been measurable with specialist scientific instruments. This Australian initiative will build upon results from the EU Citclops project (www.eyeonwater.org) which, since 2015, has combined a fully operational smartphone application with a supporting website.

This project plans to build on the success of the “Eye on Water” project by integrating additional physical measurements. Citizen scientists will generate valid data for calibration of satellite information, and provide a synoptic overview of their environment. Each participant will obtain a better understanding of how local water bodies change seasonally and in response to short duration events like floods and cyclones.

This project aims to harness the enthusiasm of citizen scientists interested in the water quality of their local region. Once organisations and communities are engaged, CSIRO will provide training for the phone application, deployment of a Secchi disk, and basic water quality testing. The consolidated data will be viewable on a website and various visualisation tools will facilitate analysis by the citizen scientists. This presentation will outline the early stages of the project’s implementation, how the citizen science measurements can be integrated spatially and temporally into satellite water quality monitoring, and some of the pitfalls we have encountered.

The Mid-Murray Landcare group in South Australia has been coordinating a community microbat monitoring program since 2003. This program has engaged over 115 citizens who have conducted surveys on 630 nights, and produced over 500 individual species records across the lower Murray-Darling Basin. A new project—the MEGA Murray-Darling Microbat Citizen Science Project—is expanding the geographic and scientific boundaries of the original program. Much is still unknown about insectivorous bat species in the Murray-Darling Basin, especially the links between species diversity and habitat type and condition. Citizen scientists will be taught to survey for bats with ultrasonic recorders, and collect associated habitat information. The data will be used to reassess microbat species distribution, diversity, habitat needs, relevant management practices and conservation status. The backgrounds of the project partners cover all the ingredients for a comprehensive citizen science effort: project coordinators that devised the original successful community project and have links with natural resource management policy makers and communities; a citizen science team from the University of South Australia; and a bat specialist scientist from the South Australian Museum. We aim to introduce people to the secret world of microbats and change their perceptions about living with bats. Our presentation will be delivered by our scientist, plus a citizen scientist, a retired business person, to explain the evolution of the project from both practitioner and participant perspectives.

Birds in Backyards: From Citizen Science to Conservation Action

Presentation Type: Poster

Relevant Themes: Engaging citizens, field-based citizen science, data management and sharing, partnerships and collaboration

Dr Monica Awasthy, Birds in Backyards Co-Manager, BirdLife Australia

Abstract

Urbanisation is one of the most dramatic and rapidly expanding forms of man-made change to our landscapes. As our urban habitats change, our bird life does as well. The loss of urban bird diversity has both ecological and human/cultural consequences. With over 90% of Australians living in urban and regional centres, for many people, the only place where they connect with the natural world is in their own backyards. The Birds in Backyards Program (BIBY) builds knowledge, skills and practical support to develop action-oriented responses to the decline of bird diversity. Begun in 1998, BIBY will be celebrating its 20th year as a national citizen science program. Underpinned by bird monitoring and habitat assessments, BIBY encourages people to take conservation action for birds wherever you enjoy them – home, school, work, or local parks and reserves. There have been exciting changes recently - a new framework and program objectives - and in 2017 our surveys joined BirdLife Australia's data portal Birdata. This survey data is used to inform policies, best practice guidelines, and provide advocacy for threatened species. We want people taking action for birds, informed by their own data. The ultimate goal of BIBY is a diverse urban native bird community, achieved by behaviour change through action research, education for sustainability and advocacy. Through our dedicated citizen scientists and our partners, BIBY empowers people to make changes at all levels (from individuals in a patch to government at landscape scales) to create and maintain habitat for birds.

Society for Conservation Biology: Participatory and Citizen Science Working Group

Awasthy M^{1,2}, **Lewandowski E**^{1,3}, **Cigliano J**^{1,4}, **Hughes C**^{1,5}, **Phillips T**^{1,6}, **Sims S**^{1,7}

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² BirdLife Australia, Brisbane QLD, Australia

³ Wisconsin Department of Natural Resources, Madison Wisconsin, USA

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⁵ Government of Alberta, Peace River Alberta, Canada

⁶ Cornell Lab of Ornithology, Ithaca New York, USA

⁷ Innovative Partnerships for Conservation, - New England, USA

Citizen science is a powerful tool for tackling many of the challenges faced in the field of conservation biology, from natural resource management to policy and public action. The Society for Conservation Biology (SCB) is an international professional organization dedicated to promoting the scientific study of the phenomena that affect the maintenance, loss, and restoration of biological diversity. Initiated in 2016, the Participatory and Citizen Science Working Group (PaCS) seeks to facilitate research and practice that aids the SCB in achieving its mission of preserving the Earth's biodiversity. The PaCS working group aims to increase awareness of, support knowledge exchange for, and promote citizen science as an effective method in advancing biodiversity conservation among practitioners, researchers, and managers. Surveying global conservation practitioners' awareness and engagement with citizen science is assisting with identifying the priorities and future actions for the PaCS working group. PaCS will be working to serve as an international knowledge and networking hub for innovations in citizen science for conservation, elevate the role of citizen science within the national/international policy realm, link practitioners and citizen scientists working towards common goals, and help develop best practice management for citizen science in conservation. We welcome all who are interested the role of citizen science in conservation and invite you to chat with us!

What IS it about dolphins?

Engaging Citizen Scientists in valuable research through an iconic species.....dolphins!

Tony Bartram

Kangaroo Island / Victor Harbor Dolphin Watch Coordinator

Abstract:

Introducing Citizen Scientists to an iconic, much loved species, employing easy to use, world's best practise methodologies to monitor dolphins and collect data of enormous significance, generates extraordinary community interest in becoming involved. Over 12 years of longitudinal Dolphin Watch research in regional South Australian waters, a large number of volunteers of all ages have participated in highly valued research outcomes.

Elements including multi entry level access, valuing and true egalitarianism which characterise this inspiring, award winning project, have seen it readily adapted to multiple sites. The use of photographic identification techniques to capture / recapture dorsal fin images is very appealing because of its simplicity and high success rate.

Intrinsic health benefits of being involved in the natural world, particularly with respect to the advantages provided by exposure to the ocean are obvious in the enthusiasm of participating volunteers and the extensive benefits to the community accordingly.

Experiences on, in and under the water promote health and wellbeing. US Marine Biologist W. J. Nichols theorises being in or around the ocean lowers levels of neurotransmitters which relay stress signals to the brain, creating a mildly meditative state and sense of general happiness. A. Cochrane and K. Callen refine this to interactions with dolphins in "Dolphins and their power to heal" - Bloomsbury 1992.

The project has the added benefit of citizen volunteers being able to be involved in higher levels of scientific understanding, analysing and cataloguing their data - an enriched experience not always available to Citizen Science projects.

Abstract for CitSciOz18

Author

Catriona Bonfiglioli, Senior Lecturer Media Studies, University of Technology Sydney

Title

Investigating citizen science journalism responses to a disrupted media environment

Abstract

In the post-truth era, controlling narratives is politically and commercially rewarding. Key tactics include gagging or undermining confidence in truth speakers such as journalists, scientists, academics and politicians, propagating fake news (Schwitzer, 2017), and de-funding high quality, fact-focused journalism. These trends, together with cuts to public service journalism and media investors' focus on cost cutting, create a news media environment hostile to expert science and health journalism. Evidence is emerging of how digital disruption is decimating specialist journalism thus increasing citizens' reliance on amateur and sponsored story telling while evidence grows of the public's susceptibility to misinformation (Pennycook & Rand, 2017; Steffens, Dunn, & Leask, 2017). Leading Australian news outlets' coverage of health and science has fallen almost 30 per cent and there is reduced reporting of important diseases such as heart disease (coverage has halved) and diabetes (40 per cent reduction) (Bonfiglioli, 2017; Bonfiglioli & Cullen, 2017). Coverage of climate change and global warming is double 2005 quantities but only one third of 2007 coverage (Bonfiglioli & Cullen, 2017). Audience research suggests key categories of journalism are missing from or neglected by the news (Bonfiglioli, 2017). Questions arise as to whether news consumption patterns, sponsored stories and false news threaten younger cohorts' ability to make science, health and environment choices. Thus this project considers how new, participatory models of health, science and environmental journalism can be developed to counter such trends. Philanthropic and entrepreneurial journalism may help but new approaches to journalism and journalism education are needed to meet future needs for trustworthy science, health and environmental news. This paper explores threats to science and health journalism and experimental responses including critical appraisal training, crowd-sourcing, social journalism, school science journalism and citizen science. Many citizens are already engaged in active citizen science, daily documentation of nutrition and physical activity, and in selecting and sharing health news (Stuart Allan & Ewart, 2015; Stuart Allan & Redden, 2017). A new citizens' science, health and environmental journalism is proposed which empowers citizens with critical evaluation skills (Davis, 2017; Higgins & Begoray, 2012; Luce, Jackson, & Thorsen, 2017). Science and health journalists and educators identify critical appraisal as a key skill of science and health journalists and one which depends on training (Farrar, 2012; Livengood, 2015). Scientific media literacy (Polman, Newman, Saul, & Farrar, 2014) and 'critical health media literacy' skills (Higgins & Begoray, 2012) are vital to the health of the planet, humans and other living creatures. Improving these skills could enhance citizens' ability to contribute to participatory science and health journalism by bearing witness to the physical, social, commercial, policy and media environments in which we make decisions which shape our environment, our health and the wellbeing of our fellow creatures.

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Seminar: Navigating the ACSA project finder: Making your project discoverable

Presenter: Peter Brenton, Atlas of Living Australia

ACSA has partnered with the Atlas of Living Australia to use the project finder capability of the ALA's BioCollect platform as the national citizen science project finder. This seminar will walk through the functionality of the ACSA project finder to teach participants how to use this tool find projects of interest and to maximise the discovery of their projects. We look at how to register projects and to use the features to promote project activities to their communities. This tool is also linked with other project finder tools and the opportunities and benefits of this will be demonstrated and discussed.

Workshop: BioCollect: A modern tool for efficient field data collection

Presenter: Peter Brenton, Atlas of Living Australia

Many organisations running citizen science projects don't have access to or the knowledge or means to develop databases and apps for their projects. Many are also concerned about long-term data management and also how to make the data that they collect accessible and impactful in terms of scientific research, policy and management outcomes. To solve these issues, the Atlas of Living Australia (ALA) has developed **BioCollect**. BioCollect is a sophisticated, yet simple to use tool which has been built in collaboration with hundreds of real users who are actively involved in field data capture. It has been developed to support the needs of scientists, ecologists, citizen scientists and natural resource managers in the field-collection and management of biodiversity, ecological and natural resource management (NRM) data. BioCollect is **free for public use** and is a **cloud-based** facility hosted by the ALA. It also includes associated **mobile apps** for offline data collection in the field. BioCollect provides form-based structured data collection for:

1. ad-hoc survey-based records;
2. method-based systematic structured surveys; and
3. activity-based projects such as natural resource management intervention projects (eg. revegetation, site restoration, seed collection, weed and pest management, etc.).

This session will cover how to set up projects and surveys in BioCollect and the features available to you and the many features of the tool.

Seminar: Citizen science can achieve real impact through data sharing

Presenter: Peter Brenton, Atlas of Living Australia

In this seminar we will explore how citizen science projects can achieve real and lasting impact through the use of data standards and data sharing as part of a broad information ecosystem. The seminar will cover how citizen science contributes into this information ecosystem and how projects can maximise the value, credibility and use of their information. We also consider why this is important and how collectively we can achieve more for our efforts than individually. Finally, we look at some of the initiatives currently under way to help improve and streamline accessibility to this information ecosystem and some examples of citizen science projects achieving real outcomes.

Karen Burke da Silva, Rebecca Phyland and Corey Bradshaw

Flinders University

Saving Nemo through Aquaculture Conservation and Citizen Scientists

The Saving Nemo program is an immersive conservation program that engages tourists and tourism operators to 'Find Nemo', thereby identifying the increasingly negative impacts of climate change, extreme weather events, and collection for the aquarium trade, on anemone and clownfish ecology, diversity, and health.

Quantifying broad-scale patterns in nature requires a vast amount of data collected across a large network of locations spanning many years. Involving citizen scientists to collect data can provide continental-, or even global-scale data-gathering networks. This project provides citizen scientists the opportunity not only to 'Find Nemo', but to become educated about real clownfish biology and the threats to their persistence. Data is being collected broadly across clownfishes' geographical range, and more specifically, at monitoring stations set up at resorts in major reef systems. Citizen scientists will record data using an the web app — IC-**ANEMONE** which also provides interactive opportunities beyond data entry to allow engaged citizens to become experts in clownfish ecology and data management.

We will also share data with students participating in our national school program — *The Clownfish Club*. Using data collected by citizen scientists and aquaculture of marine ornamental species creates authentic learning opportunities, improving laboratory skills, and an opportunity for students to make a difference to a global conservation issue. Schools are also involved in aquaculture conservation, a clownfish breeding program where students and teachers alike can have additional positive impacts such as overall understanding and attitudes toward conservation issues, increased conservation action and a greater probability of staying engaged in science. This highly collaborative project involves scientists, the tourism industry, schools, volunteer organisation and citizens working together to preserve coral reefs around the world.

Abstract title: The Waterbug bug: How to attract and retain citizen scientists

Preferred presentation type: Poster and Speed Talk

Themes: Field-based citizen science; Engaging citizens; Partnerships & collaboration; Data management & sharing; Communication & promotion

Yvonne Cabuang, Waterwatch Coordinator, Melbourne Water, 990 Latrobe St, Docklands, Melbourne 3001

Authors: Yvonne Cabuang, Waterwatch Coordinator, Melbourne Water; John Gooderham, Freshwater Ecologist, The Waterbug Company Pty Ltd, The Trustee for The Waterbug Trust.

Abstract

Engaging citizen scientists to collect robust scientific data that can be used by agencies in management planning requires an investment in skill development and personal commitment from volunteers. This may involve volunteers committing numerous hours to training on how to collect reliable data, which will not suit everyone. Attracting committed volunteers and employing a program methodology can help reduce barriers to participation, retain volunteers and maintain data integrity. The Melbourne Water Waterbug Census is a field-based citizen scientist program that uses tailored communication and promotion techniques to attract and retain volunteers. The program includes hands-on training that teaches volunteers macroinvertebrate survey techniques and identification using Agreed Level Taxonomy methods. Volunteers are supported with additional field-based training, underpinned by an accreditation process. This enables volunteers to gain experience and confidence in identification and improves data integrity. The ultimate goal of the program is to accredit volunteers to a level where they can collect reliable data independently of the program coordinator. All data collected is shared publically via the Atlas of Living Australia and within Melbourne Water via an environmental management database. Over the three years the program has been running, more than 100 volunteers have contributed to data being collected from 131 sites around Melbourne. The program methodology has successfully accredited a small number of volunteers who can now train up others. It has also led to an increase in community knowledge about waterways and community members running their own waterbug education activities.

Yvonne Cabuang completed an Honours project exploring waterbugs and their habitat in two Melbourne streams. She works as Waterwatch Coordinator for Melbourne Water managing the Waterbug Census citizen science program.

Acknowledgement:

I intend on registering and attending CitSciOz18 if my abstract is accepted

Title: Conserving a critically endangered species in Victoria's Central Highlands through citizen science surveys

Justin G. Cally

Abstract: Wildlife of the Central Highlands (WOTCH) is a grassroots citizen science organisation that primarily conducts field surveys in the Mountain Ash ecosystems of Victoria. This ecosystem is recognised by the IUCN as being critically endangered due to continued threats of bushfire and logging, which decrease the existence of hollow-bearing trees. The wildlife inhabiting the montane ash forests are comprised of several threatened species including the Leadbeater's Possum. In 2014 the Victorian government's Leadbeater's Possum Advisory Group formulated a revised management strategy that provided 200m logging exclusion buffers around Leadbeater's Possum sightings. Since that time WOTCH has been rigorously conducting surveys, especially in areas marked for clearfell logging. Equipped with thermal and infrared cameras citizen scientists survey for and record footage of Leadbeater's Possum and other threatened species. To date more than 120 Leadbeater's possums have been recorded, resulting in over 1500 ha of state forest being protected. Additionally, recordings of other listed species such as the Greater Glider, Barred Galaxies and Sooty Owl have been made. WOTCH publicises its findings in order to foster community engagement, increase local biodiversity knowledge and hold the logging industry accountable.

Author Bibliography: Justin Cally is a MSc student at the University of Melbourne, recognising the broader importance of science in the community and in conservation he joined WOTCH as a committee member in 2017.

How citizen science can help us respond to natural disasters

Smith, Cobi

Australian National University

How can citizen science support how we respond to natural disasters, such as flooding or drought? Can we design citizen science projects so that outcomes can be valuable for responding to unanticipated future events? What principles of humanitarian and emergency response work can be applied in citizen science design and practice? This session will introduce design principles that can make outcomes of citizen science useful for humanitarian responses, and examples of citizen science projects related to disaster risk reduction and mitigation internationally.

Australian Citizen Science Conference
7-9th February 2018

Can citizen science drive more than student learning: Diving Deeper with Marine Metre Square

Sally Carson - New Zealand Marine Studies Centre, Department of Marine Science, University of Otago;
Dr Jennifer Rock - Centre for Science Communication, University of Otago;

Engagement in authentic research aims to increase public understanding about the process of science which is needed for informed democratic involvement and to bridge the gap between science and society. Can the same aspirations be expected for school-based citizen science? Do opportunities to engage with environmental issues of global importance and local relevance develop student's citizenship capabilities? Does it enable them to use their science skills to participate as critical, informed and responsible citizens?

Marine Metre Squared (Mm2), a citizen science initiative for long-term monitoring of the New Zealand seashore, aims to facilitate community engagement that leads to improved coastal management. Key to the success of this project is the uptake by schools to collect longer term data. Here we examine if it can also be used as a tool to develop science citizenship capabilities. We discuss a case study, *Sediment and Seashores*, which used Mm2 to examine the impact of increased dredging in the local harbour. We present data to illustrate: (1) how school science education can be enriched through citizen science, (2) the impact of extended involvement on science understanding and skills, and (3) the value of community based projects to grow responsibility for the local environment.

Discussion will also focus on the evaluation and learning outcomes of the Mm2 project as a one-off experience in comparison with extended involvement. This understanding is relevant for projects attempting to foster community-engaged enquiry and encouraging schools to extend student learning beyond the classroom to contribute to real world issues.

Abstract Title: Co-created Citizen Science – How, When and Why?

Presentation Type: Workshop

Relevant Themes: Partnership & Collaboration; Engaging Citizens; Other

Name of Presenting Author: Miss Jade Cawthray-Syms

Position of Presenting Author: PhD Research Student

Authors Affiliation: University of Dundee, Dundee, Scotland, UK

Abstract:

There is growing interest in the potential and opportunities of more participatory approaches to citizen science, such as co-created citizen science. And despite very few examples of co-created citizen science in the literature, and the citizen science community's acknowledgement that evaluation of citizen science outcomes is underrepresented in practice, co-created citizen science is discussed as being able to achieve a whole variety of social and scientific outcomes. In addition, most reporting of citizen science in the literature includes very sparse discussion of the actual process of engagement, so across all approaches it is very difficult for the readership of the literature to replicate engagement processes, thereby restricting our ability to share and develop best practice.

This workshop therefore aims to catalyse a critical discussion about the use of a co-created process as a tool for citizen science, asking the community as a whole to discuss and deliberate on what role we expect a co-created approach to citizen science to take, what the process should look like if it is to achieve a diverse range of scientific and social outcomes, and under what circumstances is a co-created approach the right approach to take.

The workshop will adopt participatory and deliberative methods of engagement, to build a collective consensus on the 'how, when and why' for adopting a co-created citizen science approach, with the intention of publishing the workshop's findings to the wider citizen science community, after the conference.

Biography:

Currently studying for a PhD in Co-created Citizen Science, Jade has a BSc in Ecology and Conservation and a MSc in Science Communication and spent 2.5 years delivering national citizen science projects for the Natural History Museum, London.

Acknowledgement of attendance:

I confirm that I intend to register and attend the CitSciOz18 conference, if my abstract is accepted.

Citizen Science Project Design and Continuous Engagement Strategies

Alex R. Chapman and Piers Higgs
Gaia Resources

Citizen Science projects should be designed from the start with the desired outcomes clearly enunciated. These outcomes should not just consider the needs of project sponsors, data recipients or authors, but aim at delivering satisfactory outcomes for the contributing citizenry.

Engagement strategies are possibly the most critical part of a successful Citizen Science project. Without an engaged volunteer cohort who understand how to collect and contribute high-quality data, and continue to do so, most projects will fail to deliver successful outcomes.

Methods for recruiting, engaging, and retaining citizen scientists will be discussed, especially with respect to project design and delivery. Case studies will be used to exemplify some of the more successful strategies.

The Accidental Citizen Science Koala Program - 0 - 1,500 records in 2.5 years - Lessons Learned

When a community perceives a gap in basic information about local koala populations necessary to address a planning issue of importance to them, what should they do? Try to encourage professional researchers to put together a project to address the need? Or head off into the unknown territory of establishing a collegiate citizen science program?

Considerations of scale, cost and time meant that we chose the latter course. With members committed to raising \$100,000 to fund a planning appeal fight there was no money to fund researchers to conduct koala surveys.

How did a group in this situation undertake a citizen science program on their own?

We started with the objective of demonstrating that there was a significant koala population in the vicinity of a proposed motocross park.

Early achievements in data gathering attracted attention, assistance and requests to expand the program. This attractive proposition could have threatened the sustainability of the program.

We adopted a number of strategies regarding relationships (with members, landowners, research institutions), the rate and direction of program growth, maintaining the credibility of our methods and data, and what could be called strategic self-reliance - accepting assistance as we needed it, but only to the extent that we could absorb it.

Research approaches evolved quickly, with (often serendipitous) inputs from experts.

In two and a half years achievements included: mapping levels of koala activity on over 8,000ha in the Lockyer Valley Region; engaging over 50 people in survey activities, submitting 1,500 WildNet database records; and inputs to four planning processes.

We have demonstrated that small community groups can initiate and run citizen science programs on their own, generating useful and credible data.

Will our grass-trees survive? Ten years of Citizen Scientists documenting die-back from a deadly pathogen

Christine Connelly, Victorian National Parks Association
Caitlin Griffith, Victorian National Parks Association

Abstract

Citizen science has great potential to address the need for collecting data over an extended period of time. In ecology, long-term monitoring projects are rare, yet many ecological questions require a sustained approach to document gradual change. One such example is *Phytophthora cinnamomi* (previously Cinnamon Fungus), a water mould that causes die-back and death in several native plant species. Infection by *P. cinnamomi* can result in whole ecosystem shifts over many years, making long term studies highly valuable. Despite the profound impacts of *P. cinnamomi*, long-term studies are lacking. Local community groups are passionate about their local area, and have the capacity to commit to a project for several years, providing an excellent opportunity to collect much-needed long-term data. Since 2007, the Victorian National Parks Association and the Friends of Brisbane Ranges, with support from Deakin University and Parks Victoria, have collected data about the response of grass-trees to *P. cinnamomi* infection in the Brisbane Ranges National Park 80 km west of Melbourne. We have brought together scientists, land managers and the local community and fostered long-lasting, positive relationships. Our project honours the pioneering work of Dr Gretna Weste and extends her 30-year study. While soil tests in 2017 at sites of known infection in 2007 indicate that the infection may have disappeared, our data show that recovery of grass-trees is occurring slowly, if at all. Here, we present the results of our 10-year study, and describe the enduring success of our engagement strategy.

Biography of presenting author

Christine has been involved in citizen science for 10 years, beginning as a volunteer leader with the VNPA, and coordinating NatureWatch since January 2014. She is also a PhD Candidate with the Centre for Integrative Ecology at Deakin University.

Communities Listening for Nature: Citizen Scientists are building a public library of Victorian bird sounds

Christine Connelly, Victorian National Parks Association
Dr Karen Rowe, Sciences Department, Museums Victoria

Abstract

Advances in bioacoustics and digital audio recorders provide new opportunities to engage citizen scientists in bird monitoring. More than 500 species of birds are present in the state of Victoria, but with an area of more than 237,000 km², documenting where they're currently found and how they use and move across the landscape is a daunting task. In 2016, the Victorian National Parks Association and Museums Victoria began *Communities Listening for Nature*, a collaborative project that adopts a two-tiered model of community engagement: (1) working with local community groups to co-create and implement acoustic bird monitoring to address a scientific question of local interest, and (2) working in a scientist-led contributory manner to build a digital library of Victorian bird calls as a resource for improving monitoring of birds with bioacoustics, including automated species recognition. To date, we have developed and implemented on-ground monitoring with six community groups at four project locations. Here, we present the results from two project locations in the eastern part of Victoria and showcase our growing library of bird sounds, which is publically and digitally accessible through Museums Victoria's online collections database.

Biography of presenting author

Christine has been involved in citizen science for 10 years, beginning as a volunteer leader with the VNPA, and coordinating NatureWatch since January 2014. She is also a PhD Candidate with the Centre for Integrative Ecology at Deakin University.

Citizen science for threatened species conservation: The challenging case of Gilbert's Potoroo (*Potorous gilbertii*)

Jackie Courtenay (Volunteer Communications Officer, Gilbert's Potoroo Action Group and Conservation Biologist, Earth Creations)

Gilbert's Potoroo is a small marsupial in the family Potoroidae (a relative of the kangaroo family) and is Australia's rarest mammal. It was first collected for science in 1840 and by 1909 was thought to be extinct. It was rediscovered at Two Peoples Bay, near Albany, WA, in 1994. It is listed as Critically Endangered on the IUCN Red List, & under the *EPBC Act* & *WA Wildlife Conservation Act*. Since 2002 the Gilbert's Potoroo Action Group (GPAG), a volunteer community group based in Albany, has been working with the Department of Biodiversity, Conservation and Attractions (DBCA) to try to help save Gilbert's Potoroo from extinction by raising funds to support recovery actions, providing responsible information to promote public awareness and encouraging volunteers to assist in Gilbert's Potoroo research and recovery programs. The opportunity to work with Gilbert's Potoroo is exciting enough that DBCA scientists can generally easily find sufficient volunteers to help with fieldwork, even when extensive travel is required. The extreme vulnerability of the species and its location on remote nature reserves, however, limit the opportunities for independent citizen science research or monitoring which, in turn, can limit involvement with the community group as people are generally more inspired by fieldwork than fundraising! The challenge for GPAG and our partners in DBCA is to develop engaging citizen science projects that contribute to the recovery of Gilbert's Potoroo and can be carried out independently or semi-independently by GPAG members without risking disturbance to this critically endangered species.

Title: Towards a 'worker/citizen science' model: a qualitative investigation of workplace heat stress and climate change

Presentation type: long talk

Available Themes: Engaging citizens; Field-based projects; Partnerships / collaboration; Social research in citizen science

Bios:

A/Prof James Goodman is in Social and Political Sciences at UTS. He has published 12 books and led several research projects, including two large ARCs. He is Director of the newly-formed Climate Justice Research Centre.

Prof Leena Thomas leads the environmental studies strand at the UTS School of Architecture. Her research focuses on interrogating and transforming contemporary design practices to be responsive to global concerns for climate change, zero-carbon development, health, well-being and comfort in living, work and urban environments.

Dr Elizabeth Humphrys works at UTS and investigates state and civil society responses to economic and environmental crisis, with a focus on trade unions. Her book *How Labour Built Neoliberalism* is forthcoming (2018) with Brill's Studies in Critical Social Sciences series.

Dr Francesca da Rimini is a Research Associate at the Climate Justice Research Centre at the University of Technology Sydney. She has a long history of investigating the social, political and creative potential of digital technologies and internet platforms.

Abstract: There is a stated need for more empirical research on the health effects of climate change. This project aims to investigate people's direct experience of workplace heat and heat stress in the context of climate change. It integrates citizen climate science, ethnographic research and big data analysis. The project will be piloted in Australia, focussing initially on sectors particularly exposed to climate heat, including construction and foundry work, the firefighting industry, road repair, land care, waste disposal, and agribusiness. The project will gather micro-climate heat stress data using temperature and humidity sensors operated by citizen/worker participants, enriched by semi-structured interviews and individual reports. It plans to collect personal narratives of how rising heat is affecting individual and organisational work practices, and steps taken, or not, to reduce associated occupational health and safety risks. Data will be collected via phone app to an online database. An interdisciplinary team comprising social sciences, public health, big data and journalism researchers will verify, analyse and interpret the data. Subsequently, the data sets will be integrated into an open access online climate map, linked to future projections of climate heat. By creating human stories in the heat data, the project will create a new mode of engaging with climate change, and produce digital templates and protocols that can be extended to other sectors and contexts in association with partner organisations. The aim is to develop adaptable, affordable open source solutions to address heat stress, minimise risk, improve working conditions and deepen climate policy debates.

**The use of an ROV (Remotely Operated underwater Vehicle)
for engaging students in marine citizen science.**
Julia Davies and Matthew Dunbabin

This study engaged with over 200 'marine science' students as part of a broader study investigating how community groups can use robots for upscaling Crown-of-Thorns Starfish (COTS) control programs.

The study involved two surveys and hands-on trials. The first survey collected information on the students' current use and opinions of digital technologies, their attitudes towards fieldwork and involvement in citizen science projects. The data revealed their general lack of awareness of what constitutes citizen science, despite the fact that many were contributing to these programs through school activities. Nearly all students said the quality and effort of their work would be improved if its purpose and the application of collected data extended beyond the classroom.

The second survey sought student feedback after they had used an ROV and conducted COTS data-processing activities. Questions included what features would promote their involvement in citizen science, with the use of gaming motivation being found to encourage participation and engagement of computer-based tasks. Overwhelmingly, the opportunity to use an ROV was seen as a big incentive to contribute to marine-based citizen science projects.

The results of this project highlight the need for schools to increase awareness of what citizen science is and what role the students are playing in its delivery. It also shows the importance of this type of practical study to fully assess how younger generations wish to participate in these important marine science activities.

The Native Fish Recovery Plan - Gunbower and Lower Loddon (NFRP) is an ambitious project seeking to improve native fish populations and river health in over 200km of streams and wetlands in northern Victoria by improving flows, stream connectivity and riparian and in-stream habitat. The success of the project heavily depends on community involvement and a robust monitoring plan to demonstrate the value of management actions to project investors.

North Central Waterwatch arms local volunteers with the skills and equipment to monitor river health in Victoria. Traditionally, Waterwatch sites have been selected by volunteers; often without alignment to river health projects. This can lead to volunteers becoming disengaged because they are not seeing their data being used to inform river management.

To address these issues, Waterwatch and the NFRP team joined forces in 2016 to work with local citizen scientists to monitor river health, using macroinvertebrates, at 22 sites across four key waterways in the NFRP project area. About 20 citizen scientists were trained to use the Agreed Level Taxonomy (ALT) method. ALT was developed with citizen scientists in mind and involves identifying macroinvertebrates to an agreed taxonomic level, using features visible to the naked eye.

From this, *RiverScan 2016*, a Baseline River Health Snapshot Report was developed. The four waterways were assessed as being in poor ecological condition. Most sites did not meet ALT objectives for macroinvertebrate indices, reflecting a legacy of riparian and river degradation. Future results will track river health as management actions are implemented.

Annette Williams
Annette.Williams@questacon.edu.au

Citizen Science projects – Good design to achieve great outcomes

Abstract

Australian Government funding for citizen science under the *Inspiring Australia* program has facilitated the establishment of the Australian Citizen Science Association, the Eureka Prize for Excellence in Citizen Science and, in a recently concluded major grants round, 18 citizen science projects addressing scientific problems of national significance.

This interactive symposium provides an opportunity to meet some of the project leaders, hear about their work and learn how good project design is helping to maximise impact and participation in citizen science. Facilitated by Questacon's Inspiring Australia team, this session invites participants to bring along their questions for the grant recipients and join in with the discussion to find out more about the research underway, the people and systems involved, and what outcomes the projects are expected to have.

As Citizen Science continues to grow, online crowdsourced projects are enabling natural history collections to accelerate the rate of digitisation and specimen discovery. The CSIRO's National Research Collections of Australia is working on a number of rapid digitisation projects with recent investments into focusing on digitisation workflows, tools and techniques. One of the challenges we face is how to resource this migration of biological data into the digital world. We will explore the initiatives currently underway and how Citizen Science has led to crowd-sourced records and data enrichment, adding value to our research. By utilising the power of digital imaging and online crowd-sourcing tools we are able to provide access to comprehensive, reliable and validated data coupled with expert knowledge.

Wildlife Spotter - where Human Intelligence (HI) and Artificial Intelligence (AI) can meet and be friends?

Camera traps are a new survey method that researchers, governments, non-government organisations and private individuals use to identify and understand what fauna exists in a certain location. They work by taking a photo when movement is detected. Analysis of the photos can provide accurate information about species movement, type and location. There are more than 4000 camera traps deployed throughout Australia, collecting many thousands of images each per month.

Wildlife Spotter was a hugely successful online citizen science project run in 2016 by the ABC in collaboration with the Australian Museum and funded by Inspiring Australia. Around 50,000 people were engaged in the process of processing around a million camera trap images. Wildlife Spotter was dealing very much with just the tip of the iceberg in terms of the number of camera trap images that need to be processed and there are more images than we can efficiently process through Wildlife Spotter in a suitable timeframe.

The advent of machine learning and AI is revolutionising the capacity to process camera trap images, however we still need Human Intelligence (HI), that can be provided through citizen science, to oversee the identifications and to provide the training sets necessary to improve the accuracy of AI.

I will talk about how, through Wildlife Spotter, we can integrate HI and AI in a framework that increases our capacity to process camera trap images accurately whilst not dispossessing citizen scientists of the opportunity to engage with the biodiversity of Australia.

In Australia, climate change is affecting rainfall and temperature, and may consequently trigger changes in established flowering times, breeding cycles and other periodic plant and animal life cycle events. The study of these life cycle events and how they are influenced by seasonal and interannual variations in climate is known as phenology. Changes in phenology result in significant detrimental impacts on species interaction, pollination, population fitness, water cycles and carbon sequestration. These changes in turn have the potential to adversely impact human health, vector borne diseases, pest insect control, tourism and recreation, transport and agricultural productivity.

Despite the urgency in finding solutions to the problem, there is currently a significant lack of knowledge within Australia on climate change impacts on biodiversity, this is largely due to the scale of the data collection task. Success in gathering this data is only possible with an approach which engages the community in the scientific process. Established in 2009, ClimateWatch is a national citizen science program run by Earthwatch Institute Australia. The program engages users in collecting and recording data that is helping to shape the country's scientific response to climate change.

The presentation will focus on how ClimateWatch has been successfully used in partnership with education, corporate and community groups. A broader overview of the program will also be provided, sharing lessons learned and future directions for the program.

Title: Reef Watch: The results of 20 years of monitoring two South Australian reefs

Presentation type: Long talk

Theme: Showcasing science outcomes

Presenter: Tim Kildea, Reef Watch Committee Chair

Author's names: Tim Kildea, Grant Westphalen, Alex Gaut

Author's affiliations: Reef Watch Committee members

Abstract:

Southern Australian temperate reefs are acknowledged for their incredible biodiversity, which is as great as that of the Great Barrier Reef. Hallett Cove and Noarlunga reefs, located on Adelaide's southern metropolitan coast, have been historically noted for their unique ecosystems. Noarlunga Reef has been an aquatic reserve since 1971 and is now a sanctuary zone in the Encounter Marine Park. Similarly, Hallett Cove reef abuts a coastal conservation park noted for both its geological and biological importance. Despite their protected status, both reefs have been exposed to a range of anthropogenic impacts from increasing coastal urban sprawl. Since 1998, these reefs have been regularly surveyed via a citizen science program called Reef Watch. Volunteer divers have undertaken seasonal reefs surveys, measuring a range of parameters including numbers of fish and mobile invertebrates, as well as percentage cover of macroalgae (seaweed).

The presentation focuses on the results from this community study and discusses changes observed at Noarlunga and Hallett Cove since 1998, in particular a disturbing decline in the cover of large macroalgae on both reefs. Macroalgal communities provide the building blocks of temperate reef ecosystems and any decline is a warning of a decrease in biodiversity and thus reef health. These long term changes could not have been quantified without the effort expended by many dedicated volunteers. Programs such as Reef Watch reinforce the importance of developing and maintaining long term datasets and highlight the capacity of citizen science projects to contribute meaningful results in monitoring the health of ecosystems.

Presenter biography:

Tim has >20 years' experience working on temperate and tropical marine ecosystems, with research mainly focused on macroalgal and microalgal ecology. Tim has been involved with Reef Watch since its inception (1997) and is Chair of the Reef Watch Committee.

Yes I will be available to present this at the conference in February 2018.

What do you want to explore? Introducing personal research into a citizen science project

Yaela N Golumbic^{1,2}, Ayelet Baram-Tsabari¹ and Barak Fishbain²

¹ Faculty of Education in Science and Technology, Technion- Israel Institute of Technology

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Involvement of volunteers in scientific research is a broad definition often used to describe citizen science. It includes projects of vast magnitude alongside local initiatives, and incorporates data collection, data analysis and even definition of research questions by volunteers. While different models in citizen science exist, the majority of projects are limited to data collection and classification tasks, often based on established protocols and stiff regulations ensuring data quality and reliability. Despite the evident importance of these regulations, they may prevent routes of personal interest and constrain research flexibility. Taking the road less traveled by, we offer here a citizen science practice, which provides participants with multiple individually-led research opportunities. We demonstrate open-ended participation, which enables participants to study personal fields of interest within the scope of the project and determine relevance to their day-to-day life. We describe this stance, in the citizen science initiative "Sensing the Air", for monitoring air quality in the local environment. Over a period of two years, we followed the activities of 20 participants, including their use of the project platform, personal research using mobile sensors, hazard reporting and engagement in social networks. Using interviews, questionnaires, and reports, we examine participants' requirements and identify different styles of participation. This study emphasizes the importance of multiple opportunities for participation, tailored to the needs of diverse audiences. These opportunities for personal research induce personal scientific inquiry, data analysis and conclusion drawing in a personalized fashion. Hence, transforming citizen science into what citizens want it to be.

The search for genetic gold - citizen science and macadamia conservation

Gould L ¹ , Hardner C ^{2,5} , Nock C ³ , McConachie I ⁴

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Macadamias are common in cultivation but threatened in the wild. Since European settlement more than 60% of the natural habitat of macadamia species has been lost and remaining populations are threatened through further clearing and the impacts of fragmentation, e.g. fire, weeds, climate change. In the late 1800s, botanists concern for the impact of settlement on wild populations of macadamia led to the call for every person to plant a macadamia tree in their backyard. Recent research by Dr Craig Hardner, University of Queensland, found that some backyard trees contain genetics dissimilar from that in any other currently known population (not all wild population have been genetically sampled). In late 2017, a new project will get underway to engage citizen scientists in the identification of potentially wild suburban tree and to involve them in leaf collection for genetic analysis. The project utilises a web portal linked to the Atlas of Living Australia and our presentation provides the outcomes of community engagement and participation in the project. The genetic research outcomes of the project will be known later in 2018.

Key Words

macadamia, data, citizen science, mapping, genetics

A Bioblitz in a deluge: a success despite the weather.

Preferred presentation type: Long talk

Relevant theme: Field-based citizen science

Ronda J Green, BSc(Hons)PhD, Chair of the Scenic Rim branch of Wildlife Queensland

•Authors' affiliations

Chair of the Scenic Rim branch of Wildlife Queensland, and adjunct research fellow at Griffith University

The Scenic Rim harbours a very high biodiversity, lying within the MacPherson-Macleay overlap, and is close to two major population centres (Brisbane and Gold Coast), but the less obvious biota of some regions are still poorly known, and many local residents seem unaware of how special their locality is. Hence we decided on a 48 hour Bioblitz on Tamborine Mountain to contribute to scientific knowledge, conservation management and public education. We started planning months in advance, received a generous grant from the local council, support from local landowners and considerable interest from experts in various animal, plant and fungi taxa. We lined up a number of interesting speakers for the opening, set up databases on the Atlas of Living Australia and iNaturalist, and promoted the event heavily through social and other media. For three months we had sunny skies and very dry conditions, stressful for the fauna and flora but ideal for getting the public out into the forests. Two days before the Bioblitz the rain started, and continued throughout the three days of the event, often very heavily. Despite the deluge, over 20 experts and possibly 30 tertiary students and members of the general public attended, some looking very wet towards the end. Although we had to abandon some trapping, we obtained excellent results for some taxa, and some species may not have shown up had the weather been fine. We are planning for all contingencies for another Bioblitz next year.

Ronda Green is chair of the Scenic Rim branch of Wildlife Queensland, and adjunct research fellow at Griffith University, with research interests in animal-plant mutualisms and behavioural ecology, and a general interest in nature education for all ages

I intend registering and attending CitSciOz18 if my abstract is accepted

Community members engage with citizen science in their own special way. As practitioners, understanding the potential breadth, diversity and depth of engagement is a valuable step in establishing a project. Over 14 years the Victorian National Parks Association (VNPA) has run numerous citizen science projects through ReefWatch and NatureWatch with different engagement techniques. The Great Victorian Fish Count is a broadly engaging project. It is Victoria's largest marine citizen science event, with hundreds of divers and snorkelers participating each year. In contrast, the NatureWatch project Caught on Camera is a deeply engaging project. The project works very closely with community groups, to develop site specific projects where scientists, land managers and community groups work closely together on multiple aspects of the project. Both projects have had tangible scientific, conservation, learning and engagement outcomes despite their different engagement models. This talk will compare and contrast scientific, community engagement and learning outcomes resulting from these two projects. It will also address next steps to diversify engagement with VNPA's citizen science.

Family units play a highly important role in the development of attitudes and values to science and nature. As such engaging whole families in science and citizen science has exciting potential to strengthen attitudes and values towards science of both children and adults. Family engagement provides an opportunity to engage children and parents who may otherwise find it difficult to participate. In 2017, the VNPA trialled hosting two family focussed 'Great Victorian Fish Count' activities as part of the 'Wild Families' program providing additional encouragement for families to participate in Victoria's largest marine citizen science event. The Great Victorian Fish Count is a long running (13 years) citizen science event with easy and engaging methodologies, making it a practical and exciting activity for families. Participants were surveyed about their experiences. The poster will share learnings on the benefits to adults and children in families, the quality of collected data and our learnings on delivering family friendly citizen science activities. The poster will also explore questions on maximising the potential for engagement of families with citizen science.

CoralWatch – a citizen science tool to monitor coral bleaching and create reef awareness

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Worldwide coral reefs are under serious threat from anthropogenic and climatic stressors. Now more than ever, reefs require careful management informed by science and supported by government, industry and community to ensure reefs for the future. Citizen science is recognised as an effective way to bolster information flow between these sectors.

CoralWatch (www.coralwatch.org), based at The University of Queensland, Australia, is a well-established citizen science program founded in 2002. It integrates global coral health monitoring with education and public outreach creating reef awareness using simple and engaging tools that provide people with accessible information about coral reefs and climate change, and hands-on experience collecting scientific data on coral bleaching using the Coral Health Chart. The chart is an easy-to-use tool to quantify changes in coral colour associated with coral bleaching. It is so simple, no prior training is needed and anyone can get involved. The chart is used in the field and classroom, is available in 12 languages and data on >1610 reefs from 78 countries is freely available. Unlike the majority of citizen science project designs, in which citizens collect data for scientists to analyse, CoralWatch was designed to provide users with a flexible tool that can be used in a variety of ways by all end users, from citizens, classrooms through to scientists. This session will highlight the multiple uses of CoralWatch and the chart, and its applications.

CoralWatch tools that bring the Reef into your classroom: lesson plans & activities

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Worldwide, coral reefs are under serious threat from anthropogenic and climatic stressors. Now more than ever, we need to act for the future of our reefs and anyone can help save our reefs. CoralWatch (www.coralwatch.org), based at The University of Queensland, Australia, is a well-established global citizen science program that integrates global coral health monitoring with education and public outreach creating reef awareness. In this interactive session, participants will discover the wide range of education materials CoralWatch has on offer and will learn how they can easily be incorporated into their classrooms to engage students in marine and environmental science. The Reef is a perfect teaching object and can be used cross-curriculum using CoralWatch materials and our publically accessible global coral bleaching database with real-life data on >1600 reefs from 78 countries collected by citizen scientists. From our freely available year 1, 7 and 11/12 curriculum-linked lesson plans to virtual reef exercises, DVD's and mobile phone/tablet Apps, participants will see that you do not need to visit the reef to bring the reef alive in the classroom. For those that have access to the reef, we will highlight how students can use the simple Coral Health Chart to collect scientific validated coral health data and contribute to a worldwide citizen science project, along with a range of other field activities that CoralWatch offers. During the session, the latest science on coral bleaching will be presented, CoralWatch materials introduced and participants will get hands-on experience using CoralWatch education tools.

Abstract

Large scale settlement and development over the past 100 years has contributed to a loss of natural dune sites along the Gold Coast's beaches and foreshore areas. The impact of this development has been felt when combined with high volume intense storm events resulting in large scale erosion across most beaches. There has been a need for coastal management strategies to minimise the impacts of erosion. The Griffith Centre for Coastal Management implemented the citizen science project DuneWatch in 2015 and contributes to the expanding knowledge on local dune systems. DuneWatch is a South East Queensland Citizen Science program that gives the Gold Coast community an opportunity to help collect vital information on the health of our sand dunes. There are 10 beach and foreshore locations along the Gold Coast where each site is surveyed quarterly, measuring dune slopes, conducting flora and fauna surveys and recording human impacts. Over the two year period there have been 33 volunteers involved with the project, many who have been Griffith University students. The data collected over the past two years has suggested sites with the highest recorded degradation are sites with high volume of rubbish collected. The cascade effect of this results in the loss of native flora species and also a reduction in fauna biodiversity at each site. This information has provided the volunteer planting programs with a platform for further community engagement. It has been used to assess each site individually to determine the need for specific flora diversity at each site to increase species abundance and minimise the impacts of anthropogenic influences.

TITLE:

“Where’s Lori?”: exploring how rewards and technology can build participation in meaningful citizen science.

AUTHORS:

Fern HAMES (Arthur Rylah Institute for Environmental Research, DELWP), Cassandra Nolan (Monash University) and Charlie Medic (Monash University).

ABSTRACT:

Victoria’s new Biodiversity Strategy (‘Protecting Victoria’s Environment - Biodiversity 2037’) aims to connect more people with nature, and meaningful citizen science can provide an excellent vehicle for this. We are keen to explore the variety of ways in which we can build participation in citizen science and, particularly, connect disconnected, or “naïve to nature” people to nature. The Arthur Rylah Institute for Environmental Research (ARI) partnered with Monash University in “Where’s Lori?”; a pilot citizen science project gathering information about where Rainbow lorikeets occur and nest. Participants uploaded photos of Rainbow lorikeets and nesting sites to an online site and registered to be eligible for rewards. Facebook and Instagram were used to promote the project, along with radio interviews, electronic newsletters and posts to other networks. We surveyed participants to understand the role of material rewards and smartphone technology in increasing project participation, and whether project participation increased individuals’ connection to nature. We also evaluated the usefulness and value of the data collected to assess the effectiveness of citizen science as a tool to gather scientific data and therefore also provide a sense of genuine meaning to participants. Our results will inform future citizen science projects at ARI.

The National WaterbugBlitz: citizens assessing Australian waterways

Relevant theme:

Field-based citizen science

Authors:

Birgita Hansen (presenter), John Gooderham, Deirdre Murphy, Ingrid Berthold, Paul Feely, Patrick Bonney, Peter Dahlhaus

Abstract (250 words):

Monitoring the ecological condition of Australia waterways is central to wise management and use of surface water resources. Measuring condition at a continental scale poses many scientific, logistical and resource challenges, that often exceeds the capacity of agencies. The National WaterbugBlitz will engage with citizens to learn about freshwater biodiversity while undertaking a nationwide assessment of the freshwater systems they care about. The National WaterbugBlitz will deliver a time-series inventory of aquatic invertebrates (waterbugs) as key biological ecosystem health indicators of Australian freshwater rivers and wetlands. Two National WaterbugBlitz events will be conducted, one in October 2018 and the second in October 2019. Citizen scientists will use novel technologies to take waterbug identification from the laboratory to the hands of a smart phone user at their local pond or creek. Using basic tools (hand lens, ice-cube tray and plastic spoon) and the following the guidance of The Waterbug App, users with minimal training can identify live waterbugs, and upload the information to a database. The information is mapped and analysed along with complementary and legacy waterway information to report on Australian waterway health. Events will include competitions for best photo and video, and others aimed at junior and senior participants. National WaterbugBlitz data will be available as standard interoperable web-services to other applications, such as the Atlas of Living Australia, Waterwatch Victoria, and desktop geographic information systems, thus exposing the data for science education and research. Annual WaterbugBlitz maps will help catchment managers identify trends in the ecological state of freshwater systems.

Caring for Waterhole Creek is EPA Victoria's first project that utilises all three principals of the EPA citizen science model: co-design, co-monitoring and co-interpretation. This model utilises community knowledge to collaboratively design and implement projects. Creating a two-way working relationship responds to the Latrobe Valley community's desire to both, contribute to, and understand the environmental monitoring that underpins EPA's scientific and regulatory work. Citizen science provides a vehicle for EPA to engage with the community to address community health and environmental concerns.

Caring for Waterhole Creek is a water quality monitoring project that investigates how water quality changes as it flows through a catchment of diverse land use and industrial history. Co-design involves citizen scientists and EPA experts establishing research questions, monitoring locations, parameters of interest and regularity of monitoring. Co-monitoring is carried out through regular fortnightly monitoring by citizen scientists complimented by higher resolution monitoring by EPA staff for specific parameters. Co-interpretation of data involves an opportunity to interpret data by combining local knowledge with EPA freshwater expertise to create a comprehensive picture of water quality. Initial results obtained through monitoring and social science data throughout the project are positive and will be used to dictate adaptation of future approaches.

Utilising this model for Caring for Waterhole Creek has resulted in a fit-for-purpose project that caters for community needs, investigates gaps in environmental data and increases awareness for waterway health while increasing the scientific literacy of a community adversely affected by pollution.

BioBlitzes are becoming popular large-scale citizen science field events in Australia and globally. This is interesting, as they are complex and time-consuming events to organise and difficult to fully evaluate.

A BioBlitz is a snapshot biodiversity study of a specific location, where scientists and community work together to survey and document the maximum number of species in a condensed timeframe. BioBlitzes are flexible and can be adapted to varying science or engagement goals. For example, in Canada, one BioBlitz can field over 400 scientists, while in the USA a BioBlitz might have no field-based scientists at all. Regardless of structure, these events have proved repeatedly to offer a lot of fun, record thousands of species, increase scientific literacy and interest in the community, and establish long term collaborations between scientists, naturalists, natural resource managers and the wider community. A global BioBlitz day is planned in 2018!

This workshop brings together national and international practitioners to share case studies, methodologies and suggest future possible developments of BioBlitz. We have developed resources such as 'the Australian Guide to Running a BioBlitz' and the Australian BioBlitz Hub to encourage more takeup of these events and as experience and conviction of the intrinsic value of BioBlitz grows, we offer this opportunity to consider the way forward. How can we encourage more BioBlitzes and a community of practice? Can we/why would we seek to harmonise what we do? How do we further leverage the excitement and interest of BioBlitzes into long-term scientific and community value?

Citizen science projects range from collecting environmental data to collectively solving the structure of an AIDS-related enzyme through a protein-folding game. We invite you to join a conversation to explore how the citizen science community can build partnerships with government agencies to leverage these new approaches for societal benefit. How can science and technology policy help to address barriers and support citizen science initiatives? How can citizen science inform policy and regulation? What are the impacts of citizen science to management and public policy, and how do we measure success?

We will share the outcomes of the Wednesday morning pre-conference workshop *New Visions in Citizen Science for Australia*. We bring together leading international and Australian citizen science drivers of change to share their success stories of embedding citizen science in large institutions. Presenters include Martin Brocklehurst, UK/ ECSA, Chair Policy and Global Mosquito Alert working group; Lea Shanley, co-Executive Director, South Big Hub, and former Co-Chair, US Federal Community of Practice on Crowdsourcing and Citizen Science; and Jo White, Director Science and Strategy Office of Environment and Heritage (NSW).

In the Australian context, we have only isolated instances where citizen science is being used strategically to deliver agency missions or national goals. We see elsewhere in the world its rapid growth and emerging power to deliver important outcomes, such as reporting against SDG's, and as a fine mechanism for collaborations at all levels including global. This symposium offers a rare opportunity to explore together opportunities for Australia.

Reeling out the Science: Reef Life Surveys in South Australia's Marine Parks

Jamie Hicks¹, Margo Smith², Danny Brock^{1 2} and Rick Stuart-Smith^{2 3}

1. Department of Environment Water Natural Resources; 2. Reef Life Survey; 3. University of Tasmania

In 2012, the South Australian government established a network of 19 marine parks, covering 44% of state's waters, to protect and conserve its unique and diverse marine ecosystems. As part of the management of these parks, the government is required to collect information to assess the effectiveness of the parks in protecting marine biodiversity. Subtidal reefs are a key habitat in the network as they support high concentrations of biodiversity, as well as significant recreational and commercial activities. As such, they represent a particular focus of such data collection.

Reef Life Survey is an international citizen science program that trains and supports volunteer divers to survey reefs using detailed scientific methods. Established in 2008, the team of trained Reef Life Survey volunteer divers has since undertaken over 10,300 surveys in over 50 countries, and regularly contributes to monitoring programs for marine parks and state of the environment reporting around Australia. The SA Marine Parks program partners with RLS to help collect ecological data to inform management decisions. Engaging trained volunteer divers has expanded the capacity of the SA Marine Parks program to increasing the frequency of surveys across the network, as well as inspiring stewardship and building knowledge about marine parks among the wider community. The integration of SA's datasets into the international RLS database allows for the interpretation of local biodiversity trends in the context of broader regional and national patterns, including in relation to drivers such as climate change.

INTER-ACT – Interactive Consensus-based Development of a Copyright Model Act

During recent years, copyright law has become a controversial subject, which is discussed both in an academic and social debate. As the use of digital media is deeply rooted within peoples' everyday lives, many citizens are confronted with copyright issues and therefore articulate their interests in the discourse about a modern, fair copyright. However, citizens and civil society groups in many cases remain excluded from the political and legislative consultation and negotiation processes, which means that their interests are not adequately integrated into the reform processes.

Against this background, the aim of INTER-ACT is to develop an experimental demonstrator for an electronic interaction and discussion platform, which enables citizens of all stakeholder groups (users, authors, publishers etc.) to participate in drafting and discussing model proposals for copyright regulations. The project follows an interdisciplinary "citizen science approach" combining legal and social sciences methodology. By engaging members of the public, researchers will be able to empirically investigate users' perceptions of and expectations on copyright law. Citizens can share their experiences with the current law and draft model proposals, which will then be discussed and evaluated by other platform users. Therefore, the model regulatory proposals will be drafted in an open, transparent, evidence- and consensus-based process and will be dynamically adapted according to the citizens' participation. Thus, the legislator will be provided with a dynamic reference framework for creating modern copyright regulations that are based on a broad social consensus.

Rare Flora Search and Rescue – Partnering with Community Volunteers

Shenaye Hummerston & Judith Harvey

In southwest Australia there are more than 1,000 plant taxa considered to be rare and poorly known and in need of survey before they can be properly protected. These species, listed in Western Australia as Priority species, may only be known from a few small populations. These species may be being threatened or even becoming extinct without any active management or anyone even looking for them. The Rare Flora Search and Rescue Project works in partnership with community volunteers to increase their capability to undertake the search for these rare and poorly known plants. The focus of the project is to inform, train and equip community volunteers to become successful citizen scientists who can continue to contribute robust scientific information to this important project over the coming years. Over 90 volunteers are registered in the project and have started undertaking searches in groups or individually. New populations of rare and poorly known plants have been found and information is being collated and made available for 50 species. A GIS tool has been customised for the project to quickly and easily capture and submit data and the search effort from citizen scientists involved in the project. Challenges include communicating the importance of nil finds and the uptake of new technology. This project is a collaboration between WWF-Australia, The Department of Biodiversity, Conservation and Attractions, the Wildflower Society of Western Australia and the community. It has been funded through State NRM's Community Capability Grants.

The SA Murray-Darling Basin region's Waterwatch program is one of the longest running citizen science programs in South Australia and has engaged the community in catchment management through data collection since the 1990s. It is part of the region's Citizen Science Program that aims to increase community involvement in resource condition monitoring and ensure the data collected is useful for scientific analysis and policy decision making.

Recent research has shown that with adequate professional support community-based water monitoring can reliably contribute to professional datasets, and the Citizen Science Program has worked to ensure the Waterwatch data is fit for purpose with adequate data quality protocols. However, Waterwatch continues to suffer from the perception by many scientists that water quality and macroinvertebrate data collected by volunteers is unreliable.

To assuage these fears, a new Waterwatch model has been developed in consultation with government researchers, policy makers, and local catchment groups. A key component is the twice yearly Waterbug Bioblitzes, held across multiple catchments and wetlands, in which macroinvertebrate sampling and water quality measurements are undertaken by volunteers with scientists alongside to verify results.

This work is particularly important for: **education**- imparting knowledge so community knows and cares about natural resource management issues; **community engagement**- especially in conjunction with potentially controversial government water policies; and **data collection and research**- for long term monitoring and other freshwater research purposes.

Strong partnerships with scientists and community members are key to restoring faith in Waterwatch and creating a sustainable catchment management model for the future.

CitSciOz18

Abstract Title: Strangers, Stewards and Newcomers: Stories of Identity and Participation in Citizen Science

Lead presenting author: Nina James, PhD Student, School of Natural and Built Environments, University of South Australia

Authors: Dr Sandra Taylor, Adjunct Senior Research Fellow, School of Natural and Built Environments, University of South Australia

Dr Philip Roetman, Research Fellow, School of Natural and Built Environments, University of South Australia

Dr Belinda Chiera, Program Director, School of Information Technology and Mathematical Sciences, University of South Australia

Abstract:

The degree and quality of voluntary participation is critical to the success of citizen science, however cross-programmatic research focused specifically on participation is scarce. Our research has focussed on the relationship between individuals' identities and their participation in citizen science. This presentation will provide insights into the different characteristics of people engaged in different types of citizen science projects in Australia. Over 900 citizen scientists across nine citizen science projects were surveyed, as well as over 1,400 people who have never participated in citizen science. The findings illuminate a variety of factors that enable or inhibit participation and demonstrate that the volunteers who participate in citizen science are as diverse as the projects themselves. In some contexts, the environmental identities of citizen scientists clearly reflect the environmental nature of the projects they participate in. In other cases, people are less motivated by science and the environment and more influenced by their enjoyment of and interest in the local area. Some citizen science projects are engaging a cohort of non-typical participants in environmental and scientific issues and may provide exciting avenues for expanding and fostering citizen science participation into the future. The outcomes of this research provide practitioners and funding organisations with a greater understanding of the motivations of their participants and the barriers that are preventing participation, as well as suggesting possible strategies for attracting new participants.

Biography:

Nina James is a PhD student at the University of South Australia. Nina has a background in natural resource management, adult education, public policy and community engagement and is interested in social research in citizen science and environmental science.

CoastSnap: Community Beach Monitoring in Your Pocket

Michael Kinsela¹, Mitchell Harley², Elena Sánchez-García³, Kilian Vos², Kara Taylor⁴, Rebekah Dowsett¹

¹Office of Environment and Heritage, Sydney, NSW

²Water Research Laboratory, UNSW Sydney, NSW

³Universitat Politècnica de València, València, Spain

⁴Northern Beaches Council, Sydney, NSW

CoastSnap is a citizen science initiative that enables community participation in beach monitoring using smartphones, unique photo points, and state-of-the-art coastal imaging technology. The project builds awareness about the dynamic nature of Australian beaches, while developing valuable data describing beach and shoreline change. These data are used to understand how different types of beaches respond to changing waves, sediment availability, and coastal storms. Regularly measuring changes in beach width and shoreline position is integral to understanding how environmental drivers control beach behaviour, and why some beaches are more resilient than others. While coastal camera systems are an established approach to beach monitoring, the cost of professional imaging technology, and the logistical issues of securely housing camera and computer equipment in exposed and often remote locations, makes such systems costly to upscale. CoastSnap applies the image capture and processing principles of established coastal camera systems to ubiquitous community smartphone technology. Rigid photo-point phone cradles ensure that every image is captured from the same position and angle, while advanced image processing techniques account for the varying lens properties of different smartphones. Community images are submitted by sharing on popular social media platforms, and are captured and processed by the CoastSnap team to map beach features and shoreline change. Data is returned to the community in the form of time-lapse imagery and shoreline overlays describing beach change. This talk presents the CoastSnap approach, and describes the community experience and monitoring results from the initial photo points established at Manly and North Narrabeen beaches.

Abstract title: a brief, interesting and explicit description of the presentation (<15words)

- Facilitating community in becoming active and informed citizens through citizen science

Preferred presentation type

- Speed Talk

Relevant theme(s) your abstract aligns with

- Engaging citizens

Name and position of lead presenting author

- Dr. David Kopelke PSM; Principal, Boyne Island Environmental Education Centre
Authors' name/s (lead author is normally expected to present the material)

Authors' affiliations

- Boyne Island Environmental Education Centre

Abstract (maximum length 250 words)

Citizen engagement has long been recognized in the science literature as a tool for collecting data. Data collection is just one form of public participation in scientific research (PPSR). However, citizen science (CS) can invite the public to participate in both data collection and scientific investigation and thinking. Therefore, CS can play a valuable role of providing environmental education for adults, positive youth development, generating and sustaining interest in science and environmental action through engaging citizens. A key aspect of these outcomes is the process through which individuals become capable of independent thought which, in turn, forms the basis for autonomous action. This process draws upon Socio-cultural theory.

The presenter draws on his experiences as a 2016 Queensland Smithsonian Fellow studying CS and in administering a number of community environmental monitoring/action program including the community-based monitoring program, Port Curtis HarbourWatch; an initiative seeking to promote wider community stewardship and responsibility for the future health of the catchments based on the Gladstone Harbour.

This presentation examines the role of locus-of-control, agency and efficacy in making a positive contribution to motivation and engagement across the spectrum of CS projects, whether they are contributory, collaborative or co-created projects. This understanding can provide a scaffolding to enhance citizen science projects beyond just collecting data and possible allegations of 'crowdsourcing' to more 'higher-order' scientific investigation and thinking where members of the public are encouraged to take part in all stages of the research process including choosing or defining questions for study or disseminating conclusions.

Biography of presenting author (max. length 40 words)

i.e. name, present role, area of research interest

- Dr. David Kopelke is the Principal, Boyne Island Environmental Education Centre, coordinating numerous citizen-science projects. His 2016 Smithsonian Fellowship examined citizen-science in the USA. He was awarded a 2009 Public Service Medal for his contribution to environmental education and citizen-science.

Acknowledgement that you intend on registering and attending CitSciOz18 if your abstract is accepted

- Both David Kopelke & Somone Boston acknowledgement that we intend to register and attend CitSciOz18 if the abstract/s is/are accepted

Abstract title: a brief, interesting and explicit description of the presentation (<15words)

- Creating active & informed young Australian citizens through participation in citizen science projects

Preferred presentation type

- Poster and Speed Talk

Relevant theme(s) your abstract aligns with

- Working with the Education Sector

Name and position of lead presenting author

- Ms. Somone Boston; Project Officer, Port Curtis HarbourWatch
Authors' name/s (lead author is normally expected to present the material)

Authors' affiliations

- Boyne Island Environmental Education Centre

Abstract (maximum length 250 words)

There is a need for the content and practice of school science to reflect contemporary science practices in the curriculum. This creates a driver for school science activities to link beyond the classroom to the local community. Citizen-science / community-based monitoring programs can provide valuable school-community links around the science curriculum. Such initiatives expose students to the practice of science in contemporary and socially engaged settings and makes science more relevant.

The appearance of diseased fish in the Gladstone Harbour (Central Queensland) and subsequent closing the harbour to fishing in 2011 raised community concerns about the environmental health of the harbour. The Gladstone Local Marine Advisory Committee (LMAC) established a community-based monitoring program, Port Curtis HarbourWatch. The initiative sought to promote wider community stewardship and responsibility for the future health of the catchments based on the harbour, so making a concrete example of how to provide environmental education for adults.

This presentation examines environmental education for adults as well as how this program provides one means by which schools can extend the curriculum, linking Citizen Science Practices into the Australian Curriculum in the learning area of Science, the cross-curriculum priority of Environmental Education by increasing student understanding of the factors that contribute to environmental quality. Finally, in the AC General Capabilities improve student's capacity to act for maintaining and improving the quality of our waterways and harbour.

Biography of presenting author (max. length 40 words)

i.e. name, present role, area of research interest

- Ms. Somone Boston is the Project Officer for the [citizen-science program](#) Port Curtis HarbourWatch. Through combining recent teaching training with her past science background, Somone has developed a program that extends citizen science to work with the education sector.

Acknowledgement that you intend on registering and attending CitSciOz18 if your abstract is accepted

- Both Somone Boston & David Kopelke acknowledgement that we intend to register and attend CitSciOz18 if the abstract/s is/are accepted

Theme: Partnerships & collaboration

Presentation type: Poster and Speed Talk

Title: Landholders ask: 'Who's living on my land?'

Presenter: Margot Law | Citizen Science Officer | National Parks Association of NSW

Abstract: Australia has one of the worst extinction records in the world, primarily due to habitat loss. Habitat protection is the most effective means to protect species, which can exist on a spectrum from gazetted national parks to private land conservation. We are increasingly relying on private landholders to participate in conservation activities as our national reserve system is not yet sufficient. As such, government and conservation agencies are starting to work cross tenure to maximise environmental outcomes. The NPA's 'Who's living on my land?' collaborates with regional stakeholders (Local Land Services, Land for Wildlife, Landcare Groups and Great Eastern Ranges Initiative) to direct private landholders towards citizen science and conservation action by finding out what species are on their property. The project has two objectives: to add valuable species data from under-surveyed private land to public databases and to encourage landholders to use this data to improve the conservation value of their property. As much of Australia's native and feral wildlife is cryptic and nocturnal; many of our landholders have been surprised by what they have found and valuable data has been added to the public domain, including threatened (e.g. koalas, quolls) and introduced species (e.g. deer, foxes). Through this project we have taught more than 500 private landholders across NSW to use infrared cameras, and lent them cameras so they can discover 'Who's living on my land?'

Engaging citizens theme workshop (2 hours)

Where are the Millennials?

Margot Law | Citizen Science Officer | National Parks Association of NSW

Ellie Downing | Secretary | Australian Citizen Science Association

Families and golden oldies dominate the citizen science scene. Which leads to the question: “Where are the millennials?” Is this demographic not engaging with citizen science because they are not interested in our projects? Or are our communication strategies just not reaching them? Millennials are digital natives who reached adulthood in the early 21st century, representing a significant and growing demographic. They are the newest generation of decision makers and will inherit a planet facing significant environmental and social challenges. Can we use citizen science as a tool that empowers millennials to tackle these problems?

Ellie Downing and Margot Law, certified millennials and citizen science enthusiasts, will wade through the avocado laden generalisations of this generation to help you create strategies to engage this cohort with citizen science.

Ambitious thinking – the path to Wild Orchid Watch

Presentation format: Poster Presentation and 6 Minute Speed talk.

Authors: Robert Lawrence and Rosalie Lawrence

A successful citizen science project requires a compelling idea addressing a widely-recognised need, extensive networking, planning, and good dose of persistent tenacity. Preparing two orchid identification guides in 2011 gave us confidence, and experience in teamwork. We identified a set of identification tools which inspired and guided our thinking, without limiting possibilities. We were bold in contacting knowledgeable people, leveraging social media and public speaking to build our credibility, raise our visibility, and extend our network. We were actively involved in the Native Orchid Society of South Australia, joining similar groups interstate, and connecting with thought-leaders in citizen science.

We formed a small cross-disciplinary team which was tasked with producing an ambitious plan to do “all that we could imagine”, setting out our vision for Wild Orchid Watch (WOW) as a project. We developed and conducted a web-based survey to gauge public interest and concerns, particularly security. We successfully applied for grants and permission to use copyright material. Through our networks, we organised undergraduate students to work on targeted sub-projects. Lastly, we sought a University partner with which we submitted a successful proposal for federal citizen science grant, leveraging their expertise in ecology, planning, grant management, software systems design, development and delivery.

WOW as a concept has been six years in development. Its success depends on our flexibility and ability to value others, as we work toward the same goals in an open and collaborative space. We’re excitedly optimistic at the opportunity provided by the grant to realise our vision.

Preferred presentation type: Long talk

Relevant Themes: Field-based Citizen Science, Engaging Citizens

Name and Position of lead/presenting author: Dr Kellie Leigh, Executive Director

Author Affiliations: Executive Director Science for Wildlife, Adjunct Research Fellow/Lecturer University of Sydney

Title: Forget the trade-offs: a shotgun approach to citizen science to engage more audiences in conservation.

Abstract: One trade-off in the development of citizen science projects is the choice of whether to access large numbers of people spread over a large geographic area, to complete simple tasks infrequently, or alternatively to invest in training and engage fewer people on a smaller scale but in more complex activities on a repeated basis. While both science and community support are widely acknowledged as equally important for successful wildlife conservation, a second trade-off is often the choice of whether to focus on the production of peer-reviewed publications as the key outcome (which many projects fail to achieve), or to sacrifice data quality and focus more on education and engagement as standalone outcomes. We faced this challenge by engaging citizen scientists in a single species project over a staged geographic area, and using a multifaceted approach. Utilizing the koala as a flagship species in the Greater Blue Mountains World Heritage Area, we developed three different strategies to target diverse audiences. Our activities incorporated general outreach to collect opportunistic sighting data from the general public, educational tools to encourage self-driven survey participation, and training days for special interest groups for repeated participation in technical research activities. Data collected from all three activities were robust enough for publication, and were integrated into accessible conservation management tools and circulated back to the community, creating a positive feedback loop to increase participation. The information sharing also initiated threat mitigation for koalas in developed areas. This successful model is scalable and will be repeated across new sites.

Biography of presenting author: Science for Wildlife is a charity whose vision is to create and share scientific knowledge to empower wildlife conservation. Dr Leigh also maintains research collaborations and teaches part of a Masters in wildlife population management at the University of Sydney.

The author intends on registering and attending CitSciOz18 if their abstract is accepted

ABSTRACT

Reef connections: linking science communication with citizen scientists

Reef Check Australia (RCA) has a legacy of citizen science activities, having coordinated and trained volunteers to undertake reef health surveys across Queensland for over 15 years. Through the collaborations with these citizens and partners, RCA has a validated data set on indicators of reef health which can be used to complement traditional research and monitoring. To strengthen how this citizen science data is applied for science, environmental and community outcomes, a new Reef Ambassador community outreach program was launched in 2015. RCA aims to develop a more holistic version of citizen science and support a consistent framework to help RCA volunteers share information with communities.

Between 2015 and 2017, RCA recruited and trained 37 Reef Ambassadors. Each Ambassador attended a workshop which provided training in reef science, science communication and event delivery. After the completion of the workshop, the Ambassadors coordinate or contribute to community outreach events to build community awareness about local reefs and RCA's work.

This presentation will outline the key findings from preliminary evaluations of the Reef Ambassador program based on pre- and post-training surveys. It will also outline an initiative to explore the potential impact of outreach activities, through short surveys with community members who engaged with Ambassadors at events. The provide insights into how citizen science and science communication can 'join forces' to ensure citizen science outcomes extend to a broader section of the community, and enact positive outcomes for people, science and the environment.

Critical evaluation of smartphone apps as tools for water quality monitoring in SEQ inland waters

Oral presentation

Presentation Theme: Field-based citizen science

Presenting Author: Tim Malthus¹, Research Group Leader, CSIRO Oceans and Atmosphere Flagship, Dutton Park, QLD, Australia (tim.malthus@csiro.au)

Co-authors: Renee Ohmsen¹, Janet Anstee², Stuart Phinn³

1. CSIRO Oceans and Atmosphere Flagship, Dutton Park, QLD, Australia
2. CSIRO Oceans and Atmosphere, Canberra, ACT, Australia
3. School of Earth and Environmental Sciences, University of Queensland, Brisbane, QLD, Australia

Abstract

Citizen science may be one means to assist water managers to support under-resourced in situ water quality monitoring programs. If reliable, smartphone apps, in the hands of concerned citizens, may provide a useful complement to traditional methods over wider areas, more often. Two such apps were evaluated in this study.

EyeOnWater (<http://www.eyeonwater.org>) evaluates water colour using the Forel-Ule (FU) scale, a 21 level scale used to measure the colour of natural water bodies. Users take a horizontal photo of the water surface and match the water colour recorded to the FU scale. The result is uploaded to an international database of measurements.

Hydrocolor (<http://misclab.umeoce.maine.edu/research/HydroColor.php>) uses an iPhone camera to measure surface reflectance. Users deploy a photographer's grey card and separately take images of the card, the sky and water surface at observation angles guided by the app. Using the three images, HydroColor calculates water body reflectance in the RGB colour channels and uses these to determine water turbidity in NTU based on relationships for North American waterbodies.

We evaluated app performance using replicated measurements made in 13 reservoirs across SEQ and NSW covering a range of water qualities (Chl a from 2.5 to 180 mg.m⁻³). The presentation will report on the performance and utility of the apps in comparison to separate determinations of high spectral resolution reflectance made using a Satlantic underwater spectroradiometer and water quality parameters measured from concurrent sampling. The value of such approaches for informing on water quality will also be highlighted using SEQ examples.

Biography

Dr Tim Malthus combines skills in calibration, validation and field spectroscopy with analysis of satellite data, to develop improved monitoring tools. His most recent research has focussed on tools for the detection of harmful algal blooms in both inland and coastal waters, ranging from low cost optical sensors, citizen science apps and satellite data.

Tim Malthus acknowledges that he will register and attend CitSciOz18 if this abstract is accepted

Title:

Sulphur-crested Cockatoos *are* left handed

Speaker Info, affiliations:

Dr John Martin

Ecologist

Royal Botanic Garden Sydney

Co-authors:

R.E. Major¹, C.E. Taylor*, R.J. Stephens[^], A.Davis*

¹Australian Museum Research Institute, Australian Museum

*University of Sydney

[^]DigiVol, Australian Museum

Abstract:

The Sulphur-crested Cockatoo (*Cacatua galerita*) has adapted to urban areas where it is now considered common and abundant. This species is well known in Australia and is predominantly seen as an inquisitive, cheeky character; wild Sulphur-crested Cockatoos are known to approach people to receive food. In 2011 the 'Cockatoo Wingtags' project started individually marking birds and asking members of the community to report sightings, participants could include a photo of the bird. In 2016 a DigiVol project was launched to score 8340 photos, one attribute we asked participants to score was if birds were holding an object in their left or right foot (n = 1022 photos). Previous research described captive Sulphur-crested Cockatoos as using their left foot. We confirmed this finding by assessing wild birds, with 83% of birds (n = 46) exclusively using their left foot to hold items.

Pollinator observatories – citizen science to reconnect people with nature in cities

Preferred presentation type: Long talk

Relevant themes: Engaging citizens & Field-based citizen science

Name and position of lead presenting author: Dr Luis Mata, Research Fellow

Luis Mata^{1,2}, Janet Bolitho³, Justin Foster⁴, Holly Kirk¹, Cathy Oke², Kirsten Parris^{2,5} and Sarah A. Bekessy^{1,2}

¹Interdisciplinary Conservation Science Research Group, Centre for Urban Research, School of Global, Urban and Social Studies, RMIT University.

²Clean Air and Urban Landscapes Hub of the Australian Government's National Environmental Science Programme.

³Friends of Westgate Park.

⁴Earthwatch Institute Australia, Research Programs.

⁵School of Ecosystem and Forest Sciences, University of Melbourne.

Abstract

Untapping the benefits of insect biodiversity in cities is contingent on making insects, and the ecosystem services they deliver, tangible to people. Yet most insect species are small and fast, and therefore remain elusive to the majority of onlookers. In this case, plants can serve as an anchor to draw attention to plant-insect interactions. Pollinator observatories – a network of flowering plant species monitored for pollinator interactions by academic and citizen scientists – are a novel approach to reconnect people with nature and demonstrate ecosystem service delivery in cities.

We introduce two citizen science programs, led by a Landcare group and a non-profit organisation respectively, that have incorporated pollinator observatories as part of their community engagement activities. We describe our training and certification methods for citizen scientists to record plant-pollinator interactions, and an app specifically designed to record interaction data. We use our findings to illustrate how citizen science is contributing to fine-tune our knowledge of greenspace pollination networks.

In time, the interaction data documented in each observatory will allow us to gain an understanding of the temporal match between the observatory's flowering phenology and its associated pollinator assemblage. These data could be then linked to the observatory's associated microclimatic data to produce predicted 'observation windows'. We envision that in any given day, season, and weather condition, managers will be able to use this knowledge to guide greenspace users to the pollination observatories where they are more likely to witness insect pollinators in action.

Biography

Luis Mata is a Research Fellow with RMIT's Interdisciplinary Conservation Science Research Group and works as part of the NESP – CAUL Hub. He is an ecologist with an interest in plant-insect interactions, conservation science in urban environments and citizen science.

I acknowledge that I intend on registering and attending CitSciOz18 if my abstract is accepted.

Australia is home to nearly 5000 species of fishes. In a changing world it is vitally important to learn as much as we can about biodiversity of the region. Diving and angling are huge sports in Australia and New Zealand. The Australasian Fishes Project taps the enthusiasm of fish-spotters and fish scientists who upload, identify and comment on observations of fishes from within Australian and New Zealand waters. The project has been online for less than 18 months, but has had over 16000 uploads from user groups. From these data we have made over 100 'discoveries' that include information on distributional changes, parasitism, new colour morphs, hybrids, beach strandings, habitat information, fish biology, tagged fish, new records for many regions/islands and potentially new species.

The Peel-Yalgorup Wetland, located an hour from Perth in WA is listed as a Wetland of international importance under the Ramsar Convention (Ramsar 482). The ecologically diverse system meets 8 of the 9 criteria for a Ramsar listing. One of that criteria is the system regularly supports 20,000 or more waterbirds. Peel Harvey Catchment Council have identified the importance of scaling up citizen science programs with students as a means to creating stronger stewardship of the Peel-Yalgorup.

As result "Stints are Rad" was born. An excursion model that involves high-school students becoming citizen scientists for a day by learning basic shorebird ID and participating in shorebird monitoring. It was scheduled on World Shorebird Day with John Tonkin College and facilitated by Zoologist Milly Formby. Milly taught the yr7 group in the classroom before heading out onsite to Samphire Cove to monitor shorebirds. Milly Formby also shared her epic story of how she is training to fly a microlight aircraft from Australia to Siberia. Her journey will follow the migration path of the Red-necked Stint to promote urgent action for shorebirds.

The highlight of the day was completing the survey and spotting seven Black Winged Stilts and two Eastern Curlews. The group logged their observations on their mobile phone using the citizen science app "Bird-data". The information uploaded contributes to world shorebird conservation. As a result John Tonkin College are continuing to teach bird monitoring and shorebird ID as part of the Surf Science Course.

Restoring a lost ecosystem: citizen scientists helping restore what they did not know existed!

Citizen scientists are contributing to a major marine restoration project in Port Phillip Bay through the monitoring of oysters and mussels (shellfish). Port Phillip Bay has lost an estimated 90% of its shellfish reefs and globally shellfish reefs have been recognised as the most threatened marine habitat on earth. Shellfish reefs provide valuable ecosystem services including improving water quality and creating diverse habitats for algae and invertebrates to call home. To reverse the decline of shellfish reefs in Port Phillip Bay multiple organisations have banded together to recreate this important habitat. It was recognised early in the project's creation that for the program to be successful in the long term the community had to be involved and data on the recruitment dynamics of oysters and mussels needed to be collected. To do this Victorian National Parks Association's long running ReefWatch program in collaboration with The Nature Conservancy brought together community groups around Port Phillip Bay to develop a long term citizen science monitoring program to evaluate the success of restoration works and provide hands on opportunities for authentic scientific contribution.

This presentation will outline the way citizen scientists have been engaged to understand what has been lost and empowered to build a body of knowledge on the recruitment dynamics of native oysters and mussels in Port Phillip Bay using settlement plates (material placed in the sea for baby oysters and mussels to grow on). The growing interest from the community will be crucial to the ongoing success of the project.

The essential role of story in engaging communities with science

Michael Mills, Creative Director, HeapsGood Productions

Humans are the storytelling animal. We do not engage with facts or data. It is through stories that we engage with each other. It is through stories that we understand and engage with the world around us. What, then, are the implications for this in the design and application of citizen science projects? How can the use of story and storytelling techniques better engage a community in the science, and lead to better citizen science outcomes? What happens to a citizen science project that ignores the primacy of story?

This is a practical and theoretical presentation that requires it's audience to both participate and pontificate. In exploring the research of the role of performance as an engagement technique, it will become clear that citizen science projects ignoring the importance of story are doomed to failure; those that embrace it, at least have a chance of success.

At a practical level, this presentation will also include several live excerpts of interactive storytelling. It's no good just talking about it. In order to truly understand it, you need to experience it. This presentation aims to wrap it's own ideas into the very idea of story. so, come and join HeapsGood Creative Director Michael Mills on a storytelling journey that shows us how we can ensure our communities more effectively engage in the science. Join the journey and yourself become a part of the story.

Australian Citizen Science Association
#CitSciOz18: Abstract Submission

Presentation Theme: Communication and Promotion
Speed Talks Category

Shannon Mooney, Knowledge Systems Manager (lead author)
Melissa Walker, Knowledge Innovation Officer
Apanie Wood, Community Area Manager for Lower Brisbane
(representing Healthy Land and Water)

Putting Citizen Science on the Map in South East Queensland!

In SEQ, we recognise that citizen science engages the community to better understand and manage our natural assets, and in doing so helps us to work towards our regional vision of “A sustainable future for our community”.

Healthy Land and Water have been supporting community groups for the last decade with mapping support, turning data into knowledge, knowledge into understanding and understanding into action in specific areas of the landscape for multiple benefits.

In 2016, a small gathering of citizen science groups worked collaboratively to build skills and look at ways to further engage the community in citizen science activities. This involved a survey of groups and individuals involved in natural resource data acquisition and an online story map that showcases some of the citizen science groups in SEQ.

The story map of SEQ Citizen Science presents data being collected by the community in the form of online maps, video and pictures, and infographics. A snapshot of groups and their programs are promoted with opportunity to expand the story map and spread the message of the valuable work being done by volunteers across South East Queensland.

The project was supported by the SEQ Catchments (Healthy Land and Water) Members Association which is made up of over 100 different interest groups including urban industry, traditional owners, rural industry, local government, environment, research and education, integrated catchment management and landcare, coastal and marine, recreation sport and tourism.

Tweetable Abstract

Story maps enabling citizen science groups in South East Queensland to apply data and knowledge.



Bio for Shannon Mooney (longer version)

As the specialist Knowledge Systems Manager for Healthy Land and Water, Shannon provides spatial intelligence for the interpretation and application of natural asset and community data in South East Queensland. Our data warehouse and GIS System is a compilation of local, state and federal government information complimented by citizen science that underpins the business's Strategic Plan and initiatives.

Shannon has coordinated key decision support tools and spatial models including 'Key Investment Areas', Ecosystem Services Framework, Essential Habitat Mapping, Landscape Optimisation Offset Key, and the Healthy Country Program for Improved Water Quality. Our GIS Services have guided over \$20 million of on-ground investment over the last 10 years.

Shannon continues to provide support to staff, management and executive, and external clients with high level interpretation of data and statistics for improved decision making. In his spare time you can find him in his garden, nurturing the school edible garden, or putting up nest boxes for the survival of gliders in the lowland forests of Brisbane.



Session theme: Engaging citizens / Partnerships & collaboration

Working title: Using co-design to create more effective monitoring programs

Authors: David Mossop, Tess Hayes, Chris McCormack, Alison Medhurst, Anthony Boxshall, Paul Leahy, Catherine Healy, Belinda Lowing, Mikaela Power, Naomi Oosting, Jason Choi, Gavin Fisher, Paul Torre

Abstract:

Scientists can create robust monitoring programs, but can collaborating with community create even more effective approaches? Environmental monitoring programs around Australia range greatly across research objectives, temporal and spatial scales, and parameters of interest. While most monitoring programs are developed using traditional scientific expertise, the citizen science movement is providing the opportunity for community members to bring their own skills and knowledge to the design phase of the scientific process.

EPA Victoria has developed a model of citizen science involving co-design, co-monitoring and co-interpretation. Co-design enables us to merge EPA and external science expertise with local knowledge from citizen scientists, to create monitoring programs that enhance science outcomes and empower communities through meaningful participation. EPA trialed approaches to co-design in two citizen science projects in the Latrobe Valley: co-design of a new Latrobe Valley Air Monitoring Network (2016-17) and Caring for Waterhole Creek (2017). Both co-design approaches established the scope and decision-making process, used workshops to connect EPA scientists with citizen scientists, and merged EPA and community knowledge.

Social data collected from both EPA scientists and citizen scientists suggests the experiences were largely positive for both groups. The inclusion of local knowledge also revealed vital pieces of information which improved the effectiveness of site selection and analysis. By merging the perspectives and knowledge of scientists and community, we can deliver more effective monitoring to enhance environmental management.

The Powerful Owl Project is a grass-roots citizen science project that provides a conduit for laypeople to learn about and get involved with conservation actions in the urban environments. This project generates data to better understand the urban ecology of our biggest threatened owl species, the Powerful Owl. Whilst retaining all Threatened species is important, retaining top predators like owls that play a role in regulating other animal populations is doubly so. Owl populations are in decline in forests, and urban areas are expanding rapidly. If hollow-users like owls can persist and breed in urban areas, these areas may not only to retain a significant portion of the species, but also act as sources of recruitment into forested areas. Citizen scientists volunteering for the Powerful Owl project collect data on breeding success, habitat use and diet. By correlating prey use with where and how owls breed within the urban landscape, this work has identified recent dietary shifts towards ground fauna with increasing urbanization, and so an increasing source of a risk to highly urban owls through poisoning. The project data illustrates that well managed and effective data collection from citizen scientists can generate data sets that not only further our understanding of a key threatening process for Australian wildlife, but can directly inform land management to allow the persistence of threatened species, whilst building knowledge of active conservation measures within and amongst communities.

Naturmapr illustrates how new technology allows communities to create accurate and detailed data vital for effective research and natural resource management decisions. Using NatureMapr citizen scientists have established the authoritative source of species distribution and abundance in the ACT. Users load a wildlife photograph to the site and suggest an identification. Over 70 volunteer moderators confirm the identity of a new report.

The site now contains 1,150,000 records of 4350 species of animals, plants and fungi. It is used daily by land managers, parkcarers, consultants and development and planning decision makers. Amongst much else, this use has resulted in a new reserve, changed infrastructure routes, altered the prescribed burn program and re-prioritised the ACT weed control program.

It is indicative that, 50% of all of the rare plant recordings within the ACT over the last 110 years have come via NaturMapr (in its third year). This new knowledge has led to the removal of 54 species from the list of 317 species once thought as rare in the ACT, while a further 18 species not previously known from the ACT have been added.

NatureMapr facilitated citizen involvement in woodland bird and orchid and fire research, the results of which led to on ground management changes. The expansive fungi and invertebrate data has broaden conservation management to include wide consideration of these groups.

NatureMapr includes a Library of over 150,000 images. It is a comprehensive field guide, drives a program of biodiversity tweets, fuels the media and educates the public.

In Victoria, the Waterwatch and EstuaryWatch programs were established as citizen science initiatives to work with communities to strengthen engagement and participation in waterway and catchment health. The programs were established in 1993 and 2006 respectively and collect community monitoring data from rivers, lakes, wetlands and estuaries. Both programs provide quality assured community data that is current, and easily accessible to the public. Spatial web-based portals have been developed for each program to provide greater public access to all the community monitoring data collected by each of the two programs, and have been a great morale booster for volunteer monitors across the state. Monitors have been incredibly proud to see their water quality data and observations displayed online in way that is engaging and accessible to a wide audience. The data can also be readily analysed and interpreted by community, waterway managers, researchers, consultants and education providers. As such, portals are providing an important source of real time monitoring data that be used to inform both long-term waterway management outcomes, as well as assist in responding to natural resource management events (such as recent acid event along the Barwon River, Victoria). In addition, the data can be viewed together with other natural resource management or community based information, such as Water Measurement Information System (WIMS) data or additional map layers (i.e. priority streams, vegetation etc.) to provide greater context , accessibility and use of the data to understand, plan and manage our catchments.

The Pesticide Detectives: Citizen Science to understand pesticide pollution in Australia's waterways.

Preferred Presentation Type: Poster Display

Theme: Field based projects

Lead Presenting Author: Dr Jackie Myers, Senior Research Fellow

Authors: Myers¹, J.H., Sharp¹, S., and Pettigrove¹, V.

Affiliations: ¹Centre for Aquatic Pollution Identification and Management (CAPIM), School of BioSciences, The University of Melbourne, Parkville, Victoria, Australia.

Australia's rivers and waterways have intrinsic ecological, economic and social value. Information on the quality of Australia's water resources is of critical interest to local, state and federal agencies as water quality is integrally linked to the long-term availability of clean water. Of primary concern is the ever-increasing use of chemicals in our everyday life, and the risks they pose to the health and beneficial uses of waterways.

Pesticides are one group of contaminants increasingly being detected in rivers and streams across Australia and worldwide. Pesticides enter waterways from sources including urban and agricultural runoff. Their presence is a concern for aquatic life and human health. Improving our understanding of how pesticides are used as well as their fate and transportation through the environment is important for reducing their environmental, economic and social impact.

The Pesticide Detective Program aims to support citizen science based research to assess the occurrence of pesticides commonly used around the home in Australia's waterways. Citizens will work with researchers from the Centre for Aquatic Pollution Identification and Management (CAPIM) to undertake a national survey of concentrations of current use pesticides within waterways draining catchments of varied land-use. The program will assess pesticides commonly found in the home, therefore educating participants about the products they may use, how they may enter waterways and risks they may cause. This presentation will provide an overview of the proposed Pesticide Detectives program and how participants may become involved.

#CitSciOz18 Conference Abstract Submission

Author: Michelle Neil, ACSA

Time: 7 minutes or 15 minute speed talk

Title: How Can ACSA Help Your Citizen Science Project?

Every week an ACSA volunteer scours the internet including Google, Facebook groups, LinkedIn Groups, newsfeeds and Twitter hashtags searching for recent Australian citizen science content that ACSA can promote on social media. The search is labour and time intensive and is nowhere near totally inclusive. Basically stuff gets missed.

Which social media platform is best for your citizen science project? Often the accurate hashtag isn't used or an event is put up on Facebook on an obscure page. Do project managers know that ACSA can share their Facebook event to the ACSA page to give the project more exposure? Do project managers know that they can tag ACSA?

Hints, tips and tricks for social media will abound all with the aim of getting everyone's message out quickly and accurately on their own social media platforms as well as making ACSA's more up to date with the latest and greatest in #citizenscience information.

Although acoustic monitoring can be an invaluable tool for detecting secretive and rare species, large-scale analysis of environmental audio recordings presents many logistical challenges. While some projects have relied on citizen scientists to review acoustic recordings, participation was relatively low. We investigated how to engage citizen scientists with acoustics to look for endangered Eastern bristlebirds (*Dasyornis brachypterus*). The largest stakeholder group for this species is Eastern Bristlebird Recovery Team, which has been working together for decades to conserve the species. The recovery team and members of the broader citizen science community were involved in contextual inquiries to co-design engaging ways to analyse environmental recordings collected in likely bristlebird localities. Challenges to learning and accurately identifying vocalisations were revealed, including that calls of this species are poorly-known to even experienced birders. To enable learning of vocalisations, sustained engagement, and correct analysis of bird calls, designs must include example target vocalisations, online communication between peers and a means to review discoveries made by peers. Such a project will empower people to learn about unfamiliar species through acoustics. The importance of using human-computer interaction strategies to design technologies for conservation-focused citizen science was also highlighted.

Abstract title:	Nurturing partnerships and collaborations: lessons learnt
Preferred presentation type:	Long Talks (15 minutes: 12-minute talk + 3-minute Q&A)
Relevant theme(s) your abstract aligns with	Partnerships & Collaboration
Name and position of lead presenting authors	Geetha Ortac Scientist – Citizen Science Office of Environment & Heritage, NSW Ingrid Garland (nee Berthold) Director, EnviroComm Connections Pty Ltd (Representative of NSW Waterwatch)
Authors' name/s (lead author is normally expected to present the material)	1. Geetha Ortac 2. Ingrid Garland (joint presentation)
Authors' affiliations	1. NSW Office of Environment and Heritage 2. EnviroComms Connections Pty Ltd

Abstract (maximum length 250 words)

Numerous presentations, scientific papers and articles often discuss the importance of managing and engaging volunteers effectively, but put limited emphasis on the value of partnerships and collaborations. Incorporating techniques in your project design to build good working relationships and better understand the values of your project partners can help pave the way for supportive and trust-based relationships. Recruiting the right partners is critical for a project's success. Initiating early discussions with your partners can help gauge how they best fit your project (and vice versa) and help determine how both parties can mutually benefit from this collaboration. We found that managing both partners and their organisations' interests effectively in a project is key to any citizen science project's overall success.

Using the Bellingen Riverwatch project as a case study, we highlight some key lessons learnt from establishing a project which involves over 10 partnerships across different agencies and groups. Bellingen Riverwatch is a citizen science project that involves the community in monthly water quality data collection. The data collected monitors the health of the river and contributes to threatened species management actions, such as the Bellinger River Snapping Turtle which is a critically endangered species. For the first time, this project has brought all locally based organisations to work together for a common purpose and has managed to streamline data collection so that it can be better used to inform the management of the river system.

State of the Environment celebrates two decades of citizen science data on Australia's fungi

Jasmin G. Packer

Citizen science has enormous capacity to engage people in positive interactions with nature. While the benefits for humans abound (including improved health and wellbeing, and skills development), the benefits for nature are often not so clear. One of the greatest challenges is to design citizen science programs that will deliver useful and reliable data to guide conservation planning. Fungimap is one of Australia's largest and longest running citizen science groups. Founded in 1995, Fungimap has over 146,000 fungi records available online, and is the biggest contributor of fungi records to the Atlas of Living Australia. This richness of records means that conservation managers can download data on fungi occurring in their region to identify fungal distribution, spatial and climate correlations, and fragmented or rare species. Fungimap has therefore addressed the challenge of delivering useful and reliable citizen science data and has achieved this in five ways: (1) addressing policy imperative(s) and specific knowledge gaps, (2) identification tools, (3) standardised collection, (4) multiple scales, and (5) quality control. Fungimap's contribution to citizen science in Australia, and the urgent need to extend our knowledge of the distribution and diversity of Australia's fungi for better conservation management, was recently showcased in Australia's State of the Environment.

S. Parbhoo, s.parbhoo@sanbi.org.za

Oral

Category: Field-based citizen science

Cultivating the plant conservation network

S. Parbhoo

Custodians of Rare and Endangered Wildflowers (CREW) Programme: summer-rainfall region, South African National Biodiversity Institute (SANBI), P.O. Box 52099, Berea Road, Durban, 4007

The Custodians of Rare and Endangered Wildflowers (CREW) is a citizen science programme that bridges the gap between science and society. CREW is a partnership between the government agency, the South African National Biodiversity Institute (SANBI), and the non-governmental organisation (NGO), the Botanical Society of South Africa, which brings botanists and the general public to help conserve South Africa's most threatened plants. Furthermore, the programme is regionally-based, ensuring citizen scientists receive hands-on training to ensure specific information is collected over a long-term.

We survey and monitor threatened plants across the country while working closely with NGOs, conservation agencies and landowners to create awareness. With 25% of South Africa's plant species listed as threatened or Rare in the Red List of South African plants, programmes like CREW are becoming increasingly important for the conservation of our exceptionally rich botanical heritage.

CREW citizen scientists are vital for the functioning of this national body. The help that these remarkable individuals provide to the programme is instrumental for the identification of areas in need of conservation. With government conservation agencies experiencing ongoing loss of capacity and funding, the contribution of CREW citizen scientists to the conservation of South Africa's flora is invaluable. The data collected is used to update existing information on plant species of conservation concern and feeds into land use planning and decision making at the different tiers of government. The success of the CREW programme is directly linked to the passionate people who volunteer their time and resources to assist in national conservation efforts.

The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes

Contributors: C. Brown, M. Cocks, A. Hitchcock & D. Raimondo

Background

South Africa has a long history of running public awareness programmes for plant diversity and conservation, such as through the South African National Biodiversity Institute (SANBI) linked to the ten botanical gardens across the country. SANBI has a strong synergistic association with the Botanical Society of South Africa (BotSoc), and both run public awareness programmes such as the Custodians of Rare and Endangered Wildflowers (CREW).

The formal education system in South Africa includes sections on biodiversity in the high school curriculum, and specifically deals with plant diversity and human influences on ecosystems. Beyond high school, many tertiary institutions have courses focusing on plant diversity and conservation, ranging from being strictly botany focused to courses in nature conservation/management.

Apart from the formal education curriculum, South Africa has set aside several days each year to commemorate issues relevant to this target, such as Arbor Day, and commemorate pertinent international days, such as International Biodiversity Day, World Environment Day etc. There are also many initiatives that bring together government and non-governmental organisations (NGOs) in achieving public awareness and action towards plant conservation.

Challenges

Although issues of plant diversity and conservation are included in the school curriculum, the majority of schools are not equipped with either the teachers or facilities to effectively achieve the goals of the curriculum. Furthermore, analysis of the examinations done at the end of high school (National Senior Certificate) show that students fare particularly poorly in environmental studies (National Senior Certificate 2013: Diagnostic report, Department of Basic Education).

Target 14 outcomes for 2020

14.1. Plant conservation included in the life science curriculum across South Africa.

Education: plant conservation needs to be incorporated into the school curriculum at provincial level to ensure that the curriculum is relevant to local language(s)/culture(s) and biome(s). A blanket curriculum intervention for South Africa will lose an enormous opportunity to engage at a local level. Currently plant conservation is poorly supported mainly due to lack of locally relevant material available to educators. One way to gain support and understanding is to introduce the concept of bio-cultural diversity at schools. The Grade 10 Life Science curriculum provides a perfect platform for this. An excellent pilot of such an intervention is the Inkubeko Nendalo Bio-Cultural Diversity Conservation Programme, <http://www.bioculturaldiversity.co.za> run by Rhodes University in the Eastern Cape. This programme gets learners interested in plant diversity and conservation by studying how plants form an integral part of their culture. These types of education interventions need to be replicated in other provinces.

14.2. Plant conservation awareness expanded by exposure to botanical gardens and by involving the public in citizen science projects.

Creating awareness by involving the public in citizen science projects: engaging the public in monitoring plant diversity helps raise awareness of plant conservation issues and a sense of community responsibility for caring for the environment. Examples of popular and ever-growing citizen-science interventions include the CREW programme and the iSpot virtual museum. CREW involves volunteers from the public, mostly from rural areas, in the monitoring and conservation of rare and threatened plants, <http://www.sanbi.org/programmes/threats/crew>, while iSpot is an exciting and interesting website that allows anyone with an interest in nature to share their observations and passion with a network of like-minded enthusiasts by posting digital photographs of plants observations online. This makes it a virtual museum of plant information. In addition to being a virtual museum, it is a social hub for nature enthusiasts and an increasingly valuable database on species occurrences, see www.ispot.org.za.

14.3. Plant conservation promoted in relevant media.

Media: currently there is very little-media coverage for plant conservation and better coverage on social media platforms is required. Key persons from within the Plant Conservation Network need to be identified as designated

‘Talking Heads’ and to foster relationships with media outlets. Members of the Plant Conservation Network active on Social Media platforms such as blogging, Facebook, Twitter etc. need to promote plant conservation information on their platforms.

Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes

Outcomes	Activities	Responsible stakeholders	Timeframe
14.1. Plant conservation included in the life science curriculum across South Africa.	14.1.1. Educational materials developed for teaching Grade 10s relevant to each of South Africa’s nine provinces. A curriculum-aligned module designed and trialled with a pilot school in each province.	14.1.1. Education consultant (funded by BotSoc).	14.1.1. 2020
	14.1.2. The network of botanists involved in this strategy assisting in the development of appropriate educational material.	14.1.2. Education consultant (funded by BotSoc).	14.1.2. 2016
	14.1.3. SANBI National Botanical Gardens are outdoor classrooms for learners, with curriculum-linked educational activities being offered.	14.1.3. SANBI education department developing resources in collaboration with garden’s horticulturists.	14.1.3. 2020
	14.1.4. Groups of botanists taking school learners on field excursions, especially on days such as Arbor Day.	14.1.4. Volunteers from across the country involved in the CREW programme.	14.1.4. 2020
14.2. Plant conservation awareness expanded by exposure to botanical gardens and by involving the public in citizen science projects.	14.2.1. Plant conservation promoted in SANBI National Botanical Gardens through labelled and interpreted living plant displays, talks and demonstration gardens to educate and create awareness about the importance of plant diversity and conservation.	14.2.1. SANBI Gardens & Education.	14.2.1. 2020
	14.2.2. The number of individuals able to participate in iSpot expanded by developing apps compatible with android cell phones.	14.2.2. Open University from the United Kingdom responsible for the development of iSpot.	14.2.2.
	14.2.3. Educational activity developed for learning about plants using the iSpot website, ensuring this activity is available as part of the iSpot website and being used in schools.	14.2.3. iSpot team SANBI and education consultant.	14.2.3.
	14.2.4. The number of volunteers involved in the CREW programme expanded to ensure that CREW works in all areas where	14.2.4. CREW programme implemented by SANBI and	14.2.4.

	threatened plants are concentrated.	BotSoc.	
14.3. Plant conservation is promoted in relevant media.	14.3.1. Newspaper, magazine articles, and popular books on plant conservation produced.	14.3.1. Plant Conservation Network.	14.3.1. 2020
	14.3.2. Plant conservation stories, especially those linked to the 16 targets of this strategy, are featured on television and social media platforms.	14.3.2. Plant Conservation Network, SANBI Marketing and BotSoc.	14.3.2. 2020

The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy

Contributors: J. Kioko, C. Brown & D. Raimondo

Background

Within the tertiary education sector, a wide variety of courses are offered in fields that contribute to training in plant conservation. All 23 public universities offer environment-related courses at various levels (from short courses to post-graduate programmes).

Although there are courses, infrastructure and capacity to support plant conservation in South African higher education institutions, access to higher education is particularly low in the country (only about 16% of young people who should be at university, actually are), and the graduation rates are undesirably low (on average, only about 40% of those enrolled for undergraduate degrees or diplomas complete their courses). Furthermore, many of the successful graduates do not find employment, with students from previously disadvantaged backgrounds being grossly over-represented among the unemployed. This level of unemployment is in spite of a demonstrated shortage of appropriately skilled graduates for the biodiversity sector. Thus, there seems to be a persistent mismatch between the supply of trained graduates and the skills required. The plant conservation field is not exempt from this mismatch. In response to this challenge in 2009, South Africa produced the Biodiversity Human Capital Development Strategy. This strategy aims to address South Africa's shortage of skills to manage its biodiversity and improve historical inequalities in the sector.

One valuable intervention catalysed by the Biodiversity Human Capital Development has been the Groen Sebenza programme for developing young conservation practitioners across South Africa. The programme is a partnership between SANBI and 33 organisations from all tiers of government, non-governmental organisations (NGOs) and the private sector. Groen Sebenza is based on an 'incubator model' giving the 800 participating youth workplace experience through a structured mentoring programme, together with skills development and training opportunities for a period of two-and-a-half years from April 2013 to December 2016. Five hundred graduates and 300 school leavers (matriculants) referred to as 'pioneers' are placed within one of the 33 partner organisations for the duration of the project. Funding for this programme comes from National Treasury's Jobs Fund, and is being channelled into the conservation sector by the Development Bank of South Africa (DBSA). As part of each placement, training is provided. This training includes general job place training such as project management skills, conflict resolutions skills etc. It also includes specific training relevant to the specialist field of the plant conservation project that the intern is in. For example, Groen Sebenza pioneers placed with the Botanical Society and working on threatened plants, receive intensive training on how to conduct Red List Assessments and also how to conduct monitoring of threatened plants in the field. It is highly likely that there will be a second phase of the Groen Sebenza programme implemented between 2016 and 2019.

A second valuable mentorship opportunity is offered by the National Research Foundation (NRF) of the Department of Science and Technology (DST). Through the DST–NRF internship programme, unemployed science graduates and postgraduates are afforded an opportunity to acquire practical work experience and improve their competencies through exposure to a research environment. Graduates are placed for one year in various in South African scientific research institutions. Many receive placements in conservation projects within biodiversity research institutions. The DST–NRF internship programme is a long-term programme implemented on an annual basis.

Target 15 outcomes for 2020

15.1. Conservation courses offered in South Africa's universities aligned with skills needed in the field of plant conservation.

15.2. Work place mentorship opportunities available in plant conservation programmes.

South Africa has a strong history of botanical research, however, despite this there is still a number of areas of plant conservation where there is lack of appropriate skills. These areas were identified in 2013 as part of a workshop to develop this National Plant Conservation Strategy. The three most urgent skills development interventions required include:

Promoting applied ecology and ethnobotanical studies in universities to ensure skills exist to sustainably manage the over-utilisation of South Africa's plant species. This intervention will help South Africa achieve Target 11, Target 12 and Target 13.

Developing skills amongst conservation graduates to assess the quality of Environmental Impact Assessments and to conduct law enforcement processes linked to land-use rights. This intervention will allow South Africa to achieve Target 5 and Target 7.

Reversing the declining trend in the foundational science of plant taxonomy. This declining trend is affecting South Africa's ability to achieve Target 1, Target 2 and Target 3 of this strategy.

Target 15: The number of trained people working with appropriate facilities sufficient according to national needs, to the targets of this Strategy

Outcomes	Activities	Responsible stakeholders	Timeframe
15.1. Conservation courses offered in South Africa's universities aligned with skills needed in the field of plant conservation.	15.1.1. GreenMatter partnership, responsible for the implementation of the Biodiversity Human Capital Development Strategy aware of critical skills required for plant conservation and appropriate interventions being made.	15.1.1. BotSoc.	15.1.1.
	15.1.2. Workshops hosted that bring together conservation practitioners and staff from South Africa's Universities of Technology that offer Nature Conservation and Horticultural Diplomas to identify skills required for improved environmental management, law enforcement and <i>ex situ</i> conservation.	15.1.2. BotSoc.	15.1.2.
	15.1.3. Course convenors of postgraduate university courses in conservation at the University of Cape Town (UCT), University of Witwatersrand (Wits) and University of Stellenbosch aware of and teaching students about the conservation priorities as identified in this strategy and the NBSAP.	15.1.3. Postgraduate course convenors at UCT, Stellenbosch and Wits, Strategy for Plant Conservation coordinator (SANBI).	15.1.3. 2017
15.2. Work place mentorship opportunities available in plant conservation programmes.	15.2.1. Plant conservation research programmes continue to host interns supported by the DST–NRF Internship programme.	15.2.1. Plant Conservation Network.	15.2.1. Ongoing
	15.2.2. Internship opportunities as part of the Groen Sebenza	15.2.2. Plant Conservation Network.	15.2.2.

	Programme available in plant conservation programmes.		Ongoing
15.3. Promote postgraduate research studies required to ensure the conservation of South Africa's plant species.	15.3.1. Bursaries provided for taxonomic revisions of priority genera identified in the paper: 'Taxonomic research priorities for the conservation of the South African flora', Von Staden et al. 2013.	15.3.1. SANBI and DST–NRF.	15.3.1. Ongoing
	15.3.2. Bursaries provided for applied ecology and ethno-botanical studies to research sustainable harvesting requirements of South Africa's most highly utilised plant species.	15.3.2. Scientific Authority of South Africa and DST–NRF	15.3.2. Ongoing

Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy

Contributor: D. Raimondo

Background

South Africa has strong institutional capacity and a rich history of creating networks to promote plant conservation. The South African National Biodiversity Institute (SANBI), formerly the National Botanical Institute, is a branch of the Department of Environmental Affairs (DEA), and monitors and reports on the status of species and ecosystems and provides planning and policy advice to help safeguard all of South Africa's biodiversity. SANBI is the focal point for the implementation of the National Plant Conservation Strategy.

Nine provincial conservation authorities and the South African National Parks (SANParks) manage protected areas and implement conservation of plant diversity outside of reserves.

The Botanical Society of South Africa (BotSoc), established in 1913, has been promoting the conservation and wise-use of South Africa's rich flora for over 100 years. The society now has over 20 000 members spread across the world.

Research institutions and collaborations are also strong. The South African Association of Botanists (SAAB) meets annually and represents a wide range of academic botanical disciplines, with members located at different South African universities, and academic and research institutions.

To protect South Africa's unique biomes and to promote applied conservation research for these areas, specific biome-based research and conservation forums have been established; these include the Fynbos Forum, the Arid Zone, the Thicket Forum, and the Grassland Society of South Africa.

Research into indigenous knowledge of plants and their sustainable use is promoted by the Indigenous Plant Use Forum.

Since 2003 the capacity to conserve and monitor South Africa's unique flora has been expanded by enabling members of the public to work as citizen scientists. The Custodians of Rare and Endangered Wildflowers (CREW) programme is a vehicle through which conservation-minded citizens can participate in national plant conservation work. A powerful network has been established over the past decade by linking professional botanists and citizen scientists via the CREW programme. CREW members monitor and conserve threatened plants.

Target 16 outcomes for 2020

16.1. A South African network for plant conservation effectively implementing and updating the Strategy for Plant Conservation.

16.2. Working groups for each target ensuring that specified outputs are being achieved.

Given South Africa's strong conservation and research capacity, the only necessary intervention to help promote plant conservation is coordination around specific areas of work. In March 2013, 46 conservationists and botanists representing a wide range institutions and organisations met to develop South Africa's Strategy for Plant Conservation. Working groups for each of the 16 targets were established and these groups are now responsible for ensuring that progress is made towards achieving each of the outputs listed under the targets. The organisations that took part in developing this plant conservation strategy and are actively involved in its implementation are listed on page iv. Many independent botanists are also involved and committed to the implementation of this strategy.

Target 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy.

Outcomes	Activities	Responsible stakeholders	Timeframe
16.1. A South African network for plant conservation effectively implementing and updating the Strategy for Plant Conservation.	16.1.1. A workshop for all botanists and conservationists involved in plant conservation strategy organised to monitor progress of the strategy.	16.1.1. BotSoc and SANBI to organise.	16.1.1. Biannually (2018, 2020)
	16.1.2. Outputs for each target and individuals responsible updated as needs are identified.	16.1.2. Focal point for South Africa's National Plant Conservation Strategy.	16.1.2. Biannually (2017, 2019)
16.2. Working groups for each target ensuring that specified outputs are being achieved.	16.2.2. Annual update reports written on work progress and posted online.	16.2.2. Working group coordinators.	16.2.2. Annual
	16.2.3. Case studies, scientific papers, images and video links of work being done posted online.	16.2.3. Working Group coordinators and all stakeholders working to help achieve this strategy.	16.2.3. Annual

Birds in Schools: Observation, Interpretation and Action

In Australia there are a diverse and colourful range of birds that can live amongst us in the urban landscape. These birds provide an opportunity for people to appreciate and connect with wildlife on a daily basis. However, as we are becoming more urbanised, our bird communities are also changing and people are losing the experience of having a variety of birds living near them, making it harder to retain a connection to nature. Engaging with school kids and the wider community is necessary to reverse habitat loss in cities.

Birds in Schools is an inquiry-based curriculum resource that encourages Years 5 and 6 students to engage in the scientific process as citizen scientists by monitoring birds. With the guidance of BirdLife Australia staff and volunteers, their teachers and other project partners, students are able to collect data, analyse and interpret their observations. They then use the evidence collected to make management recommendations through an action plan, aiming to improve the bird diversity on their school grounds, and to educate and engage their local community about environmental issues. During 2015 & 2016, 18 schools across the Sydney Region participated in the program which culminated in the creation of bird-friendly schoolgrounds. During this presentation, we will hear from the students themselves about their experiences in the project to date. We discuss how the program builds the knowledge, skills and practical support for schools to develop action-oriented responses to the decline of bird diversity in the urban landscape.

Short-beaked echidnas are iconic native Australian mammals and one of only three egg laying mammals. Despite this, we know little about their distribution and genetic diversity. It is vital to obtain more information about echidna biology, numbers, and distribution to understand how they are affected by environmental changes. It is urgent to obtain such information as the well-studied Kangaroo Island echidna population has recently been listed as endangered. The Echidna Conservation Science Initiative – EchidnaCSI – is a new smartphone app-based citizen science project combining molecular biology, ecology, community engagement and education. EchidnaCSI encourages the public to take photos of wild echidnas to understand more about their distributions throughout Australia. The app also provides information and instructions about how to identify and send in echidna scats. From these scats we are currently establishing DNA and hormone extraction protocols to investigate diet, population genetic information as well as variation in breeding season and stress levels. EchidnaCSI was launched in September 2017 and achieved over 1000 downloads of the app within three weeks and more than 200 submissions of data, including both sightings and scats. We have already established reliable DNA extraction and amplification techniques to determine the sex of an echidna. We are currently optimising additional tests to analyse diet whilst generating robust protocols to analyse hormones involved in reproduction and stress. This project combines community engagement and molecular analysis to unlock fundamental biology of echidnas in Australia and will provide important information to inform policy and conservation regarding these enigmatic mammals.

In-depth Examination of Engagement in Citizen Science: Moving beyond Data Collection Measures

Tina Phillips, Heidi Ballard, and Rick Bonney

“Engagement in citizen science” is a ubiquitous term, but one that lacks context and meaning. This talk will describe the first phase of a NSF-funded collaborative research project aimed at understanding what engagement in citizen science looks like across six environmentally-based projects that span the contributory, collaborative, and co-created continuum. Through in-depth interviews with 72 participants from the six projects, we describe a framework for studying engagement that goes beyond simple output measures such as the amount of data collected, number of participants, retention rates, and other baseline measures of recruitment and outreach. The Dimensions of Engagement framework includes the following constructs related to engagement: affective, cognitive, social, motivational, and behavioral engagement. In addition to comparing how scientific activities differ across projects, we describe the main sources of learning, the role of emotions and feelings, and the potential for communities of practice in citizen science. Findings also provide evidence for the important role that motivation plays in potentially influencing all other dimensions, as well as understanding of key barriers to citizen science engagement. Finally, this research resulted in the development of the Participant Engagement Metric, an empirically grounded and easy to use metric to quantify and measure social and scientific practices related to citizen science engagement. Collectively, this work is intended to build on existing literature to create a more clearly defined framework that operationalizes citizen science engagement and provides a better understanding of the relationship between participant experiences and intended learning outcomes.

The Australian Citizen Science Conference 2018

Title:

The hidden power of citizen science: science literacy and what this means for our world

Authors:

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Australia

Presenter:

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Conference theme:

Showcasing science outcomes

Abstract

It is argued by many that civic science literacy is a necessity in the 21st century, not only for business and employment but for an informed citizenry able to understand and inform public policy issues. Every day governments, industries and citizens are confronted with daunting public policy issues such as energy generation and supply, the rapid growth of cities and urbanisation, human health and wellbeing, agriculture and food production, pollution and waste management, biodiversity loss and ecosystem management. We are regularly required to make decisions that will impact the wellbeing and sustainability of our own communities and of the world around us. It has been shown that civic science literacy is positively associated with support for basic scientific research and for the intellectual freedom needed for good science fundamental to good decision-making. Sadly it is also argued that no major industrialised nation on the world has a sufficient number of scientifically literate adults. Citizen science makes a critical contribution to improving the science literacy of communities, such as through generating a basic appreciation of the nature of how scientific evidence is generated and an ability to think critically about information and data. Citizen science demonstrates that science is a systematic way of thinking and building knowledge, is collaborative and is creative. It is the job of science to move us from an opinion-based view of the world to evidence-based understanding. Citizen science has a significant role to play in this important undertaking.

Using Citizen Science to predict the impacts of urbanisation on biodiversity.

Currently, half of the world's population live in urban places, but this is expected to increase to two thirds by 2050. Often an outcome of rapid urbanisation is a significant decline in biodiversity as landscapes are increasingly altered and become less natural. Adelaide, South Australia seems typical of many rapidly urbanising cities where an extra 500,000 people to be accommodated over the next 25 years - without substantially increasing the urban footprint. This project, using Adelaide as a case study is examining the fundamental relationship between urban development and biodiversity as a way of predicting the future impacts of various urban forms. Bird species distributions (a good biodiversity indicator) and other key environmental features across the region have been mapped to produce biodiversity models. These models help predict the impacts of future urban development scenarios on biodiversity, from which the tools being developed will inform governments, planners, developers and local communities.

Large amounts of data needed to be collected, so citizen scientists were recruited to conduct the various bird surveys needed. This type of research is as challenging as it is novel, requiring robust data collection methods, surveys over large areas for extensive periods, very careful design and extensive support from citizen scientists. The methods needed to run such complex citizen science projects are covered, including data design, quality and management approaches, the recruitment of appropriately skilled citizen scientists and the ongoing role that they can play in empowering their local communities.

James Plummer, PhD Candidate, University of South Australia

Em. Ass. Prof. David Bruce, University of South Australia

Dr. Philip Roetman, Research Fellow, Discovery Circle Citizen Science Lab, University of South Australia

Prof. John Boland, Professor of Environmental Mathematics, University of South Australia

Citizen Science in Urban Agriculture Research: Results from the Edible Gardens Project

Abstract (max 250 words - currently 231 words)

In an uncertain future of climate change and constrained resources, urban agriculture is widely viewed as a sustainable and scalable approach to improving food security. While community gardens are relatively well studied, research into the inputs and productivity of individual household food gardens presents profound practical challenges, notably the sheer number of geographically separated gardens, the enormous diversity of garden sizes and types, as well as highly variable cultivation methods. Water use, in particular, remains incredibly understudied; particularly the variety of water sources and irrigation methods utilised. In 2016 the Edible Gardens project, a South Australian citizen science project, was developed to investigate the inputs (labour, costs and water use), and outputs (produce yields and value) of urban food gardens. Previous research into urban agriculture has struggled to collect a wide range of input data when not using a citizen science approach. Citizen science has enabled a large cohort of gardeners to measure inputs and outputs, and report on a wide variety of production methods over an extended period of time. Here results from the Edible Gardens project are presented, in addition to the ways in which citizen science is an effective and practical approach for future urban agriculture research.

Acknowledgement

The presenting author acknowledges that they will register and attend CitSciOz18 if this abstract is accepted.

Combating antibiotic resistance requires a multimodal approach, spanning community, basic science, medical and veterinary practice. Public awareness is central for dealing with the problem of antibiotic resistance and its global effects on populations. We are using wildlife as a vehicle for conveying issues of antibiotic resistance to the public by involving citizens in fundamental science that addresses dissemination of resistance. Under the banner 'Scoop a Poop', citizens learn about resistance, how to identify and collect wildlife scat samples, and become familiar with the science used to investigate resistance. Participants (high school students) collect possum scats from urban backyards using the specially designed 'scoop a poop' kit. The citizen scat samples are then analysed by third year undergraduate students as part of a practicum, with the activity assessed through preparation of an infographic aimed at reporting results to citizen participants. The increased sampling intensity afforded by citizen participants enables us to assess the ecology and transmission of antibiotic resistance in a widespread species, the brushtail possum. Possums thrive in rural and remote areas, but have also adapted well to urban environments. They are therefore exposed to varying levels of contact with antibiotic resistance genes carried by humans and domesticated animals. Consequently, possums are a potential sentinel species for understanding dissemination of antibiotic resistance in the Australian environment. Addressing this issue at the ecosystem level through citizen participation will help direct decisions on where national efforts should be placed in combatting transmission of resistance between environmental compartments.

DigiVol Citizen Science poster

Profile the Australian Museum's innovative DigiVol project and communicate the project's key enablers, such as science and technology, education, community engagement and capacity building.

Citizen science offers opportunities to increase scientific literacy in the community, but also means that the same information may need to be conveyed in a number of ways to be understood by those participating in a project. The challenge for practitioners is to identify the needs of the community that they are working with, and develop appropriate communication materials. When Melbourne Water and EnviroDNA developed an environmental DNA marker for platypus, it was seen as an opportunity to involve the community in catchment management. Platypus are typically difficult to study due to their shy nature, but DNA present in the water allows researchers to determine platypus presence from a filtered water sample. The methods of collecting the sample are relatively straight-forward, but carrying out the methodology meticulously is essential to ensuring that samples are free from contamination. To address multiple methods of learning, we designed a three-stage training program; Youtube instructional video, in-field demonstration and step-by-step instruction sheet. Feedback from our pilot study was gathered by 3-point scale survey (n=14 respondents), finding that the in-field demonstration was most useful (93% highest rating), followed by step-by-step guide (46% highest rating) and Youtube film (36% highest rating). Other communication (via email, phone or facebook) was also highly rated as a part of the program, with 79% of respondents rating it as very helpful. Our results indicate that in a digital age, online resources can be an additional support tool for citizen scientists, but the value of face-to-face communication should not be underestimated.

River Detectives: young citizen scientists connecting with their local waterways

Engaging young people in our community and inspiring them to become future stewards of the environment can be achieved through citizen science. Programs that include hands-on, real life science activities can connect students to their local outdoor spaces. Participating in the collection of water quality data is one way that natural resource management organisations can support youth in connecting with their local waterways.

River Detectives is a school orientated citizen science program established by North Central Catchment Management Authority (CMA) as an education arm of the Waterwatch program. The program received funding in 2017 to run a multi-region Victorian pilot involving Corangamite CMA, North East CMA, Wimmera CMA and Melbourne Water regions. Through the pilot over 100 schools/groups, and 4000 students, had access to professional learning opportunities, water science and macroinvertebrate monitoring kits and an online platform for classroom resources and to record data. The pilot enabled collaboration between organisations and strengthened program delivery by facilitating the sharing of knowledge and resources back to participants.

The River Detectives pilot demonstrates how collaboration between agencies can increase the reach of a citizen science program and empower educators to connect the next generation of environmental stewards to their local waterway. The program ensures data collected by schools can be used interactively and is also accessible in the Waterwatch database. River Detectives has helped support teachers and leaders to achieve highly engaged students who are comfortable, connected and excited about improving their local river environment.

Melbourne Water Frog Census Citizen Science program
Richard Akers – Melbourne Water Corporation
Imran Qazi – Spatial Vision

The Melbourne Water Frog Census is a citizen science program that engages community volunteers to record frog calls and uses that information as an indicator of waterway health. Over 15 years the Frog Census had used tape recorders and later audio attachments in emails. The recently released Frog Census app now makes recording frog information quicker, easier and accessible to anyone with a smartphone in their pocket. The Frog Census app has removed a number of barriers to participation by volunteers, by simplifying the process of submitting each report. Time, geolocation and weather conditions are now automatically tagged to each report. This has led to a significant increase in the survey effort during the first spring breeding season.

Strategic communications and promotion to key demographics and areas broadened the audience of the program. A decrease in time between reporting and verification of reports has improved the feedback loop and encourages continued engagement in the Frog Census.

Administrative outcomes have included streamlining data management processes and a reduced cost in data verification per record. Quicker turnaround in verification provides more effective information for waterway management in Melbourne.

The Frog Census app was so successful that over 1,000 records were captured and verified in the first three months. This presentation will explain the approach taken to building, deploying and promoting the app and highlight the key successes.

In 1834 British anatomist Sir Richard Owen, founder of the British Natural History Museum, coiner of the term “dinosaur” and author of the first monotreme descriptions wrote that not all could be learned from dead specimens. He posed 7 questions, primarily relating to reproduction, that he believed could only be answered by direct observation of animals in the field. In 1865 he restated his questions as none had been answered or even addressed. An 8th question was added in 1881. It was, in fact, not until 1884 that Dr. William Haacke, acting director of the South Australian Museum, discovered that echidnas were an egg-laying mammal.

When we began echidna research on Kangaroo Island in 1988, one of the 8 questions had been definitively answered and 2 others partially addressed. Echidnas are secretive, cryptic, have no home dens, do not follow trails and cannot be reliably trapped. In order to tackle these age old questions along with new ones, it was necessary to recruit and train enthusiastic volunteers to first find elusive echidnas. Then using available technology, such as microchipping for long term positive ID, radio telemetry and later GPS mapping we began following and documenting foraging habits, home ranges, habitat use and reproductive biology. We have resolved the mysteries of how echidnas mate, how often females breed, growth of the young, age of sexual maturity and many more fascinating monotreme facts. This would not have been possible without citizen science assistance.

Workshop: The Gamification of Citizen Science

Andrew Robinson

CEO, QuestaGame

16 October, 2017

Science organisations around the world are working hard to get people to contribute useful data, but engaging people in this effort can be a challenge. Citizen science programs have generally targeted people who are already interested in science or who want to contribute to scientific projects. Digital technology can help engage people, but many people - even those who are interested in nature - are suffering from volunteer fatigue or simply not able to see the practical benefits of their contribution [1,2].

Gamification offers a way to engage a broader audience in citizen science projects and to increase the activity of the participants. More than that, gamification may be the best - and perhaps only - digital-human interface for addressing other aspects of citizen science technologies, such as emerging data quality issues [3], or a lack of virtual peer feedback mechanisms [4].

This workshop will take a deep dive into gamification - what it means for citizen science technology, how it's often misunderstood, how it can be used badly, how it can be used well. Indeed, it could be argued that without some form of gaming mechanics, digital citizen science technologies will fail to maximise community engagement and achieve value for investment.

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Artificial Intelligence and Citizen Science: Fears, Fascinations, Opportunities, Risks

Andrew Robinson^{1,2}, Paul Flemons^{3,4}, Erin Roger^{4,5}, Jessie Oliver^{4,6} and Andrew Tokmakoff⁷

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⁵ *NSW Office of Environment and Heritage*

⁶*Queensland University of Technology*

⁷*Terrestrial Ecosystem Research Network (TERN) University of Adelaide*

There's little doubt that Artificial Intelligence (AI) has the potential to radically transform our world. In fact, it's already doing so. In the field of citizen science, AI offers some extraordinary opportunities - from the instant visual recognition of flora and fauna to the discovery of exoplanets thousands of light years away. These same developments, however, also raise numerous questions about the impact AI will have on our relationship with science and the natural world. This plenary session will provide a summary of a recent workshop held on "AI, Biodiversity and Citizen Science," while seeking to clarify - even demystify - some of the latest developments in AI and how they might apply to citizen science as a whole. A panel of speakers will present examples of how AI is being implemented in specific projects, including applications of computer vision technology to identify species in photos from camera traps and mobile phones. The panel will discuss both the opportunities and risks of these sorts of implementations of AI - from the ability to process large data sets more quickly, to some of the ethical concerns related to data bias, or the disempowering of people to have agency over their data. The fact is, when it comes to assessing the impact of AI, there are still many unknowns. The plenary will include questions, answers and discussions about the fears and fascinations people have when it comes to AI and how it's impacting the practice of citizen science.

Creating a BioExpertise Economy: Learnings from QuestaGame's BioExpertise Engine

Andrew Robinson, Mallika Robinson, Priyank Tiwari, Elliot Osborne, David Haynes

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16 October, 2017

Australians produce - and share online - over 500,000 geocoded wildlife images each year [1]. Most of these images, however, are not identified to research-grade levels and therefore less useful to scientific research [2]. The lack of research-grade identifications also suggests the supply of taxonomic expertise is either lagging behind demand or that demand is not sufficient to generate supply [3].

A rise in the popularity of artificial intelligence-powered flora and fauna identification apps [4] along with researchers seeking higher quality data records [5] suggests that the demand for fast, accurate identifications not only exists but will increase.

QuestaGame's BioExpertise Engine (BEE) is designed to provide rapid and reliable identifications of floral and faunal sightings submitted as online images. BEE makes this result scalable by engaging an online community of amateur and professional scientists through the provision of a well-defined set of incentives. These incentives include such factors as expert scores, speed of response, double-blind peer review and end-user demand. This system of incentives is designed to make BEE a knowledge marketplace where participants are treated as knowledge workers with expertise to sell or to exchange.

The result is an ability to associate an economic value to each element of biodiversity expertise. These values could motivate participation from biodiversity knowledge communities (for example, water-watch groups or landcare groups) and engage with a broader audience, leading to greater public involvement - and faster, more accurate data results - in biodiversity citizen science projects.

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Good Game? How Gaming Mechanics Can Impact the Outcomes of Citizen Science Projects

David Haynes, Andrew Robinson, Mallika Robinson, Priyank Tiwari, Michelle Gordon

QuestaGame; Centre for Biodiversity Analysis, Australian National University; Department of Computer Science and Engineering, University of New South Wales

16 October, 2017

Roy et al (2012) and others [1,2,3] have described at least five possible risks for citizen science projects going forward: (a) excluding people, (b) financial costs, (c) mobile connectivity, (d) volunteer confusion and fatigue, and (e) increased centralisation. Could competitions and gaming mechanics reduce these risks when applied to biodiversity data collection?

Previous studies have lacked large competition modelling and applied gaming data sets [4]. But From 12-20 August, 2017, as part of National Science Week, QuestaGame held what may be Australia's largest ever bioblitz - a gamified competition called "the Great Australian Biodiversity Challenge." The event involved over 100 botanic gardens across Australia and in just 8 days generated 22,441 identifications and mapped 864 different taxa. From 23 September to 8 October, 2017, Parks Victoria used QuestaGame to run another bioblitz competition - the "Junior Rangers Spring BioQuest." The event took place in 15 national parks across Victoria, with 4234 identifications and 280 taxa mapped.

Both events yielded interesting results. For example, in the "Great Australian Biodiversity Challenge," a small botanic garden - the Lismore Rainforest Botanic Garden - outperformed the larger botanic gardens in Sydney and Melbourne, as well as larger organisations with deep taxonomic expertise, such as the Australian Museum. Similarly, in the "Junior Rangers Spring BioQuest," the top player, under 13 years old, scored ten times as many points as all the park rangers combined.

This presentation will look at the results of these competitions and consider how they might apply to each of the five risks mentioned above.

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Assessing and developing citizen science projects

Citizen science projects engage members of the public (citizen scientists) in scientific research in partnership with professional scientists. The citizen scientists make hands-on or intellectual contributions to the research, usually including data collection or analysis, with benefits for both the research and the citizen scientists. Examples in South Australia include the *Great Koala Count*, *Water Watch* and *Cat Tracker* projects. The interest in citizen science and the number of projects is growing locally, nationally and internationally. While there are many quality projects with excellent outcomes for research, education and community engagement, there are also projects that do not achieve their planned outcomes. We have been working on a standard process to assess and develop citizen science project ideas. This work began with a workshop to assess the value of citizen science projects for the Marine Parks Performance Program of the Department of Environment, Water and Natural Resources. For that workshop we developed and refined a project assessment template with three important elements. First, a program brief to describe the project, its aims, and how it aligns with departmental or program objectives. Second, an assessment of the desired outcomes. Third, an analysis of the management of the project, including elements such as costs, data management, communications, and temporal commitment. We will introduce the template and discuss its use for assessing existing projects and developing new projects.

The social impact of the Cat Tracker project

Domestic cats are one of the most popular pets worldwide and they play an important and much-cherished role in the lives of many South Australians. The *Cat Tracker* project was designed to help cat owners make informed decisions about the management of their pet cats. We conducted a social survey about cat ownership and tracked 428 cats in South Australia. We published the results online and then conducted an evaluation survey. The evaluation has demonstrated learning, attitude change and behaviour change. Many people involved in the project reported that the tracked cats travelled further than expected and that they were surprised by the locations, distances, dangers and routes revealed by the cat tracking. The initial survey and the evaluation survey enabled a pre/post comparison of attitudes to cat containment. Attitudes towards cat containment changed. There was an increase in people reporting that it was important to keep cats indoors both at night and during the day. Respondents to the evaluation survey also reported changing their behaviour towards cat management. The most common behaviour change was an increase in cat containment, either by keeping cats indoors for longer each day, or by keeping cats completely indoors. Respondents also reported that they would manage any future cats differently, often by keeping them indoors for longer each day. People who were directly involved in cat tracking were more likely to have changed their attitudes and behaviours, although people who answered surveys and observed the project also changed their attitudes and behaviours.

Practitioners and participants: same projects different perspectives

Creators of Citizen Science projects usually have a clear goal of what they want to achieve when they ask the public for their help in either collecting or analysing data. But how well have these goals been received by the participants who contribute? During this symposium we will hear two sides of the same project – thoughts from not only the practitioner, but also a heavily involved participant!

Four projects will be discussed, with the practitioner firstly describing how they envisioned the public uptake, interacting, communicating and contributing to their project. Following this, a participant who has contributed to the project will discuss their point of view: how they heard about the project, what their involvement has been, and what their experiences have been like.

Following the talks will be time for discussion with the audience, which will be a great opportunity to tease out any issues with public participation, effective communication strategies and increasing community awareness, with the input from the participants themselves.

Projects discussed will be:

EchidnaCSI – Tahlia Perry and Jackie Courtenay

Community Water Monitoring – Sylvia Clarke and Ron Kelertas

EP Birds – Ben Smith and Margaret Luscombe

Cat Tracker – Phil Roetman and Libby Boschen

Title: Understanding motivations and barriers to citizen science

Author: Erin Roger

Citizen science is growing rapidly in Australia and globally, and presents valuable opportunities to engage with the community and amplify scientific research. Despite the potential, there is a lack of information for practitioners in understanding peoples' motivations and barriers to participating in citizen science. Indeed, few studies have examined community understanding of the term citizen science in Australia and what factors influence participation in projects. Here, we describe a social research method to examine motivation in participation and include our findings from focus group research, an online survey and choice modelling. We found that the term citizen science is not widely understood, but once explained the concept is broadly appealing as a way for people to give back to their community or to society more broadly. Other motivations to participate in citizen science include a clear understanding of both time commitment and task(s) required of participants. Key barriers to participating in citizen science were identified such as science itself as well as a lack of awareness of what institutions undertake scientific research. Based on the research, we provide common elements required to build and sustain successful citizen science projects. When key elements of an appropriately designed citizen science project are met, citizen science can represent a mechanism to collect scientifically robust data and maintain ongoing community interest and participation.

Abstract title: Exploring the potential of citizen science approaches in public health

Preferred presentation type: Long talk (12 min talk + 3 min Q&A)

Relevant theme(s): Social research in citizen science, engaging citizens

Presenting author: Samantha Rowbotham

Authors: Samantha Rowbotham¹, Merryn McKinnon², Joan Leach², Rod Lamberts² & Penelope Hawe¹

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Abstract

Public health scientists, practitioners and policy makers face complex challenges that could benefit significantly from greater citizen engagement. For example, citizen science could provide access otherwise difficult to obtain data on the presence (or absence) of policies and programs that affect health (e.g. alcohol supply, cost of healthy food, access to recreational spaces), and new insights into public health problems and solutions. Engagement of citizens in public health science also brings the potential to increase public understanding of and engagement with policy making processes, and to mobilise public demand for policies and programs that benefit health. However, while citizen science has been utilised at the intersection between public health and environmental science, for example in monitoring air and water quality, such approaches are rare in others areas of public health. Within this presentation we will outline the potential opportunities and challenges of citizen science for public health, and discuss examples of emerging projects in this area. We will suggest that if we are to tackle the complex challenges that face public health then new avenues are needed to capture the energy and attention of the “by-standers” in public health (i.e. those that are not directly affected by particular health conditions). We will argue that the strength of engaging citizen scientists lies not simply in the amount of data they can generate, but in the creation of new actors and the elevation of diverse, new and outlying perspectives which may prove critical for addressing the complex problems faced in public health.

Biography of presenting author

Dr Samantha Rowbotham is a Research Fellow with the Menzies Centre for Health Policy, University of Sydney and the Australian Prevention Partnership Centre. She is currently involved in projects exploring how to improve communication about population health science.

Acknowledgement

I acknowledge that I intend on registering and attending CitSciOz18 if my abstract is accepted

Conserving species requires information. Data on where species occur, their population trends, and threats are all critical to understanding whether a species is safe or whether it needs conservation intervention. Globally there is currently a heavy bias towards birds and mammals in the amount of data available on species. This bias exists not only in citizen science, but also among scientists and policy makers. Consistently, the least represented taxonomic group in terms of both data and threatened species listings is invertebrates.

Among invertebrates, butterflies are a flagship taxa. People generally love butterflies, unlike more phobia-inducing groups like spiders, centipedes. They are heavily represented in mythology and art, and have a special place in the human psyche as symbols of change and fragile beauty. This represents an opportunity for science, and for citizen scientists, to help address the problem of invertebrate underrepresentation.

We are in the process of designing and building a national citizen science initiative to record data on butterflies. This project will be similar to existing projects such as eBird. We will be working with the Atlas of Living Australia to set up a database, website and phone app to allow citizen scientists to collect and enter moderated butterfly data that can be used by science to answer questions that we currently are unable to even ask due to lack of information.

This project represents an opportunity to raise the profile of invertebrates in Australia, and begin work which can secure the future of butterflies in this country.

Using the [Mental Modeler](#) tool for a complex environmental and social issue

Annette Scanlon, Philip Roetman, Steven Gray

Mental Modeler is a freely available bespoke software program used to capture individual and community knowledge in a standardised format, it enables model building and scenario analysis. We used this tool in community workshops across South Australia to harvest people's ideas and collective intelligence about a contentious environmental problem – little corellas. Little corellas are intelligent gregarious cockatoos loved by many people, but large flocks in urban and rural areas also cause considerable frustration. Common problems with little corellas include tree damage and defoliation, taking grain, and disturbing residents with loud vocalisations and mess. In our workshops with citizen scientists, Mental Modeler was used to facilitate discussion around the management of little corellas, and together we created a map of the associated components and their relationships. The process enabled participants to understand the complexity of little corella management. We found considerable variation in the terms used to describe the issues and explain to management actions. During the workshops, we recognised some convergence of opinion, with participants understanding the need for management of little corellas and accepting various management strategies. We developed a master model from the workshops and supplemented with other data, which is an easy-to-use predictive and educational tool for managers and the public.

New Visions in Citizen Science and Public Policy in Australia

Wednesday, February 18, 2018

8:30 AM - 12:00 PM

We invite you to join a conversation with a group of international citizen science policy experts to consider recent achievements and barriers that have been overcome across a range of scenarios and what impacts can be seen in management and public policy.

Citizen science projects range dizzyingly from classifying galaxies and collecting environmental data to collectively solving the structure of an AIDS-related enzyme through a protein-folding game. How can science and technology policy support citizen science initiatives such as these? How can the citizen science community build partnerships with all government agencies to leverage new approaches across multiple programs?

Contribute with us to a roundtable discussion to help identify and prioritise the opportunities and barriers to the adoption of citizen science for public policy implementation in Australia: What new technologies, like low cost sensors and big data, can support public participation in scientific research? How can projects ensure high-quality data collection and analysis? How might citizen science integrate new approaches like big data and how do we measure success?

Keynote: Sustainable Development Goals and Citizen Science

Alex Caldas, Chief of Technology Outreach, UNEP Environment Live, Nairobi (Video)

- **Martin Brocklehurst**, UK/EU, Founding member of the European Citizen Science Association (ECSA) Head of Policy Working Group for ECSA and core contact point with the EU and UNEP on Citizen Science. Instigator of the emerging Global Mosquito Alert Consortium working with the UNEP and CS teams around the world and the recent delegation to UNEP Nairobi Science/Business/Policy Forum
- **Lea Shanley**, co-Executive Director of the US South Big Data Innovation Hub, and co-founder and former co-Chair of the Federal Community of Practice on Crowdsourcing and Citizen Science (CCS), will discuss the origins and progress of the Federal CCS to advance policies and initiatives for government-supported citizen science, as well as opportunities for integration with Big Data and Earth observation approaches.
- **Amy Kaminski**, previously senior policy advisor in the office of the Chief Scientist at NASA, now program executive for prize competitions and challenges, working to facilitate NASA's uses of these open innovation techniques to bring new ideas for technologies and other solutions into NASA.

Converting eco-tourists to wildlife citizen scientist by sharing geotagged holiday snaps on social media.

Obelia Walker, Greg Simpson, and Dr David Newsome

Environmental and Conservation Sciences, Veterinary and Life Sciences, Murdoch University

In collaboration with our partners Borneo Eco Tours, BEST Society, and Universiti Malaysia Sabah, we are exploring the use of geotagged photographs shared on social media for wildlife monitoring. Our case study research regarding endangered Bornean Pygmy Elephant investigates the occurrence and movement of elephants in the Lower Kinabatangan Wildlife Sanctuary (LKWS) tourism zone, Sabah, Borneo. This pilot citizen science project has been promoted to guests and guides at Sukau Rainforest Lodge with the aim of establishing a database of elephant images using photographs taken during tours along the Kinabatangan River. Tourists and guides are encouraged to share geotagged elephant snaps (#PicMeElephant) and to comment about the wildlife experience via photo-sharing platform Flickr. During our 5 month pilot, more than 200 geotagged photos of Pygmy Elephants at approximately 20 locations along 50km of the LKW were shared in an open access database. This provides proof of concept that geotagged holiday snaps uploaded to social media by vacationing wildlife citizen scientists and knowledgeable guides can provide a low-cost effective approach for monitoring elephants at ecotourism destinations in the Central Indo-Pacific.

Honours student Obelia Walker is supervised by renowned nature-based tourism educator/researcher Dr Newsome and Mr Simpson, who conceived/led this project. With a focus on the Central Indo-Pacific, our research interests include sustainable tourism, citizen-science, and wildlife conservation and protection.

Estuary Guardians are the future custodians of the Peel-Harvey Estuary helping to look after local ecosystems through a range of projects in their classrooms, schools and communities. Estuary Guardians was established by staff and students from John Tonkin College in Mandurah and was launched at the student initiated Inaugural Dolphin Community Forum. The Forum brought together community groups and researchers who are monitoring the health of the local dolphin population or who have a vested interest in the long term protection of the estuary. By collaborating and meeting with the various environmental conservation organisations in the catchment there can be more powerful outcomes and messages regarding the health and sustainability of the Peel-Harvey Estuary. We act as an "umbrella" to these organisations without affecting the individual identities of each of them. With representatives from each organisation meeting together, sharing ideas and seeing where there are avenues to pitch in and help each other, we then have a greater chance of achieving objectives more effectively. The students in collaboration with Mandurah Dolphin Research Group (Murdoch University), Dolphin Rescue, and Mandurah Cruises have produced a Fin Guide of dolphins in the Mandurah Estuary to enable members of the community to identify and monitor the dolphins and report their behaviour to the research unit via customised apps.

Bush Ranger Cadet Environmental Education Program

By successfully implementing Bushranger Cadets into our schools we are leading change to implement Sustainability Education, one of three cross curriculum priorities of the Australian Curriculum. The knowledge being gained through environmental education and action learning in real world issues allows our students the opportunity to connect with the community and instigate change. The students participate as active citizens by undertaking cooperative action to protect and enhance their environment and be instrumental in building a sustainable future through school programs policies and processes.

Through capacity building skills we have forged links, relationships and partnerships with the local councils, University researchers, the Department of Biodiversity, Conservation and Attractions, Peel Harvey Catchment Council, Conservation Volunteers Australia (CVA), Australian Conservancy (ACC), *fishRecwest*, Keep Australia Beautiful (KAB), Estuary Guardians, Mandurah Heritage and Environment Group, Wastewise, amateur ornithologists and entomologists as well as Indigenous involvement and consultation with Indigenous Ranger Groups. These relationships increase the reliability of our monitoring data, create opportunities for cadets to work with scientists, and continue to showcase public education and our commitment to the environment and sustainability.

Financial support from Cadets WA, (Department of Local Government and Communities) allows participation of students; irrelevant of socioeconomic status and location; to participate in experiential learning and adventurous activities in the natural environment.

Citizen Science on a shoestring: The Eyre Peninsula goannas project

Ben Smith (presenter)¹, Greg Kerr²

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What do you get when you combine threatened goannas, a lack of data, a limited budget and the need to make sense of a rising number of anecdotal reports? An opportunity for innovative engagement.

Rosenberg's goanna (*Varanus rosenbergi*) were once common across southern Australia. However, their distribution is now limited to isolated populations in south west Western Australia, South Australia, Victoria, ACT and New South Wales.

Kangaroo Island is thought to be the species' last stronghold, although anecdotal evidence suggests that Eyre Peninsula may sustain a larger than expected mainland population, despite less than ten recorded in the Biological Database of South Australia prior to 2011 and their vulnerable classification.

With conservation methods such as 1080 fox baiting programs well established on Eyre Peninsula, this project aimed to gain a greater understanding of the distribution of these scavenger/predators, both inside and outside of National Parks.

The project team knew they wouldn't have the funding to launch the ultimate goanna monitoring project, but put their heads together to come up with innovative ideas to encourage community participation.

Two years later, their minor financial investment has paid off with over 1000 goanna sightings recorded through EPgoannas.com.au.

To date, community engagement has been a key component to the success of this project. The next step will involve finding a PhD student(s) to undertake a more detailed studies of this species and hopefully determine the size Eyre Peninsula's *V. rosenbergi* population, understanding breeding areas and determine factors that affect trophic interplay.

Ecosystem custodianship: a win for local habitat, volunteers and Lake Mac City

Margo Smith, Senior Sustainability Engagement Officer, Lake Macquarie City Council, Speers Point, NSW

Lake Macquarie City Council's Community Ecosystem Monitoring Program has been operating since 2010, and involves monitoring major ecosystems across the local government area. Each Spring and Autumn trained volunteers conduct field surveys across the City covering the 55 sites, at 18 month intervals. Results from the surveys are used to create Ecosystem Health Scorecards.

Under the program, Council trains and supports members of the local community to participate in field surveys to observe and report on the health of the City's major ecosystems, from woodland, rainforest and heath, to the coastal maritime grasslands. It gives participants an opportunity to contribute their expertise and enthusiasm for the science involved in environmental management including indicators for the condition of the natural environment.

Participants involved in the program have made observations of threatened and regionally significant species, changes to local environments, monitored the impact of severe weather events, bushfire regeneration, and human-use impacts, including illegal dumping. Observations made through the field surveys also identify emerging issues and provide opportunities for Council to improve the effectiveness of complementary management programs.

Community ecosystem monitoring assists the natural environment and everyone wins, through data collection, shared learning, skills building, socialising and the mental and physical health benefits of being outdoors. The program demonstrates the value of well-supported citizen science and to date more than 130 participants have been trained, with more than 230 ecosystem surveys completed across Lake Mac City.

Report cards can be viewed at lakemac.com.au

Biography

Margo has worked in local government for 15 years, predominantly in community engagement with a focus on the natural environment. Her passion is building networks and shared learning experiences. In her spare time she is actively involved in marine citizen science

Introducing Wild orchid Watch

Ben Sparrow, Robert Lawrence, Andrew Tokmakoff, Sally O'Neill.

Wild Orchid Watch is a citizen science project recently supported by the federal government Department of Industry, Innovation and Science. The project will have three major components. The first is to create tooling for citizen scientists to collect information on orchid species, their distribution and habitat. This will involve the creation of a mobile phone app, supporting cloud based database and web interface for the project and will likely incorporate machine learning and interactive keys to assist with identification along with the ability to submit photographs to crowd-source identification. The second component incorporates an engagement program to include information that orchid researchers consider valuable and to engage and train interested amateurs (Natural history and orchid societies) and the public, and will incorporate a training component. The last component is to conduct research on the changes in orchid distribution and abundance and to use that information to infer responses to climate change and likely environmental impacts.

Developing Citizen Science Apps for Conservation Biology: Koala Counter and EchidnaCSI

Alan Stenhouse¹, Philip Roetman², Frank Grutzner³, Tahlia Perry³, Lian Pin Koh¹

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Affiliations: Environment Institute, School of Biological Sciences, University of Adelaide, Australia

Discovery Circle, University of South Australia, Australia

Field data collection by Citizen Scientists has been hugely assisted by the rapid development and spread of smart phones as well as apps that make use of the integrated technologies contained in these devices. I will describe some of the experiences (both good and bad) that we have experienced in collaborative development of two Citizen Science apps for Conservation. First is the Koala Counter app used in the Great Koala Count 2 – a two-day Blitz-style population census. Second is the EchidnaCSI app – an observational tool for collecting sightings and samples of echidna. From a developer's perspective, I will provide details on multi-platform app development as well as collaboration and integration with the national biodiversity repository – the Atlas of Living Australia. Preliminary results regarding user engagement and device differences will be presented along with lessons learned and paths for future research.

What is DigiVol and what are institutions around the world using it for.

Many museums and institutions around the world hold scientifically important objects. These important objects include specimen labels, notebooks and diaries, recording sheets, registers and photographs. Not all of these objects have a digital record attached to them and therefore are not accessible without visiting the institution itself.

DigiVol.org, a crowdsourcing citizen science initiative run by the Australian Museum's Centre for Citizen Science in collaboration with the Atlas of Living Australia, is helping to make these objects available to people around the world with the help of citizen scientists.

DigiVol enables institutions around the world to upload their images and engage citizen scientists in extracting data and information from images for researchers to use in their studies.

Citizen scientists on DigiVol say they feel that it is a rewarding experience knowing that the information they capture becomes accessible to scientists, conservation agencies and government departments who can then work together to better understand, manage and conserve biodiversity. It is also an important resource for online citizen scientists wanting to volunteer from home. It provides a place for not only people with physical disabilities (unable to travel) but also for full time workers to contribute to scientific data collection. *'Great way to volunteer from home and in your own time' – DigiVol volunteer*

This talk will demonstrate how more than 30 institutions around the world are using DigiVol and its community of citizen scientists and how others can get involved.

The role of citizen science in Australian threatened species recovery: current programmes and practices.

Long Talks (15 minutes: 12-minute talk + 3-minute Q&A)

Communication & promotion

Data management & sharing

Showcasing science outcomes

Dr Rochelle Steven, Postdoctoral Researcher

School of Biological Sciences, University of Queensland

Professional researchers do not have the capacity and resources to adequately monitor all threatened species in Australia. Thus, the effectiveness of recovery efforts to stem population declines cannot be evaluated or measured accurately for all species. Citizen science is increasing in popularity to act as both a tool for deeper engagement with science, nature and conservation, while also alleviating the burden of collecting data about a species or recovery actions in its habitat. Despite the clear potential of citizen science to play a key role in reversing the concerning trends in biodiversity loss, and demonstrated benefits to environmental awareness, it remains unclear what attributes make a citizen science programme effective for delivering threatened species recovery. We will present a review of citizen science programmes that assist in threatened species recovery and are administered by a broad range of stakeholders and governmental and non-governmental organisations. By using a mixed-methods approach, our findings give a cross sectional analysis of the role of citizen science in conservation and build a best practice framework for optimising the capacity of future citizen science programmes to achieve their objectives and deliver benefits for threatened species.

Bio: Rochelle's current research examines the role and potential for citizen science to assist in threatened species recovery. She has a special interest in bird conservation and improving the ability for urban environments to support diverse bird communities.

I acknowledge my intention to register and attend the CitSciOz18 Conference should my abstract be accepted.

Using citizen science to monitor the recovery of Warrumbungle National Park

Presenter: Patrick Tegart, Office of Environment and Heritage

Collaborators: Office of Environment and Heritage – Erin Roger, Gillian Dunkerley, Hugh Jones, Peter Serov and Louise Goggin; National Parks and Wildlife Service - Craig Wall, May Fleming; Warrumbungle National Park Environmental Education Centre – Wes Leedham

In 2013, the Warrumbungle National Park (NSW) was devastated by two natural disasters. The first was an intense fire that burnt 90% of the park. This was followed by intense rainfall, which led to large sections of the park eroding (due to lost vegetation), causing sedimentation of the streams.

As part of the park recovery management plan, the NSW Office of Environment and Heritage, National Parks and Wildlife Service and other collaborators implemented three projects. These projects focussed on bird diversity, stream health and vegetation regrowth (photopoints). Through mixed promotion and participation, these projects involve the local community, schools and park visitors, while embedding ongoing citizen science to monitor and provide valuable information on how the national park is recovering.

Since the first project started in 2014, over 200 individuals have contributed valuable data. The collected data has highlighted the following; 1) the seven bird surveys - run in autumn and spring each year - have observed the bird community in the burnt areas have become more like the bird community in the unburnt areas 2) six water quality surveys and macroinvertebrate counts have indicated stream health is improving and 3) vegetation regrowth has been monitored via the contribution of 157 photopoint images. The popularity of the program has led to a third photopoint stand being installed.

Current results have provided insight into park recovery, key management implications and successful mechanisms to involve participants in citizen science.

The Threatened Bird Network – Engaging the Community in Threatened Bird Conservation and Citizen Science

Janelle Thomas¹ and Caroline Wilson¹

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The Threatened Bird Network is a unique national program aimed at saving Australia's threatened birds through community engagement, citizen science and direct recovery management. The network provides a link between volunteers and threatened bird conservation projects around Australia, by advertising and promoting project volunteer opportunities. Since establishing in 1996, the Threatened Bird Network has contributed thousands of hours in citizen science support to a diverse range of threatened bird projects, through its network of over 13,000 volunteers. The Threatened Bird Network currently assists over 30 threatened bird conservation projects ranging from Finch surveys in northern Australia, supplementary feeding and radiotracking for critically endangered honeyeaters in south eastern Australia, to surveys for cryptic wetland birds in remote regions of Australia. With an extensive network of project partners and volunteers, the Threatened Bird Network plays an important role in engaging the community in citizen science, to provide vital data to these bird conservation projects. Volunteers are spread across the country, are of all ages and come from many different backgrounds. They undertake a wide range of activities such as surveys, nest monitoring, radiotracking and genetic research. Training workshops and materials provided by the Threatened Bird Network assist in building the skills and knowledge for these volunteers contributing to citizen science projects.

Key Words

Threatened bird, citizen science, conservation

Photopoints for monitoring environmental condition

Photopoints are a well-accepted approach within the ecological community to capture landscape and vegetation condition information through time. Photopoints have also been adopted by citizen science practitioners as a way to involve the public in observing and monitoring environmental change. A photopoint is a marked location where photographs are taken and collected. Influences such as introduced species, erosion, over-grazing and exceptional climatic conditions (e.g. drought, flood, fire) can be observed. However, to date, the information available from photopoints has tended to be assessed qualitatively, with change typically represented by a visual contrast between images. In addition, a significant challenge with the use of photopoints for monitoring environmental condition is the regular collection, management and analysis of photopoint images.

Here we describe the development of protocols that when followed will derive images that can be used for quantitative condition assessment. We also describe a collaborative process for developing infrastructure for the collection of photopoints by landholders who are active stewards of their land. We provide a managed mechanism for landholders to generate images at photopoints, thereby providing a wide-ranging and steady supply of images for condition assessment. We also provide context of our activities, outline the approach we are taking to engage landholders to become data collectors for condition assessment and provide an overview of the science and engineering which processes the collected images. Our approach to developing landholder photopoint protocols can serve as a model to make better use of photopoint imagery to deliver robust citizen science projects of scientific and societal benefit.

Gamification in Wild Orchid Watch

Presentation format: 6 Minute Speed Talk

Authors: Andrew Tokmakoff, Robert Lawrence, Ben Sparrow.

Gamification involves bringing the fun and compelling aspects of games to non-gaming applications such as citizen science. Mechanisms such as teams, points, tasks, missions, leaderboards and badges are known to be effective in motivating Citizen Science participants, improving the amount of data submitted, and also the quality of that data. In order for Citizen Science projects to provide scientists with the data they need to progress their work, such projects need to have a user-base which is sustainable, beyond the first “big bang” of project launch. Over time, participants can be expected to join, participate and eventually either leave or become inactive. In this submission, we outline the set of gamification mechanisms we intend to make use of in the Wild Orchid Watch Citizen Science project, explaining why we will use them and how. Gamification in Citizen Science offers a path to improved engagement and data quality outcomes, and is therefore of broad relevance to the Citizen Science community.

In order to explain the behavior of a group of Trans-Neptunian Objects, a new planet, Planet IX, has been proposed. Planet 9 is calculated to be between 4 and 10 Earth masses and between 200 and 800 AU away. However, based on previous all-sky searches, if it exists, it mostly exists in a narrow window towards the galactic plane. SkyMapper is an automated telescope surveying the sky repeatedly and has covered the area Planet IX may exist. However to search through all of this data would require an entire PhD thesis.

As part of BBC Stargazing Live, we ran a citizen science search to find this potential new planet. BBC Stargazing Live saw 16.1 million people tune in and process over 100,000 images, providing over 4 million classifications in 2.5 days. I will give an update and overview on the search, from our novel strategy to results, which include the discoveries of new solar system bodies.

Title: The importance of conservation ethic and commitment to science in the retention of citizen scientists.

Presentation type: Speed talk

Relevant themes: Engaging citizens; Social research in citizen science

Presenting author: Rustem Upton

Authors: Rustem Upton¹, Ruth Lawrence¹, Janelle Thomas², and Caroline Wilson²

Affiliations: ¹ Department of Outdoor and Environmental Education, La Trobe University, Bendigo, Victoria; ² Threatened Bird Network, BirdLife Australia

Abstract

Understanding what factors motivate participation in citizen science programs is crucial to the retention of participants and the ongoing success or viability of a program. Additionally, the motivations that drive initial participation may differ to the motivations that drive ongoing commitment. Citizen science programs therefore, may need to contain multiple dimensions that initially attract participants, and then maintain their interest, enthusiasm and needs sufficiently for them to continue their participation. The aim of our study was to identify key factors that motivate environmental volunteers to maintain their ongoing participation with citizen science projects. A questionnaire completed by 387 participants of citizen science projects related to bird conservation in Australia was collected and analysed using factor analysis. The desire to contribute to conservation and science and the enjoyment and interest in nature and the outdoors were the strongest retention factors discerned and were independent of demographics or length of time of association with a project. These findings indicate that a concern for, an enjoyment of, and an interest in, nature and conservation are the dominant drivers of citizen science participation, regardless of the amount of time a participant has spent with a project. The implications from this study is that different participant management strategies may be necessary for differing forms of environmental volunteerism, and that it is paramount for citizen science projects to maintain strong conservation goals, strive for meaningful conservation outcomes, and facilitate a strong connection between project participants and the natural places and biota.

Presenter biography

Rustem is a freelance environmental educator who has worked and studied in the environmental sector for over twenty years. His presentation is drawn from research undertaken during his Bachelor of Arts (Nature Tourism) Honours studies completed in 2016.

I intend on registering and attending CitSciOz18 if this abstract is accepted.

In the European Citclops project (Citizens observatories for coast and ocean optical monitoring, 2012-2015) new tools have been developed to involve citizens in the monitoring of natural waters. The colour of water was identified as a simple property that can be measured quantitatively via an App in smartphones (www.eyeonwater.org). This tool measures the spectral distribution of water reflection (hue angle and FU scale) in a way that is fully compliant with colour retrieval by in-situ scientific instrumentation and satellite sensors. Proof of concept, laboratory tests, validation in field campaigns and quality control procedures have been published in peer-reviewed journals to foster confidence in the quality of these data. The collection of colour observations is now fully operational (www.eyeonwater.org) and open to the public and scientists.

In this presentation we will present the basic building blocks of this App and website and highlight some essential steps in the data collection and processing. For quality control, these steps include the in-App protocols to collect suitable images, validation in the server and community control of unreliable data. For water managers these steps include the demonstration of compatibility to state-of-the-art in-situ measurements and data storage according to international standards. Finally, we present a proof-of-concept study how these low-cost tools can complement remote sensing measurements and fill observational gaps in the Ebro Delta, an important region for tourism and aquaculture in Spain.

The Eye-on-Water App is adopted by CSIRO as basis for citizen data collection of inland and coastal waters in and around Australia.

University campuses have considerable potential to provide a range of valuable learning spaces. The Monash University Clayton Campus supports a diversity of native biota, water-bodies, and gardens with rare plant species. These habitats are key learning resources for people interested in the natural environment, with opportunities for long-term and in-depth monitoring. While information about those outdoor learning spaces and their resident species exists in internal and external databases, it is not provided in an efficient, regularly-updated at-hand tool. Further, although environmental studies are common on campus, students are not always able to accurately locate or identify their study species, resulting in misidentification and/or the loss of data.

MonEco is a spatial biodiversity guide that centralises internal and external information, allows users to discover sites of biodiversity interest, locate and identify local and migratory species and report their sightings. New data are collected during teaching activities, during research projects and on-campus training and monitoring. The underlying aims of MonEco are to improve users' learning experiences, enhance their identification skills and enable them to become more effective citizen scientists.

MonEco engages staff and students in valuable outdoor learning activities; facilitates students' transition from University to employment via enhancement of employability skills; allows primary and secondary students to participate in biodiversity monitoring; provides a framework for interdisciplinary collaboration for education, increase botanical and zoological awareness and generates a sense of connection to the on-campus environment by staff, students and the broader community.

Title:

Mines over matter: Citizen science and air pollution in rural NSW

Author Details

Amelie Vanderstock, Tanya Latty, Dieter Hochuli, Leard Forest Research Node

Author Bio

Amelie Vanderstock is a Phd candidate at Sydney University and key member of the Leard Forest Research Node. She uses participatory methods to study insect and community resilience. Amelie is passionate about participatory science as a tool for environmental justice.

Abstract:

Air pollution is a growing rural issue. The rapid expansion of coalmines in agricultural regions is increasing particulate matter (PM) pollution from coal dust. Long-term monitoring programs that are ecologically relevant and sensitive to concerns of local communities are necessary. We founded the 'Leard Forest Research Node' (LFRN) to foster ongoing environmental data collection and capacity building with the Maules Creek Community, NW-NSW. The local community had an interest in citizen science, however lacked the capacity to initiate monitoring before connecting with the LFRN. This community became invaluable in data collection, field instrument design and site selection in collaboration with university honours research. Urban-rural collaboration and learning between Sydney residents/students and farmers was cultivated through regular fieldwork. Using this citizen science approach, we quantified particulate matter deposition using both standard dust gauges and tomato plants *Lycopersicon esculentum* as phytometers. Foliar particulate deposition significantly increased with proximity to the Maules Creek Coalmine. Inconsistent patterns and higher rates of dust deposition in gauges compared with plants, confirm that standard gauges cannot be used as proxies for foliar particulate deposition. Rather, a combination of sampling methods is necessary to inform studies of the ecological effects of particulate matter. These findings prompted the announcement of a regional air pollution monitoring scheme by the NSW Environmental Protection Authority. The LFRN model is applicable to other agricultural regions. We demonstrate how local environmental concerns can instigate citizen science to empower rural communities, create access to farmer- scientist collaborations, and deliver strong scientific outcomes with management implications.

FeralScan community-based invasive species monitoring - Lessons learnt from landholder co-design and future directions

Peter West

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Community-based pest surveillance technologies have evolved substantially in recent years. Mobile Apps offer untapped opportunities to improve community-based data collection, as well as provide greater support to communities and landholders with pest and weed management. As technology and community involvement increases, arrangements for utilising data become more crucial to enabling effective management interventions.

The FeralScan community pest animal web-mapping program (www.feralscan.org.au) with free mobile Apps, now contains over 100,000 community records of pest animals, their impacts, local control actions and photographs supplied by over 25,000 Australians. The Program is currently being used by landholders, Landcare groups, pest control groups, private contractors, local governments, regional land managers, researchers and biosecurity authorities.

FeralScan offers an interactive service for landholders and communities to support community surveillance of pests, and to connect landholders to online resources and support. Community groups benefit from using the program to collectively document pest problems, map control activities, track changes in their local area, and access support.

FeralScan pest surveillance data now offers biosecurity authorities and farming networks with the capacity to respond quickly to pest problems. It is being used to alert biosecurity authorities to changes in pest activity, such as new incursions of high risk species, expansion in the range of an established species, and significant incidents.

Lessons learnt from co-design with farmers, landholder groups and stakeholders will be discussed. Future directions for biosecurity, invasive species detections, biocontrol surveillance, and improved community support will be presented.

The public as a partner in enhancing mosquito surveillance networks to protect public health

Craig Williams¹, Brian L. Montgomery², Phil Rocha², and Cameron Webb³

¹University of South Australia, School of Pharmacy and Medical Sciences

²Metro South Public Health Unit, Queensland Health

³Medical Entomology, Marie Bashir Institute of Infectious Diseases and Biosecurity, University of Sydney

Mosquito-borne diseases are pervasive public health concerns on a global scale. Strategic management of risk requires well-designed surveillance programs, typically coordinated by local health authorities, for both endemic and exotic mosquitoes as well as the pathogens that they may transmit. There is great potential to utilise citizen science to expand the reach of current surveillance programs, particularly those centred on urban areas. There is increasing focus internationally on the role of citizen science in mosquito surveillance as evidenced by the establishment of the 'Global Mosquito Alert' project driven by multiple international stakeholders and citizen science associations. In Australia, new initiatives to engage the public in mosquito surveillance are emerging in multiple centres; utilizing a range of emerging field and laboratory technologies that remove previously existing barriers to community involvement. In South Australia, citizen science entomology programs have been trialled, and mosquito trapping and identification technology to expand existing trapping networks has been assessed. In suburban South-East Queensland, Zika Mozzie Seeker is linking citizen scientists into a network by using new laboratory techniques to rapidly screen for *Ae. aegypti* RNA in large numbers of eggs collected from DIY ovitraps,. In NSW, citizen science is being used to promote biodiversity and delineate pest and non-pest activity of mosquitoes associated with urban wetlands and surrounding suburbs. Citizen science holds great potential for public engagement activities as well as serving to enhance existing surveillance operations.

Unleashing the potential of citizen science in environmental science for NSW

Kate Wilson, Jo White, Erin Roger

The NSW Government through the Office of Environment and Heritage (OEH) has recognised the potential contribution of citizen scientists to improving environmental outcomes for NSW. Citizen science can achieve two major objectives for government: it expands the potential for information collection, analysis and curation; and it engages and motivates the community who become involved.

In 2016 OEH made a firm commitment to citizen science, and released a three-year Citizen Science Strategy. The vision is to “Drive a new era of public participation in science by developing collaborative projects that support decision-making and are engaging for the public”. The emphasis on a real contribution by citizen science to decision-making is a critical and distinguishing part of this vision. To support this, OEH has a position statement defining the standards adhered to by OEH citizen science projects. The standards ensure the products are sound and defensible with robust conclusions. Citizens’ contributions are utilised to deliver scientifically rigorous data which are being used to support decision-making and increase public trust in the government.

Two examples where citizens are contributing data that is being used are: the container deposit scheme, where citizen scientists are establishing a baseline to monitor the scheme’s impact long-term, and the Quollidior project which has involved 300 people processing over 60,000 images. This information is informing management actions for the quoll through improved knowledge of local population size and seasonal trends. This talk will elaborate on the ways in which OEH is using citizen science to enhance decision-making in NSW.

I spy.....Using a Community Surveillance Tool to Inform Decision Makers of Threats to Australian Agricultural & Horticultural Industries

Dominie Wright, Nichole Hammond, Laura Fagan and Rosalie McCauley

Department of Primary Industries and Regional Development

3 Baron-Hay Court, South Perth WA 6151.

Citizen science campaigns are popular across a wide range of industries including agriculture, fisheries and ecology to name a few.

To encourage community surveillance the Department of Primary Industries and Regional Development (DPIRD) developed the MyPestGuide™ (MPG) family of apps. The MPG family contains four field guides to identify insects, cereal diseases, grape diseases and a reporting tool. MyPestGuide™ Reporter lets people record up to four photos, with GPS coordinates, add comment on what they are looking at and sends their observations to DPIRD. Participants receive an email response from a DPIRD expert telling them what the pest is and how to manage it, if needed. This information is kept in a searchable database.

Through the use of apps, DPIRD has been able to react quickly to the reporting of new pests such as citrus gall wasp or declared weeds, preventing the establishment and spread of exotic pests. MPG™ has also been successfully used during several incidents including absence reporting for Russian Wheat Aphid in WA (2016), Queensland fruit fly (2015/16), Cucumber Green Mottle Mosaic Virus (2016) and for Tomato Potato Psyllid (2017), garnering critical decision-making information from the community. The reporting tool has provided a mechanism that allows decision makers to engage with the wider community and actively encourages passive surveillance across Australia to occur.

We will discuss the pros and cons of using a community surveillance tool and how it helps protect Australian agricultural industries.